

# Moxa Managed Switch MRX (v2.x) Command Line Interface

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[www.moxa.com/products](http://www.moxa.com/products)

**Models covered by this user manual:**

MRX-G4064-L3-8XGS Series Managed Ethernet Switches

MRX-Q4064-L3-16XGS Series Managed Ethernet Switches



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# Moxa Managed Switch MRX (v2.x) Command Line Interface

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# 1. About This Manual

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This chapter describes how to use the command line to configure Moxa's managed Ethernet switches. Besides the web interface configuration, the command line interface helps system administrators easily and quickly manage, monitor, and configure Moxa's managed Ethernet switch.

## 2. Understanding the Command Line Interface

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This chapter helps users understand the command line interface, and demonstrates a general idea on the command line operation.

### Accessing the Switch

Users can connect to the switch using one of two methods: by console or by Telnet.

### Logging in using the RS-232 Console

The Moxa managed switch features an RJ45 serial console port to allow users to connect to the switch and configure settings.

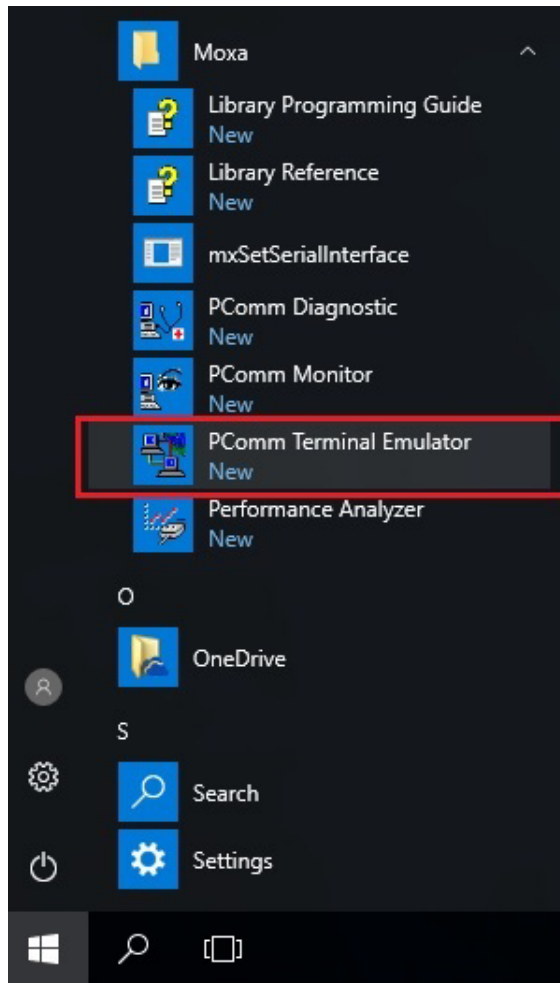


#### NOTE

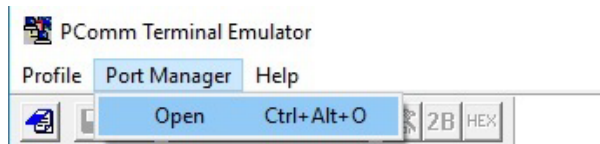
Moxa recommends using PComm Terminal Emulator for serial communication. This software is available for free on the Moxa website. You can use other serial communication software, but the following instructions may be different.

1. Use the RS-232 serial cable with RJ45 interface.
2. Connect the RJ45 interface end to the console port on the switch, and the other end to the computer.
3. Download the **PComm Terminal Emulator** from the Moxa website and install the software.

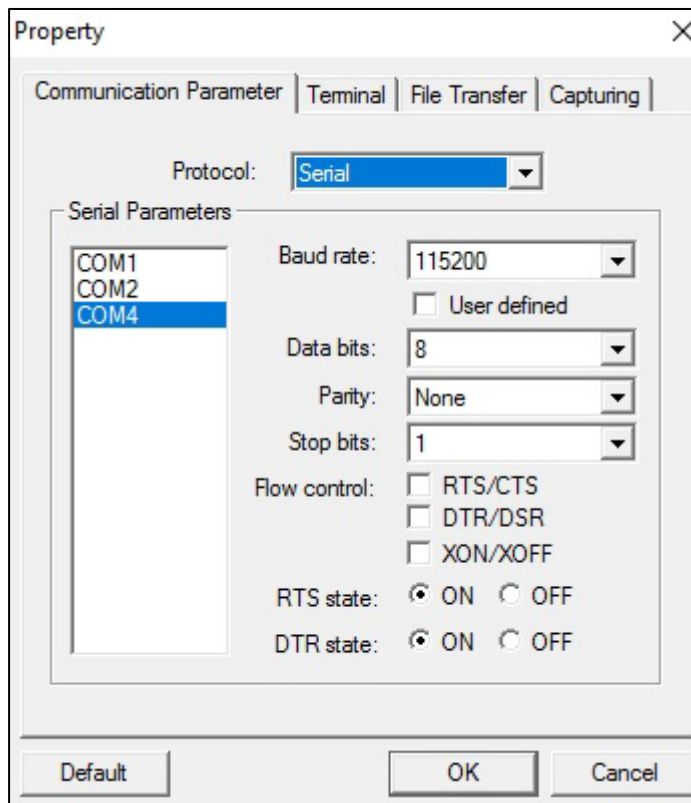
4. In Windows, click **Start > Moxa > PComm Terminal Emulator**.



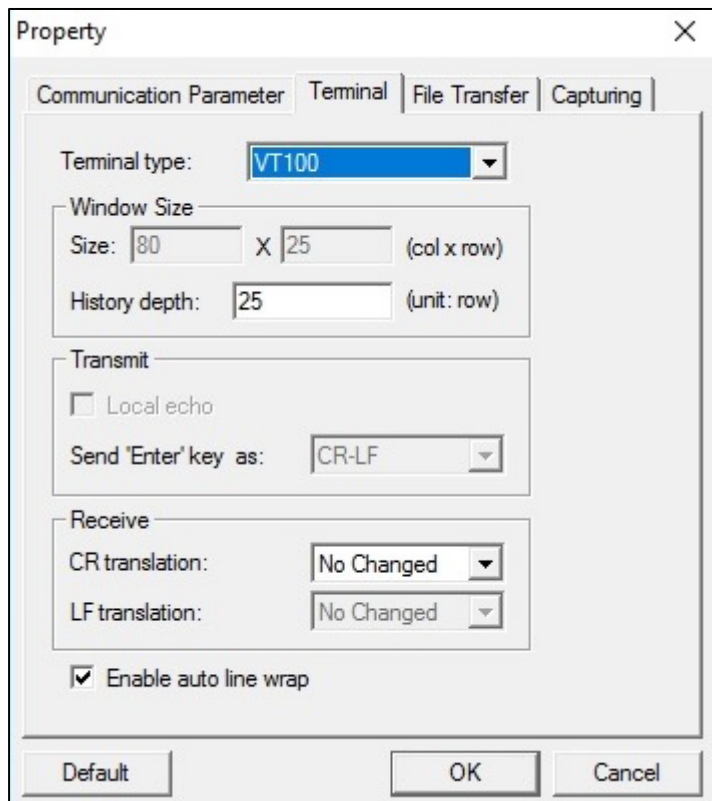
5. Click **Port Manager > Open** to establish a new connection.  
The Property window will appear.



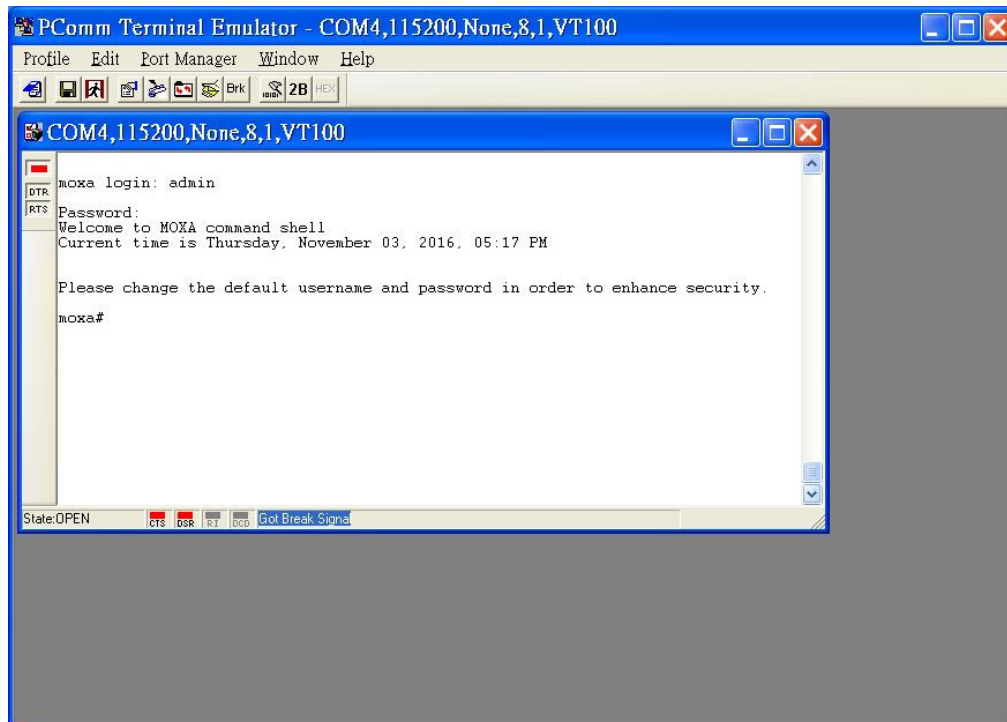
- On the **Communication Parameter** tab, select the COM port that will be used for the console connection. Configure the fields as follows: **115200** for **Baud rate**, **8** for **Data bits**, **None** for **Parity**, and **1** for **Stop bits**.



- On the **Terminal** tab, select **VT100** as the **Terminal Type**, and click **OK** to continue.



- Log in to the console using the default login name **admin** and password **moxa**. This password will be required to access any of the consoles (web, serial, Telnet).



- When successfully connected to the switch, you can start configuring the switch parameters by using command line instructions.



## NOTE

By default, the password assigned to the Moxa switch is **moxa**. We recommended changing the default password after logging in for the first time to help keep your system secure.

## Logging in using Telnet

Opening the Moxa switch's Telnet or web console over a network requires that the PC host and Moxa switch are on the same logical subnet. You may need to change your PC host's IP address and subnet mask. By default, the Moxa switch's IP address is **192.168.127.253** and the subnet mask is **255.255.255.0**. Your PC's IP address must be configured with an IP of the form 192.168.127.xxx and a subnet mask of 255.255.255.0.



## NOTE

When connecting to the Moxa switch through Telnet or the web console, first connect one of the Moxa switch's Ethernet ports to your Ethernet LAN, or directly to your PC's Ethernet port. You may use either a straight-through or cross-over Ethernet cable.



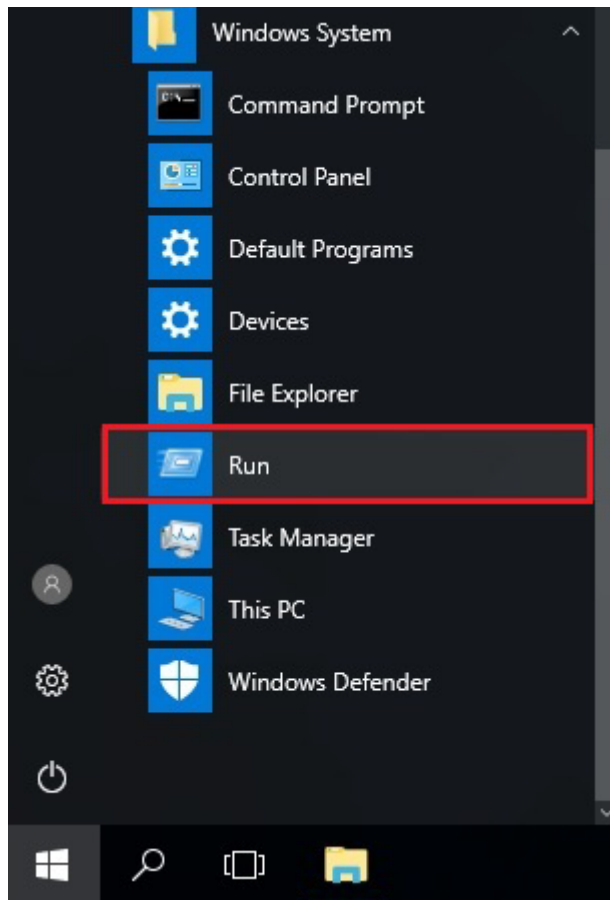
## NOTE

The Moxa switch's default IP address is 192.168.127.253 with subnet mask of 255.255.255.0.

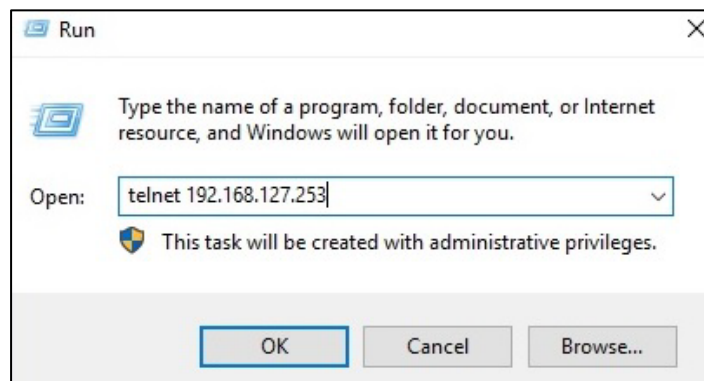
The default IP address for OOBM (MGMT port) is 192.168.126.253 with a default subnet mask of 255.255.255.0

After making sure that the Moxa switch is connected to the same LAN and logical subnet as your PC, open the Moxa switch's Telnet console as follows:

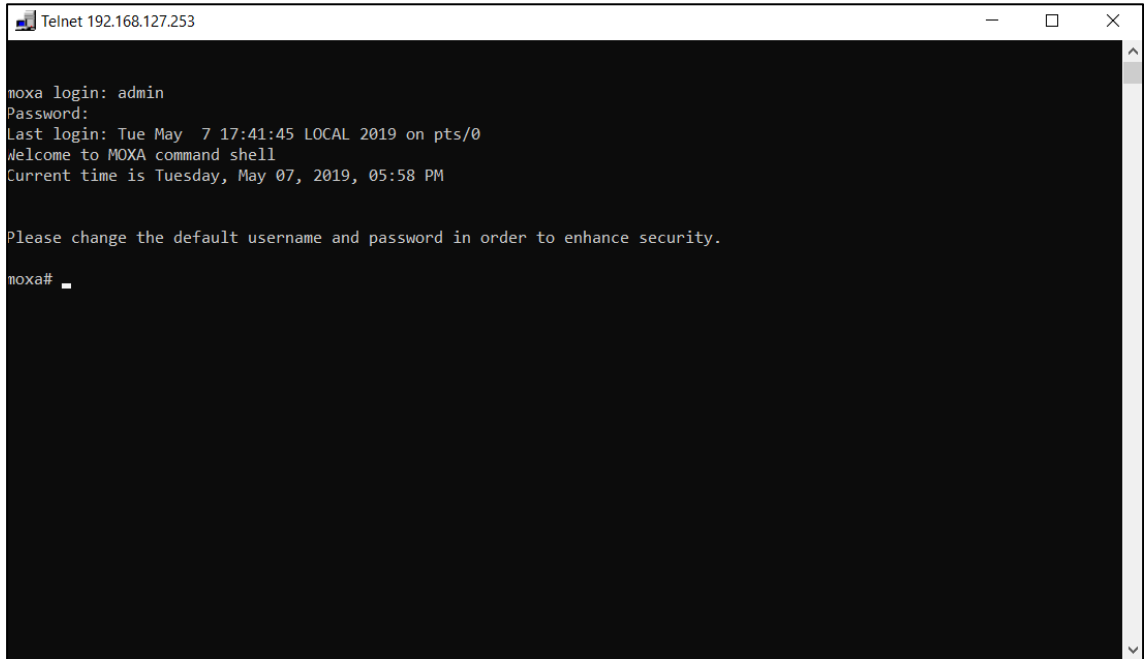
10. In Windows, click **Start > Run**.



11. In the Windows Run window, enter **telnet** followed by the Moxa switch's IP address (192.168.127.253). You can also issue the Telnet command from a DOS prompt.



12. Log in to the Telnet console using the default login name **admin** and password **moxa**. This password will be required to access any of the consoles (web, serial, Telnet).



```
Telnet 192.168.127.253
moxa login: admin
Password:
Last login: Tue May  7 17:41:45 LOCAL 2019 on pts/0
Welcome to MOXA command shell
Current time is Tuesday, May 07, 2019, 05:58 PM

Please change the default username and password in order to enhance security.

moxa#
```

13. When successfully connected to the switch, you can start configuring the switch parameters by using command line instructions.



## NOTE

By default, the password assigned to the Moxa switch is moxa. We recommended changing the default password after logging in for the first time to help keep your system secure.

# Command Modes

## Basic Configuration

The CLI (Command Line Interface) for Moxa's Managed switches can be accessed through either the serial console or the Telnet console. For either type of connection, access to the CLI is generally referred to as an EXEC session.

The CLI is organized using different configuration levels. When you first enter the CLI, type "?" to view a list of basic commands and a description of each function. Type any of the commands shown on the screen to access the next configuration level. The help panel can be accessed from any configuration level by typing "?". The switch will show all the commands for the current configuration mode.

```
moxa# ?
clear          Clear the specified parameters
cli           Configure the CLI display parameters
configure     Enter configuration mode
copy         Perform copy operation
end          Exit to the privileged Exec (#) mode
exit        Exit the session
help       Display help for the command
locator   Activate device locator so that the LED on the
          device blinks
logout    Terminate the session
ping     Ping a target to check its status
relay   Relay related command
reload  Halt and perform a warm restart
show   Display configuration / statistics / general
      information
moxa#
```

## Understanding All Command Modes

The Moxa switch's CLI supports multiple types of configuration levels for performing different functions. Refer to the following table for an overview of all available modes.

Mode	Access Method	Prompt	Exit Method	About This Mode
User EXEC	Begin a new session and login as <b>user</b> .	moxa>	Enter the <b>exit</b> command. This will return you to the previous configuration mode.	Use this mode to display system information.
Privileged EXEC	Begin a session and login as <b>admin</b> .	moxa #	Enter the <b>exit</b> command. This will return you to the previous configuration mode.	Use this mode to verify commands that you have entered.
Global configuration	Enter the <b>configure</b> command while in Privileged EXEC mode.	moxa (config)#	Enter the <b>exit</b> command. This will return you to the previous configuration mode.	Use this mode to configure parameters that will apply to the entire switch.
Interface configuration	While in global configuration mode, enter the <b>interface</b> command, followed by an interface identification.	moxa (config-if)#	Enter the <b>exit</b> command. This will return you to the previous configuration mode.	Use this mode to configure parameters for the specified interface.

Refer to the following example of changing configuration modes below.

Type **config** at the command prompt to enter configuration mode.

```
moxa# config
moxa(config)#
```

Type **exit** to return to the previous configuration mode.

```
moxa(config)# exit
moxa#
```

Type **end** from within any configuration level to return to privileged Exec mode.

```
moxa(config)# end
moxa#
```

## Help Messages

The CLI supports several types of interactive commands. The **Help** commands are listed in the following table:

Command	Purpose
?	Shows a brief description of the Help feature in any command level.
Partial command?	Shows a list of commands that begin with the entered character string. There should be no space between the command and the question mark.
Partial command<Tab>	Completes a partially entered command name. There should be no space between the command and <Tab>.
Command ?	Shows the keywords, arguments, or both associated with the command. There should be a space between the command and the question mark.
Command keyword ?	Shows the arguments that are associated with the keyword. There should be a space between the command and the keyword, and between the keyword and the question mark.

## Special Usage and Limitations

If the command contains any special characters, such as `*`, `#`, and `%`, you need to use the quotation marks (`"`) to cover these special characters. Refer to the following figure for an example.

```
moxa(config)# contact "test#"
moxa(config)# exit
moxa# show run
Building user configuration ...

! -----
! Time: 2019-08-30 18:37:01
! Model name: MDS-G4028
! Firmware version: v0.4 Build 2019_0703_1227
! Product revision: V255.255.255
! IP address: 192.168.127.253
! MAC address: 00:01:02:03:04:05
! Serial number: MOXA00000000
! Module M2 product revision: None
! Module M3 product revision: None
! Module M4 product revision: None
! Module M5 product revision: None
! Module M6 product revision: None
! Module M7 product revision: None
! -----
configure terminal
contact "test#"
interface ethernet 1/1
!
interface ethernet 1/2
--More--
```

In addition, you may use a semicolon mark (`;`) to separate several commands. Refer to the figure below for an example.

```
moxa(config)# hostname test;contact test2
moxa(config)#
test(config)#
```

## Abbreviated Commands

The exclamation mark (`!`) can be used to enter the global configuration mode, as shown in the example below.

```
moxa# !
moxa(config)#
moxa(config)#
```

In addition, you can input one or more letters to quickly see all commands starting with these letters. For example, if you type `c?`, all commands starting with `c` will be shown. Refer to the figure below as the example.

```
moxa# c?
clear
cli
configure
copy
```

In addition, when pressing **Tab** after typing the prefix letter, the syntax of the commands starting with that letter will be shown. See the figure below for details.

```
moxa# c
EXEC commands :

clear logging event-log
clear screen
clear spanning-tree detected protocols interface { <interface-type> <interface
-id> | port-channel <integer> }
clear statistics [interfaces {port-channel <integer> | <interface-type> <inter
face-id> }]
cli eth-index-naming { modular | non-modular }
cli pagination turn {on | off}
configure [ terminal ]
copy event-log {tftp://server/filename | sftp://<user-name>:<pass-word>@server
/filename}
copy running-config startup-config
copy running-config {tftp://server/filename | sftp://<user-name>:<pass-word>@s
erver/filename} [included-default] [password <string(60)>]
copy startup-config {tftp://server/filename | sftp://<user-name>:<pass-word>@s
erver/filename} [included-default] [password <string(60)>]
copy { tftp://server/filename running-config | sftp://<user-name>:<pass-word>@
server/filename running-config } [password decrypt-password]
copy { tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename
--More--
```

## No and Default Forms of Commands

A “no” command can be used to perform the “delete”, “disable”, or “reset to default” functions. Type “no ?” to check how parameters can be used.

```
moxa(config)# no ?
contact                Reset the contact information of the device
description            Reset the description of the device
dot1x                  Configure dot1x parameters
event-notification    Configure event notification parameters
hostname              Reset the hostname of the device
interface             Configure interface parameters
ip                    Configure IP parameters
ipv6                  Configure IPv6 parameters
lldp                  Configure LLDP parameters
location              Reset the location information of the device
logging               Configure logging parameters
logging-server        Logging server parameters
login                 Configure login related configuration
mac-address-table     Configure MAC address table parameters
management            Configure management parameters
monitor               Configure Port Mirror parameters
ntp                   Configure NTP/SNTP parameters
poe                   Configure PoE parameters
port-channel          Configure port-channel parameters
radius-server         Configure RADIUS server configuration
--More--
```

The following example shows how a “no” command can run the “reset to default” function.

```
moxa(config)# hostname test
moxa(config)#
test(config)# no hostname
test(config)#
moxa(config)#
```

The following example shows how “no” can run the “disable” function.

```
moxa(config-if)# gvrp
moxa(config-if)# no gvrp
moxa(config-if)#
```

# CLI Error Messages

You may encounter some error messages while configuring Moxa's Ethernet switch. Refer the following table for an overview of error messages and solutions.

Error Message	Meaning	Solution
% Ambiguous command	The characters you entered are insufficient for the switch to recognize the command.	Re-enter the command with a space between the command and the question mark (?). The possible keywords with the command will appear.
% Incomplete command	The keywords or values you entered are incomplete.	Re-enter the command with a space between the command and the question mark (?). The possible keywords with the command will appear.
% Invalid input detected at '^' marker.	The command you entered is incorrect. The point of invalid input will be indicated by a caret (^).	Enter a question mark (?) to display all the available commands in this command mode. The possible keywords with the command will appear.

## Command History

Use the Up arrow and Down arrow keys to show to cycle through the history of previously entered commands.

Pressing the Up arrow will display the previously entered command. Pressing the Down arrow will display the next command in the history.

# 3. Commands

This chapter covers all commands for users to configure Moxa's managed Ethernet switch.

## System

### System Management

#### Information Settings

##### Configure Device Hostname

###### Commands

**hostname** device-name

**no hostname**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>hostname</b>	Configure the device hostname parameters
	device-name	The hostname of the device consisting of lower-case letters, numbers, and hyphens
<b>Defaults</b>	hostname: moxa	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# hostname device-name device-name(config)# no hostname moxa(config)#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

##### Configure Device Description

###### Commands

**description** text

**no description**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>description</b>	Configure the device description parameters
	text	The description of the device
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# description "description data" moxa(config)# no description	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Contact Information

### Commands

**contact** text

**no contact**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>contact</b>	Configure device contact information
	text	The contact information of the device
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# contact "contact info" moxa(config)# no contact	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Location Information

### Commands

**location** text

**no location**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>location</b>	Configure the device location information
	text	The location information of the device
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# location "location info" moxa(config)# no location	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show System Information

### Commands

**show system information**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>system</b>	Display system information
	<b>information</b>	Display system information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show system information  Hardware Version : V0.0.0 Firmware Version : v0.3 build 2019_050202111 Device Contact : Device Name : moxa Device Location : Device Description : Device Uptime : 0 Days, 1 Hrs, 35 Mins, 21 Secs Login Authentication Mode : Local	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Firmware Upgrade

## Upgrade the Firmware

### Commands

**copy** { <tftp\_url> | <sftp\_url> | **usb:** <filename> | **micro-sd:** <filename> } **device-firmware**

<b>Syntax Description</b>	<b>copy</b>	Perform copy operation
	<b>device-firmware</b>	Copy a device firmware file
	tftp_url	Specify the remote TFTP server address in the format "tftp://server/filename"
	sftp_url	Specify the remote SFTP server address in the format "sftp://username:password@server/filename"
	<b>usb</b>	Copy from an ABC-02 USB device under the /Moxa folder.
	<b>micro-sd</b>	Copy from a microSD device under the /Moxa folder.
	filename	Specify the filename
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# copy tftp://server/"filename" device-firmware (config)# copy sftp://username:password@server/"filename" device-firmware (config)# copy usb:"filename" device-firmware (config)# copy micro-sd:"filename" device-firmware	
<b>Error Messages</b>	Invalid: Firmware verify failed Invalid: Invalid Request Data Invalid: File expects [0-9], [a-z], [A-Z], and -._() Invalid: Not support USB. Invalid: Not support microSD. Invalid: USB function is disable Invalid: MicroSD function is disable	
<b>Related Commands</b>	N/A	

# Configuration Backup and Restore

## Copy Running Configuration

### Commands

**copy running-config** { <tftp\_url> | <sftp\_url> | **usb:** <filename> | **micro-sd:** <filename> }

**copy** { <tftp\_url> | <sftp\_url> | **usb:** <filename> | **micro-sd:** <filename> } **running-config**

<b>Syntax Description</b>	<b>copy</b>	Perform copy operation
	<b>running-config</b>	running-config to be copied
	tftp_url	File in remote location to be copied
	sftp_url	File in remote location to be copied
	<b>usb</b>	File in ABC-02 under /Moxa/config to be copied
	<b>micro-sd</b>	File in micro-SD under /Moxa/config to be copied
filename	File name	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>(config)# copy running-config tftp://server/"filename" (config)# copy running-config sftp://username:password@server/"filename" (config)# copy running-config usb: "filename" (config)# copy running-config micro-sd: "filename"  (config)# copy tftp://server/"filename" running-config (config)# copy sftp://username:password@server/"filename" running-config (config)# copy usb: "filename" running-config (config)# copy micro-sd: "filename" running-config</pre>	
<b>Error Messages</b>	<pre>Invalid: File expects [0-9], [a-z], [A-Z], and -_() Invalid: Not support USB. Invalid: Not support microSD. Invalid: USB function is disable Invalid: MicroSD function is disable Invalid: USB configuration import failed Invalid: MicroSD configuration import failed</pre>	
<b>Related Commands</b>	<pre>copy startup-config { &lt;tftp_url&gt;   &lt;sftp_url&gt;   usb: &lt;filename&gt;   micro-sd: &lt;filename&gt; } config-file encryption password &lt;password&gt; show config-file encryption show customer-key info copy customer-key {&lt;tftp_url&gt;   &lt;sftp_url&gt;} private {&lt;tftp_url&gt;   &lt;sftp_url&gt;} certificate label &lt;name&gt; clear customer-key signed-config {enable   disable}</pre>	

## Copy Startup Configuration

### Commands

**copy startup-config** { <tftp\_url> | <sftp\_url> | **usb:** <filename> | **micro-sd:** <filename> }

<b>Syntax Description</b>	<b>copy</b>	Perform copy operation
	<b>startup-config</b>	Copy the startup configuration
	tftp_url	Specify the remote TFTP server address in the format "tftp://server/filename"
	sftp_url	Specify the remote SFTP server address in the format "sftp://username:password@server/filename"
	<b>usb</b>	Copy from an ABC-02 USB device under the /Moxa folder.
	<b>micro-sd</b>	Copy from a microSD device under the /Moxa folder.
	filename	Specify the filename
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>(config)# copy startup-config tftp://server/"filename" (config)# copy startup-config sftp://username:password@server/"filename" (config)# copy startup-config usb: "filename" (config)# copy startup-config micro-sd: "filename"</pre>	
<b>Error Messages</b>	<pre>Invalid: File expects [0-9], [a-z], [A-Z], and -_() Invalid: Not support USB. Invalid: Not support microSD. Invalid: USB function is disable Invalid: MicroSD function is disable Invalid: USB configuration import failed Invalid: MicroSD configuration import failed</pre>	
<b>Related Commands</b>	<pre>copy running-config { &lt;tftp_url&gt;   &lt;sftp_url&gt;   usb: &lt;filename&gt;   micro-sd: &lt;filename&gt; } config-file encryption password &lt;password&gt; show config-file encryption show customer-key info copy customer-key {&lt;tftp_url&gt;   &lt;sftp_url&gt;} private {&lt;tftp_url&gt;   &lt;sftp_url&gt;} certificate label &lt;name&gt; clear customer-key signed-config {enable   disable}</pre>	

# File Encryption

## Configure File Encryption Password

### Commands

**config-file encryption password** <password>

**no config-file encryption**

<b>Syntax Description</b>	<b>config-file</b>	Configure configuration file-related settings
	<b>encryption</b>	Configure configuration file encryption
	<b>password</b>	Configure the configuration file password
	<password>	Specify the encryption password
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# config-file encryption password 1234	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	copy running-config { <tftp_url>   <sftp_url>   usb: <filename>   micro-sd: <filename> } copy startup-config { <tftp_url>   <sftp_url>   usb: <filename>   micro-sd: <filename> } show config-file encryption show customer-key info copy customer-key {<tftp_url>   <sftp_url>} private {<tftp_url>   <sftp_url>} certificate label <name> clear customer-key signed-config {enable   disable}	

## Show Configuration File Encryption Information

### Commands

**show config-file encryption**

<b>Syntax Description</b>	<b>show</b>	Display running information for the function
	<b>config-file</b>	Display configuration file-related information
	<b>encryption</b>	Display the configuration file encryption information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	# show config-file encryption	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	copy running-config { <tftp_url>   <sftp_url>   usb: <filename>   micro-sd: <filename> } copy startup-config { <tftp_url>   <sftp_url>   usb: <filename>   micro-sd: <filename> } config-file encryption password <password> show customer-key info copy customer-key {<tftp_url>   <sftp_url>} private {<tftp_url> <sftp_url>} certificate label <name> clear customer-key signed-config {enable   disable}	

## Enable/ Disable Configuration Auto Backup

### Commands

**auto-backup config { enable | disable }**

<b>Syntax Description</b>	auto-backup	Auto backup file to external storage
	config	Configuration file
	enable	Enable setting
	disable	Disable setting
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# auto-backup config enable (config)# auto-backup config disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/ Disable Configuration Auto Restore

### Commands

**auto-restore config { enable | disable }**

<b>Syntax Description</b>	auto-restore	Auto restore file from external storage
	config	Configuration file
	enable	Enable setting
	disable	Disable setting
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# auto-restore config enable (config)# auto-restore config enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Event Log Backup

### Commands

**copy event-log** { <tftp\_url> | <sftp\_url> | **usb:** <filename> | **micro-sd:** <filename> }

<b>Syntax Description</b>	<b>copy</b>	Perform copy operation
	<b>event-log</b>	Copy the system event log
	tftp_url	Specify the remote TFTP server address in the format "tftp://server/filename"
	sftp_url	Specify the remote SFTP server address in the format "sftp://username:password@server/filename"
	<b>usb</b>	Copy from an ABC-02 USB device under the /Moxa folder.
	<b>micro-sd</b>	Copy from a microSD device under the /Moxa folder.
filename	Specify the filename	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# copy event-log tftp://server/moxa.log (config)# copy event-log sftp://username:password@server/moxa.log (config)# copy event-log usb: Moxa/log/moxa.log (config)# copy event-log micro-sd: Moxa/log/moxa.log	
<b>Error Messages</b>	Invalid: File expects [0-9], [a-z], [A-Z], and -_() Invalid: Not support USB. Invalid: Not support microSD. Invalid: USB function is disable Invalid: MicroSD function is disable Invalid: Invalid Request Data	
<b>Related Commands</b>	N/A	

# Account Management

## User Account

### Configure User Account Setting

#### Commands

**username** <username> **password** <password> **group** { admin | user | supervisor } **status** { enable | disable } **email** <email>

**no username** username

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>username</b>	Configures username parameters
	username	The username to be used for login
	<b>password</b>	Configures password parameters
	password	The password to be entered by the user
	<b>group</b>	Configures the user privilege level
	group	Valid values are "admin", "supervisor", and "user" "admin" for admin group, "supervisor" for supervisor, and "user" for normal user group
	<b>status</b>	Configures user status parameters
	enable	Enable the user
	disable	Disable the user
<b>email</b>	Configures the user email	
email	The user's email address	
<b>Defaults</b>	N/A.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# username testuser password test123 group admin status enable email test@test.com	
<b>Error Messages</b>	% Max User Account Amount Reached % Invalid Username Format % Password doesn't comply with password rules. % Invalid Email Format % Invalid Password Format % User does not exist % At least one admin should be active. % User status cannot be updated by self. % User Deletion Failed % User cannot be disabled by self % User cannot be modified group by self % User cannot be deleted by self	
<b>Related Commands</b>	Show user	

## Show User Information

### Commands

show user

<b>Syntax Description</b>	<b>show</b>	Display running information for the function
	<b>user</b>	Display user parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	# show user USER            ACTIVE            PRIVILEGE            EMAIL admin            1            admin            admin@sample.com user            1            user            user@sample.com supervisor      1            supervisor      supervisor@sample.com	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	username	

## Online Account

### Show System Online Account

#### Commands

show system online-account

<b>Syntax Description</b>	<b>show</b>	Display running information for the function
	<b>system</b>	Display system related information
	<b>online-account</b>	Accounts already logged into this device
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privilege EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show system online-account  Online Account  Account    Role      IP Address      Interface    ID      Idle Admin     Admin    192.168.127.253    HTTP(S)    4a5d6d51    1 Chris     Supervisor 192.168.127.252    HTTP(S)    19ad4348    10 User      User     192.168.127.251    Telnet      86ac3734    20 Jason     User     192.168.127.250    SSH        5c73d2a2    30 Tim       User     Local            Console     5c73d2a2    50	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Remove System Online Account

#### Commands

remove system online-account id <id>

<b>Syntax Description</b>	<b>remove</b>	Remove an online account
	<b>system</b>	Display system related information
	<b>online-account</b>	Accounts already logged into this device
	<b>id</b>	Login account ID in the table
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privilege EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# remove system online-account id 1a2b3c4d	
<b>Error Messages</b>	This ID is not valid.	
<b>Related Commands</b>	N/A	

# Password Policy

## Configure Password Maximum Lifetime

### Commands

**password max-life-time** [<days (0-365)>]

<b>Syntax Description</b>	<b>password</b>	Configure password parameters
	<b>max-life-time</b>	Configure the maximum lifetime of the password
	days	Maximum lifetime in days; a 0 or "no" value means it does not expire
<b>Defaults</b>	0	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# config moxa(config)# password max-life-time 30 moxa(config)# password max-life-time	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show password max-life-time	

## Configure Password Validation Rules

### Commands

**password validate-rules** [lowercase] [uppercase] [numbers] [symbols]

<b>Syntax Description</b>	<b>password</b>	Configure password parameters
	<b>validate-rules</b>	Configure validation rules
	lowercase	Configure at least 1 lowercase flag for password validation
	uppercase	Configure at least 1 uppercase flag for password validation
	numbers	Configure at least 1 number flag for password validation
	symbols	Configure at least 1 symbol flag for password validation
<b>Defaults</b>	There are no validation rules configured by default	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# config moxa(config)# password validate-rules lowercase numbers moxa(config)# password validate-rules	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show password validate-rules	

## Configure Password Minimum Length

### Commands

**password minimum-length** <minimum-len (4-63)>

<b>Syntax Description</b>	<b>password</b>	Configure password parameters
	<b>minimum-length</b>	Configure the minimum password length
	minimum-len	The minimum password length
<b>Defaults</b>	4	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# config moxa(config)# password minimum-length 8	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show password minimum-length	

## Show Password Minimum Length

### Commands

#### show password minimum-length

<b>Syntax Description</b>	<b>show</b>	Display running information for the function
	<b>password</b>	Display password parameters
	<b>minimum-length</b>	Display the minimum length of the password
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show password minimum-length	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	password minimum-length	

## Show Password Validation Rules

### Commands

#### show password validate-rules

<b>Syntax Description</b>	<b>show</b>	Display running information for the function
	<b>password</b>	Display password parameters
	<b>validate-rules</b>	Display the password validation rules
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show password validate-rules	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	password validate-rules	

# Management Interface

## User Interface

### Enable Network Server

#### Commands

**ip** { http | https | telnet | ssh | moxa-command } **server enable**

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	http	Configure HTTP management UI service parameters
	https	Configure HTTPS management UI service parameters
	telnet	Configure Telnet management UI service parameters
	ssh	Configure SSH management UI service parameters
	moxa-command	Configure Moxa Command management UI service parameters
	<b>server</b>	Configure management UI service server parameters
	<b>enable</b>	Enable the management UI service
<b>Defaults</b>	http: enabled https: enabled telnet: enabled ssh: enabled moxa-command: enabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip https server enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Disable Network Server

#### Commands

**ip** { http | https | telnet | ssh | moxa-command } **server disable**

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	http	Configure HTTP management UI service parameters
	https	Configure HTTPS management UI service parameters
	telnet	Configure Telnet management UI service parameters
	ssh	Configure SSH management UI service parameters
	moxa-command	Configure Moxa Command management UI service parameters
	<b>server</b>	Configure management UI service server parameters
	<b>disable</b>	Disable the management UI service
<b>Defaults</b>	http: enabled https: enabled telnet: enabled ssh: enabled moxa-command: enabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip telnet server disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Network Port Numbers

### Commands

**ip** { http | https | telnet | ssh } **port** <port-number>

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	http	Configure HTTP management UI service parameters
	https	Configure HTTPS management UI service parameters
	telnet	Configure Telnet management UI service parameters
	ssh	Configure SSH management UI service parameters
	<b>port</b>	Configure the service port of the management UI service
	port-number	The service port number
<b>Defaults</b>	http server port: 80 https server port: 443 telnet server port: 23 ssh server port: 22	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip http port 8080	
<b>Error Messages</b>	Invalid: UI service management port port-number is duplicated.	
<b>Related Commands</b>	N/A	

## Configure SNMP Server Port Number

### Commands

**snmp-server port** <port-number>

<b>Syntax Description</b>	<b>snmp-server</b>	Configure SNMP server parameters
	<b>port</b>	Configure the service port of the SNMP server
	port-number	The service port number
<b>Defaults</b>	The default SNMP server port is set to 161	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# snmp-server port 161	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Network Maximum Session Numbers

### Commands

**ip http max-session** <session-number>

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>http</b>	Configure HTTP/HTTPS management UI service parameters
	<b>max-session</b>	Configure the maximum number of concurrent login sessions through HTTP and HTTPS
	session-number	The maximum number of login sessions
<b>Defaults</b>	The maximum number of concurrent HTTP sessions is set to 5 by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip http max-session 3	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Network Terminal Maximum Session Numbers

### Commands

**ip terminal max-session** <session-number>

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>terminal</b>	Configure Telnet and SSH terminal parameters
	<b>max-session</b>	Configure the maximum number of concurrent login sessions through Telnet and SSH terminal
	session-number	Maximum number of login sessions
<b>Defaults</b>	max terminal session: 1	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip terminal max-session 3	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Network Service Information

### Commands

**show ip service information**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ip</b>	Display IP information
	<b>service</b>	Display management UI service information
	<b>information</b>	Display the information for management UI services
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip service information HTTP service: Enabled HTTP port: 80 HTTPS service: Enabled HTTPS port: 443 Telnet service: Enabled Telnet port: 23 SSH service: Enabled SSH port: 22 SNMP service: Enabled SNMP port: 161 MOXA service: Enabled HTTP/HTTPS Maximum Login Sessions: 5 Telnet/SSH Maximum Login Sessions: 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Hardware Interface

### Enable/Disable USB Hardware Interface

#### Commands

**hardware-interface usb** {enable | disable}

<b>Syntax Description</b>	<b>usb</b>	USB in device
	enable	Enable setting
	disable	Disable setting
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# hardware-interface usb enable (config)# hardware-interface usb disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Enable/Disable microSD Hardware Interface

#### Commands

**hardware-interface micro-sd** {enable | disable}

<b>Syntax Description</b>	<b>micro-sd</b>	microSD in device
	enable	Enable setting
	disable	Disable setting
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# hardware-interface micro-sd enable (config)# hardware-interface micro-sd disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Enable/Disable DIP switch Hardware Interface

#### Commands

**hardware-interface dip** { enable | disable }

<b>Syntax Description</b>	<b>hardware-interface</b>	Configure hardware interface parameters
	<b>dip</b>	Configure dip switch parameters
	enable	Enable the hardware interface dip service
	disable	Disable the hardware interface dip service
<b>Defaults</b>	enable	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# hardware-interface dip enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	turbo-ring-v2 { enable   disable }	

## Display Hardware Interface Information

### Commands

#### show hardware-interface

<b>Syntax Description</b>	<b>show</b>	Display configuration information
	<b>hardware-interface</b>	Display hardware interface information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show hardware-interface DIP Switch: Enabled microSD: Enabled USB: Enabled	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display External Storage Information

### Commands

#### show external-storage info

<b>Syntax Description</b>	<b>Show</b>	Display configuration information
	<b>external-storage</b>	Includes USB and microSD
	<b>info</b>	Information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# show external-storage info External Storage info ----- Auto-backup event log Enable      : YES Auto-backup configuration Enable      : YES Auto-restore configuration Enable      : YES	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## SNMP

### Configure SNMP Server Access Mode

#### Commands

**snmp-server access** { enable | disable | read-only }

<b>Syntax Description</b>	<b>snmp-server</b>	Configure SNMP server parameters
	<b>access</b>	Configure the SNMP server access mode
	enable	Enable SNMP server access
	disable	Disable SNMP server access
	read-only	Set SNMP server access to read-only mode
<b>Defaults</b>	SNMP server access is disabled by default	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# snmp-server access enable moxa(config)# snmp-server access disable moxa(config)# snmp-server access read-only	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-server show snmp-server	

### Configure SNMP Server Read-Only Community Settings

#### Commands

**snmp-server community read-only** <community-name(4-32)>

<b>Syntax Description</b>	<b>snmp-server</b>	Configure snmp-server related parameters
	<b>community</b>	Configure the SNMP server community
	<b>read-only</b>	Configure the SNMP server community for read-only
	community-name(32)	The SNMP server read-only community name
<b>Defaults</b>	The default read-only community name is set to public	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# snmp-server community read-only public	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-server show snmp-server	

### Delete SNMP Server Read-Only Community

#### Commands

**no snmp-server community read-only**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>snmp-server</b>	Configure SNMP server parameters
	<b>community</b>	Configure the SNMP server community
	<b>read-only</b>	Configure the SNMP server community for read-only
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no snmp-server community read-only	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-server show snmp-server	

## Configure SNMP Server Read-Write Community Settings

### Commands

**snmp-server community read-write** <community-name(32)>

<b>Syntax Description</b>	<b>snmp-server</b>	Configure SNMP server parameters
	<b>community</b>	Configure the SNMP server community
	<b>read-write</b>	Configure the SNMP server community for read-write
	community-name(32)	The SNMP server read-write community name
<b>Defaults</b>	The default read-write community name is set to private	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# snmp-server community read-write private	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-server show snmp-server	

## Configure SNMP Server Read-Write Community to Default Value

### Commands

**no snmp-server community read-write**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry /reset to default value
	<b>snmp-server</b>	Configures SNMP server parameters
	<b>community</b>	Configure the SNMP server community
	<b>read-write</b>	Configure the SNMP server community for read-write
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no snmp-server community read-write	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-server show snmp-server	

## Configure SNMP Server Version

### Commands

**snmp-server version** { v1-v2c-v3 | v1-v2c | v3 }

<b>Syntax Description</b>	<b>snmp-server</b>	Configure SNMP server parameters
	<b>version</b>	Configure the SNMP server version compatibility
	v1-v2c-v3	Set the SNMP server version to v1-v2c-v3
	v1-v2c	Set the SNMP server version to v1-v2c
	v3	Set the SNMP server version to v3-only
<b>Defaults</b>	The default SNMP server version is set to v1-v2c	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	Set up at least one SNMP server user account before enabling v1-v2c-v3 or v3	
<b>Examples</b>	moxa(config)# snmp-server version v1-v2c-v3 moxa(config)# snmp-server version v1-v2c moxa(config)# snmp-server version v3	
<b>Error Messages</b>	% Atleast setup one valid user before enable snmp-server version v1-v2c-v3 or v3	
<b>Related Commands</b>	snmp-server show snmp-server	

## Configure SNMP Server Version to Default Value

### Commands

**no snmp-server version**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>snmp-server</b>	Configure SNMP server parameters
	<b>version</b>	Configure the SNMP server version compatibility
<b>Defaults</b>	The default SNMP server version is set to v1-v2c	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no snmp-server version	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-server show snmp-server	

## Configure SNMP Server User Account Settings

### Commands

**snmp-server user** <user-name(32)>

**authority** { read-only | read-write }

**auth-type** { none | md5 | sha } [auth-passwd <authentication-password(64)> ] **encryption**  
{ disable| des | aes } [encryption-key <encryption-key(64)>]

<b>Syntax Description</b>	<b>snmp-server</b>	Configure SNMP server parameters
	<b>user</b>	Configure SNMP server user accounts
	user-name(32)	The user name of the SNMP server user account
	<b>authority</b>	Configure the access right for the user account
	read-only	Give read-only access to the user
	read-write	Give read-write access to the user
	<b>auth-type</b>	Configure the authentication protocol for the SNMP server user account
	none	Do not use any authentication protocol
	md5	Use MD5 authentication
	sha	Use SHA authentication
	auth-passwd	Configure the authentication password for the SNMP server user account
	authentication-password(64)	The authentication password
	<b>encryption</b>	Configure the data encryption protocol for the SNMP server user account
	disable	Disable data encryption
	des	Use DES data encryption
aes	Use AES data encryption	
encryption-key	Configure the data encryption key for the SNMP server user account	
encryption-key(64)	The data encryption key	
<b>Defaults</b>	There is no user account table by default	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	If the authentication type is set to none, data encryption should be disabled. If the authentication type is not none, an authentication password must be set up. If data encryption is not disabled, a data encryption key must be set up.	
<b>Examples</b>	moxa(config)# snmp-server user testNoAuthNoPriv authority read-write auth-type none encryption disable moxa(config)# moxa(config)# moxa(config)# snmp-server user testAuthNoPriv authority read-write auth-type md5 auth-passwd 1111111111 encryption disable moxa(config)# moxa(config)#	

	<pre>moxa(config)# snmp-server user testAuthPriv authority read-write auth-type md5 auth-passwd 111111111 encryption des encryption-key 222222222 moxa(config)# moxa(config)#</pre>
<b>Error Messages</b>	<pre>% If authentication-type is none, data-encryption method should be disabled % must setup authentication password % must setup data encryption key % Can't get snmp-server user-account information % Can't get snmp-server user-account table % Can't get snmp-server user-account table index ('%d') % Can't get user-name from snmp-server user-account table('%d') % Can't create user account % Can't modify user account</pre>
<b>Related Commands</b>	<pre>snmp-server show snmp-server</pre>

## Delete SNMP Server User Account

### Commands

**no snmp-server user** <user-name (32)>

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>snmp-server</b>	Configure SNMP server parameters
	<b>user</b>	Configure SNMP server user accounts
	user-name (32)	The user name of the SNMP server user account
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config)# no snmp-server user testNoAuthNoPriv moxa(config)# no snmp-server user testAuthNoPriv moxa(config)# no snmp-server user testAuthPriv</pre>	
<b>Error Messages</b>	<pre>% Can't get snmp-server user-account information % Can't get snmp-server user-account table % Can't get snmp-server user-account table index ('%d') % Can't get user-name from snmp-server user-account % Can't delete user account</pre>	
<b>Related Commands</b>	<pre>snmp-server show snmp-server</pre>	

## Configure SNMP Trap Host Settings

### Commands

```
snmp-trap host <host-address(32)> mode { trap-v1 | trap-v2c | inform-v2c | trap-v3 | inform-v3 }
[community <community-name(32)>]
```

<b>Syntax Description</b>	<b>snmp-trap</b>	Configure SNMP trap parameters
	<b>host</b>	Configure the SNMP trap host address
	host-address(32)	The SNMP trap host address
	<b>mode</b>	Configure the SNMP trap mode
	trap-v1	Use trap-v1 mode
	trap-v2c	Use trap-v2c mode
	inform-v2c	Use inform-v2c mode
	trap-v3	Use trap-v3 mode
	inform-v3	Use inform-v3 mode
	community	Configure the community for the SNMP trap host
community-name(32)	The community name for the SNMP trap host	
<b>Defaults</b>	There is no SNMP trap host entry by default	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	A community name must be set when using trap-v1, trap-v2c, or infom-v2c mode. SNMP v3 must be enabled when SNMP trap-v3 mode is enabled. At least one valid user must be set up before setting the SNMP trap host to trap-v3 mode.	
<b>Examples</b>	moxa(config)# snmp-trap host 192.168.127.254 mode trap-v1 community public moxa(config)# snmp-trap host 192.168.127.253 mode inform-v3	
<b>Error Messages</b>	% Can't get snmp-trap host information % Can't get host name from snmp-trap host table % Can't get snmp-trap host table index('%d') % Can't get host-name from snmp-trap host table('%d') % Can't create host entry % Can't modify host entry % must set community name when mode is trap-v1, trap-v2c or infom-v2c % must enable v3 in snmp-server when snmp-trap host <host-address> trap-v3 mode is enable % Atleast setup one valid user before enable snmp-trap host to trap-v3 mode	
<b>Related Commands</b>	snmp-trap show snmp-trap	

## Delete SNMP Trap Host Entry

### Commands

```
no snmp-trap host <host-address(32)>
```

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>snmp-trap</b>	Configure SNMP trap parameters
	<b>host</b>	Configure the SNMP trap host address
	host-address(32)	The SNMP trap host address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no snmp-trap host 192.168.127.254 moxa(config)# no snmp-trap host 192.168.127.253	
<b>Error Messages</b>	% Can't get snmp-trap host information % Can't get host name from snmp-trap host table % Can't get snmp-trap host table index('%d') % Can't get host-name from snmp-trap host table('%d') % Can't delete host entry	
<b>Related Commands</b>	snmp-trap show snmp-trap	

## Configure SNMP Trap Inform Retry Setting

### Commands

**snmp-trap inform-retries** <inform-retries-number(1-99)>

<b>Syntax Description</b>	<b>snmp-trap</b>	Configure SNMP trap parameters
	<b>inform-retries</b>	Configure SNMP trap inform retries
	inform-retries-number(1-99)	The amount of SNMP trap inform retries
<b>Defaults</b>	The default number of SNMP trap inform retries is set to 3	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# snmp-trap inform-retries 3	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-trap show snmp-trap	

## Reset SNMP Trap Inform Retry to Default Value

### Commands

**no snmp-trap inform-retries**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>snmp-trap</b>	Configure SNMP trap parameters
	<b>inform-retries</b>	Configure SNMP trap inform retries
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no snmp-trap inform-retries	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-trap show snmp-trap	

## Configure SNMP Trap Inform Timeout Setting

### Commands

**snmp-trap inform-timeout** <inform-timeout-number(1-300)>

<b>Syntax Description</b>	<b>snmp-trap</b>	Configure SNMP trap parameters
	<b>inform-timeout</b>	Configure the SNMP trap inform timeout
	inform-timeout-number(1-300)	The SNMP trap inform timeout in seconds
<b>Defaults</b>	The default SNMP trap inform timeout is set to 10 seconds	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# snmp-trap inform-timeout 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-trap show snmp-trap	

## Reset SNMP Trap Inform Timeout to Default Value

### Commands

**no snmp-trap inform-timeout**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>snmp-trap</b>	Configure SNMP trap parameters
	<b>inform-timeout</b>	Configure the SNMP trap inform timeout
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no snmp-trap inform-timeout	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	snmp-trap show snmp-trap	

## Configure SNMP Trap User Account Settings

### Commands

**snmp-trap user** <user-name(32)> **auth-type** { none | md5 | sha } [auth-passwd <authentication-password(64)> ] **encryption** { disable| des | aes } [encryption-key <encryption-key(64)>]

<b>Syntax Description</b>	<b>snmp-trap</b>	Configures SNMP trap parameters
	<b>user</b>	Configure SNMP trap user accounts
	user-name(32)	The user name of the SNMP trap user account
	<b>auth-type</b>	Configure the authentication protocol for the SNMP trap user account
	none	Do not use any authentication protocol
	md5	Use MD5 authentication
	sha	Use SHA authentication
	auth-passwd	Configure the authentication password for the SNMP trap user account
	authentication-password (64)	The authentication password
	<b>encryption</b>	Configure the data encryption protocol for the SNMP trap user account
	disable	Disable data encryption
	des	Use DES data encryption
	aes	Use AES data encryption
	encryption-key	Configure the data encryption key for the SNMP trap user account
encryption-key (64)	The data encryption key	
<b>Defaults</b>	There is no user account table by default	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	If the authentication type is set to none, data encryption should be disabled. If the authentication type is not none, an authentication password must be set up. If data encryption is not disabled, a data encryption key must be set up.	
<b>Examples</b>	moxa# con t moxa(config)# snmp-trap user test auth-type none encryption disable moxa(config)# snmp-trap user test auth-type md5 auth-passwd 1111111111 encryption disable moxa(config)# snmp-trap user test auth-type md5 auth-passwd 1111111111 encryption des encryption-key 2222222222	
<b>Error Messages</b>	% If authentication-type is none, data-encryption method should be disabled % must setup authentication password % must setup data encryption key % Can't get snmp-trap user-account information % Can't get snmp-trap user-account table % Can't get snmp-trap user-account table index ('%d') % Can't get user-name from snmp-trap user-account table('%d') % Can't create user account % Can't modify user account	

<b>Related Commands</b>	snmp-trap show snmp-trap
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## Delete SNMP Trap User Account

### Commands

**no snmp-trap user** <user-name (32)>

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>snmp-trap</b>	Configures SNMP trap parameters
	<b>user</b>	Configure SNMP trap user accounts
	user-name (32)	The user name of the SNMP trap user account
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no snmp-trap user test	
<b>Error Messages</b>	% Can't get snmp-trap user-account information % Can't get snmp-trap user-account table % Can't get snmp-trap user-account table index ('%d') % Can't get user-name from snmp-trap user-account % Can't delete user account	
<b>Related Commands</b>	snmp-trap show snmp-trap	

## Show SNMP Server Information

### Commands

**show snmp-server information**

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>snmp-server</b>	Display SNMP server information
	<b>information</b>	Display general SNMP server information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show snmp-server information ----- snmp-server                   : enable ----- version                        : v1-v2c community read-only         : public community read-write        : private	
<b>Error Messages</b>	% Can't get snmp-server information % Can't get snmp-server community information	
<b>Related Commands</b>	snmp-server	

## Show SNMP Server User Account Information

### Commands

**show snmp-server user**

<b>Syntax Description</b>	<b>show</b>	Displays the configuration/statistics/general information
	<b>snmp-server</b>	Displays SNMP server information
	<b>user</b>	Displays SNMP server user accounts
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show snmp-server user ----- snmp-server user-account : 3 ----- user-name : testNoAuthNoPriv authority : read_write authenticate-type : none encryption-method : disable  user-name : testAuthNoPriv authority : read_write authenticate-type : md5 encryption-method : disable  user-name : testAuthPriv authority : read_write authenticate-type : md5 encryption-method : des	
<b>Error Messages</b>	% Can't get snmp-server user-account information % Can't get snmp-server user-account table	
<b>Related Commands</b>	snmp-server	

## Show SNMP Server Engine ID Information

### Commands

**show snmp-server engine-id**

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>snmp-server</b>	Display SNMP server information
	<b>engine-id</b>	Display the engine ID of the SNMP server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show snmp-server engine-id snmp-server engineID : 800021f303000111234567	
<b>Error Messages</b>	% Can't get snmp-server status information % Can't get snmp-server status information jason object	
<b>Related Commands</b>	snmp-server	

# Out-of-band (OOB) Management

## OOB General Configuration

### OOB Interface setting

#### Commands

**interface mgmt**

<b>Syntax</b>	<b>interface</b>	Interface type
<b>Description</b>	<b>mgmt</b>	OOBM interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)#interface mgmt. moxa(config-mgmt)#	
<b>Error messages</b>	N/A	
<b>Related Commands</b>	N/A	

### OOB IP address setting

#### Commands

**ip address** { dhcp | <ucast\_addr> <ip\_mask> [<gateway-ip>]}

<b>Syntax</b>	<b>ip address</b>	IP address
<b>Description</b>	dhcp	Assign IPv4 by DHCP
	ucast_addr	IPv4 address
	ip_mask	IPv4 netmask
	gateway-ip	Gateway IPv4 address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)#interface mgmt moxa(config-mgmt)#ip address dhcp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### OOB Interface ON/OFF setting

#### Commands

**hardware-interface oob** {enable | disable}

<b>Syntax</b> <b>Description</b>	<b>hardware-interface</b>	Hardware Interface
	<b>oob</b>	OOBM interface
	enable/disable	Admin ON/OFF
<b>Defaults</b>	Enable	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# hardware-interface oob enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display OOB Information

### Display OOB IP Information

#### Commands

**show ip oob management**

<b>Syntax</b>	<b>show</b>	Display command
<b>Description</b>	<b>ip</b>	OOBM ip address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa#show ip oob management IPv4   Mode      : Manual   Address   : 192.168.126.253   Netmask   : 255.255.255.0   Gateway   :</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display OOB Status

### Commands

#### show oob status

<b>Syntax</b>	<b>show</b>	Display command
<b>Description</b>	<b>oob</b>	OOBM status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show oob status Status      Duplex  Speed  Negotiation  Flow Control  MDI/MDIX connected   Full    1G     Auto         on            MDIX(AUTO)</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display Hardware Interface

### Commands

#### show hardware-interface

<b>Syntax</b>	<b>show</b>	Display command
<b>Description</b>	<b>hardware-interface</b>	Hardware Interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show hardware-interface USB: Enabled MicroSD: Enabled OOB: Enabled</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Time

## System Time

### Configure Clock Time Zone

#### Commands

**clock timezone** { "-12" | "-11" | "-10" | "-9:30" | "-9" | "-8" | "-7" | "-6" | "-5" | "-4" | "-3:30" | "-3" | "-2" | "-1" | "0" | "1" | "2" | "3" | "3:30" | "4" | "4:30" | "5" | "5:30" | "5:45" | "6" | "6:30" | "7" | "8" | "8:30" | "8:45" | "9" | "9:30" | "10" | "10:30" | "11" | "12" | "12:45" | "13" | "14" }

Syntax	Description	
	<b>clock</b>	Configure system clock parameters
	<b>timezone</b>	Configure the timezone
	"-12"	UTC-12:00
	"-11"	UTC-11:00
	"-10"	UTC-10:00
	"-9:30"	UTC-09:30
	"-9"	UTC-09:00
	"-8"	UTC-08:00
	"-7"	UTC-07:00
	"-6"	UTC-06:00
	"-5"	UTC-05:00
	"-4"	UTC-04:00
	"-3:30"	UTC-03:30
	"-3"	UTC-03:00
	"-2"	UTC-02:00
	"-1"	UTC-01:00
	"0"	UTC+00:00
	"1"	UTC+01:00
	"2"	UTC+02:00
	"3"	UTC+03:00
	"3:30"	UTC+03:30
	"4"	UTC+04:00
	"4:30"	UTC+04:30
	"5"	UTC+05:00
	"5:30"	UTC+05:30
	"5:45"	UTC+05:45
	"6"	UTC+06:00
	"6:30"	UTC+06:30
	"7"	UTC+07:00
	"8"	UTC+08:00
	"8:30"	UTC+08:30
	"8:45"	UTC+08:45
	"9"	UTC+09:00
	"9:30"	UTC+09:30
	"10"	UTC+10:00
	"10:30"	UTC+10:30
	"11"	UTC+11:00
	"12"	UTC+12:00
	"12:45"	UTC+12:45
	"13"	UTC+13:00
	"14"	UTC+14:00
<b>Defaults</b>		N/A
<b>Command Modes</b>		Global Configuration
<b>Usage Guidelines</b>		N/A
<b>Examples</b>		moxa# configure terminal moxa(config)# clock timezone "8"
<b>Error Messages</b>		N/A
<b>Related Commands</b>		N/A

## Configure Clock Source

### Commands

**clock source** { local | ntp | sntp }

<b>Syntax Description</b>	<b>clock</b>	Configure system clock parameters
	<b>source</b>	Configure the source of the system clock
	local	Use the local clock
	ntp	Use Network Time Protocol (NTP)
	sntp	Use Simple Network Time Protocol (SNTP)
<b>Defaults</b>	clock source: local	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# clock source local	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Clock Setting

### Commands

**clock set** hh:mm:ss [ month ] [ day ] [ year ]

<b>Syntax Description</b>	<b>clock</b>	Configure system clock parameters
	<b>set</b>	Configure the system time
	hh:mm:ss	The system time in the format hh:mm:ss
	month	The month, January (1) to December (12)
	day	The day of the month (1 to 31)
	year	The year
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# clock set 11:11:11 12 31 2019	
<b>Error Messages</b>	Invalid: Cannot modify clock time as the clock source is not Local	
<b>Related Commands</b>	N/A	

## Enable Clock Summer Time

### Commands

**clock summer-time enable**

<b>Syntax Description</b>	<b>clock</b>	Configure system clock parameters
	<b>summer-time</b>	Configure Daylight Savings Time parameters
	<b>enable</b>	Enable Daylight Savings Time
<b>Defaults</b>	Daylight saving time is disabled by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# clock summer-time enable	
<b>Error Messages</b>	Invalid: The start date plus offset should be before the end date.	
<b>Related Commands</b>	N/A	

## Disable Clock Summertime

### Commands

#### clock summer-time disable

<b>Syntax Description</b>	<b>clock</b>	Configure system clock parameters
	<b>summer-time</b>	Configure Daylight Savings Time parameters
	<b>disable</b>	Disable Daylight Savings Time
<b>Defaults</b>	Daylight saving time is disabled by default	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# clock summer-time disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Clock Summertime Date

### Commands

**clock summer-time date** <started-month> <started-week> <started-day> <started-hour:started-minute> <ended-month> <ended-week> <ended-day> <ended-hour:ended-minute> [<offset>]

<b>Syntax Description</b>	<b>clock</b>	Configure system clock parameters
	<b>summer-time</b>	Configure Daylight Savings Time parameters
	<b>date</b>	Configure the date of Daylight Savings Time
	started-month	Specify the Daylight Saving Time starting month <integer (1-12)> (Jan (1) to Dec (12))
	started-week	Specify the Daylight Saving Time starting week (1st-last)
	started-day	Specify the Daylight Saving Time starting day <integer (1-7)> (Mon (1) to Sun (7))
	<started-hour:started-minute>	Specify the Daylight Saving Time starting day (Hour <00-24>, Minute <00-59>)
	ended-month	Specify the Daylight Saving Time ending month <integer (1-12)> (Jan (1) to Dec (12))
	ended-week	Specify the Daylight Saving Time ending week (1st-last)
	ended-day	Specify the Daylight Saving Time ending day <integer (1-7)> (Mon (1) to Sun (7))
	<ended-hour:ended-minute>	Specify the Daylight Saving Time ending day (Hour <00-24>, Minute <00-59>)
	offset	Specify the offset time (HH:mm <00:00-23:59>)
	<b>Defaults</b>	daylight saving time date: Mar last Sun 01:00 Oct last Sun 01:00 01:00
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# clock summer-time date Mar 2nd 02:00 Nov 1st Sun 02:00 01:00	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure NTP Authentication Key

### Commands

**ntp auth-key key-id** {md5 | aes128cmac} key-string

**no ntp auth-key** key-id

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>authentication-key</b>	Configure the NTP authentication key
	<b>aes128cmac</b>	Use AES128CMAC authentication
	key-id	The key ID, ranging from 1 to 65535
	md5	Use MD5 authentication
	key-string	The authentication key with a maximum length of 32 characters for plain text, 66 characters for Moxa-encrypted hex
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp auth-key 1 md5 1a2b3c4d moxa(config)# ntp auth-key 1 aes128cmac 1a2b3c4d moxa(config)# no ntp auth-key 1	
<b>Error Messages</b>	Invalid: Authentication key ID key-id is duplicated.	
<b>Related Commands</b>	N/A	

## Configure NTP Remote Server

### Commands

**ntp remote-server ntp** server-index server-address [ authentication key key-id ]

**no ntp remote-server ntp** server-index [ authentication ]

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>remote-server</b>	Configure remote time server parameters
	<b>ntp</b>	Configure NTP server parameters
	server-index	The index of the server, ranging from 1 to 2
	server-address	The NTP server address
	authentication	Configure NTP authentication parameters
	key	Use key authentication
	key-id	The ID of the authentication key
<b>Defaults</b>	NTP time server: time.nist.gov	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp remote-server ntp 1 1.1.1.1 moxa(config)# ntp remote-server ntp 2 2.2.2.2 authentication key 1 moxa(config)# no ntp remote-server ntp 2 authentication moxa(config)# no ntp remote-server ntp 1	
<b>Error Messages</b>	Invalid: Authentication key ID key-id of NTP client server-index does not exist.	
<b>Related Commands</b>	N/A	

## Configure SNTP Remote Server

### Commands

**ntp remote-server sntp** server-index server-address

**no ntp remote-server sntp** server-index server-address

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>remote-server</b>	Configure remote time server parameters
	<b>sntp</b>	Configure SNTP server parameters
	server-index	The index of the server, ranging from 1 to 2
	server-address	The SNTP server address
<b>Defaults</b>	The default SNTP time server is set to time.nist.gov	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp remote-server sntp 1 1.1.1.1 moxa(config)# no ntp remote-server sntp 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable NTP Server

### Commands

**ntp server enable**

<b>Syntax Description</b>	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>enable</b>	Enable the NTP server
<b>Defaults</b>	NTP server: disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp server enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Disable NTP Server

### Commands

**ntp server disable**

<b>Syntax Description</b>	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>disable</b>	Disable the NTP server
<b>Defaults</b>	The NTP server is disabled by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp server disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure NTP Server Authentication

### Commands

#### ntp server authentication

<b>Syntax Description</b>	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>authentication</b>	Enable authentication
<b>Defaults</b>	NTP server authentication is disabled by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp server authentication	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Disable NTP Server Authentication

### Commands

#### no ntp server authentication

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>authentication</b>	NTP authentication
<b>Defaults</b>	NTP server authentication is disabled by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# no ntp server authentication	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Clock Information

### Commands

#### show clock

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>clock</b>	Display system clock information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show clock Clock Source : Local Time Zone : UTC+00:00 Current Time : Fri May 03 22:59:33 2019 Daylight Saving : Disabled Start Date : Jan 01 2000 00:00 End Date : Dec 31 2000 23:00 Offset : 0 Minutes Authentication Keys NTP Client Time Server [1] time.nist.gov (No Auth) SNTP Client Time Server [1] time.nist.gov NTP/SNTP Server : Disabled Authentication : Disabled	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show PTP Global Information/Status

### Commands

show ptp

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ptp</b>	Display PTP information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ptp PTP GLOBAL INFO:   PTP Status           : Enabled   Current Profile      : 1588v2 Default Profile   Offset From Master(ns): -7.0   Mean Path Delay(ns) : 79   Steps Removed       : 2   Sync. Status        : Locked   PTP Clock Time(TAI) : Wed Jan 01 01:09:20 2020</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show IEEE1588 PTP Information/Status

### Commands

show ptp profile default

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ptp profile default  1588v2 CLOCK DATA SET   PTP Clock Type       : Peer-to-Peer Boundary Clock   PTP Device Profile   : 1588v2 Default Profile   Clock Identity       : 00:90:e8:ff:fe:d1:5a:53   Transport Type       : 802.3 Ethernet   Clock Domain        : 0   Two-Step Flag        : True   Number of PTP Ports  : 28   Priority1            : 129   Priority2            : 128   Clock Quality:     Class              : 248     Accuracy            : 254   Offset From Master(ns): 2.0   Mean Path Delay(ns) : 8.0   Steps Removed       : 2   Maximum Steps Removed : 255   Slave Port          : 5   Sync. Status        : LOCKED   Accuracy Alert(ns)  : 1000   PTP Clock Time(TAI) : Wed Jan 20 19:10:20 2021  1588v2 PARENT DATA SET</pre>	

	<pre> Parent Clock:   Parent Clock Identity   : 00:90:e8:ff:fe:71:1e:a5   Parent Port Number     : 10 Grandmaster Clock:   Grandmaster Clock Identity : 00:50:c2:ff:fe:c2:db:ad   Grandmaster Clock Quality:     Class                 : 6     Accuracy               : 254     Priority1              : 10     Priority2              : 128  ##### ##### For Transparent moxa# show ptp profile default  1588v2 CLOCK DATA SET   PTP Clock Type       : End-to-End Transparent Clock   PTP Device Profile   : 1588v2 Default Profile   Clock Identity       : 00:90:e8:ff:fe:d1:5a:53   Transport Type       : 802.3 Ethernet   Clock Domain         : 0   Two-Step Flag        : True   Number of PTP Ports  : 4   Sync. Status         : Syncing   Accuracy Alert (ns)  : 1000  1588v2 PARENT DATA SET   No Parent Data Set in Transparent Clock </pre>
<b>Error Messages</b>	N/A
<b>Related Commands</b>	<pre> show ptp profile default parent show ptp profile default clock </pre>

## Show PTP Profile Default Clock

### Commands

**show ptp profile default clock**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>clock</b>	Display clock information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ptp profile default clock  1588v2 CLOCK DATA SET PTP Clock Type      : End-to-End Boundary Clock PTP Device Profile  : 1588v2 Default Profile Clock Identity      : Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 4 Priority1            : 128 Priority2            : 128 Clock Quality:   Class              : 248   Accuracy            : 254 Offset From Master(ns): 0 Mean Path Delay(ns) : 0 Steps Removed       : 0 Maximum Steps Removed: 254 Slave Port           : Sync. Status         : Syncing Accuracy Alert(ns)   : 1000 PTP Clock Time(TAI) : Wed Jan 01 00:00:00 2020  ##### ##### For Transparent moxa# show ptp profile default clock  1588v2 CLOCK DATA SET PTP Clock Type      : End-to-End Transparent Clock PTP Device Profile  : 1588v2 Default Profile Clock Identity      : Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 4 Sync. Status         : Syncing Accuracy Alert (ns) : 1000 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ptp profile default parent	

## Show PTP Profile Default Parent

### Commands

#### show ptp profile default parent

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>parent</b>	Display parent information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ptp profile default parent  1588v2 PARENT DATA SET Parent Clock:   Parent Clock Identity   : 0x70:C9:C6:FF:FE:96:34:80   Parent Port Number     : 1 Grandmaster Clock:   Grandmaster Clock Identity :   Grandmaster Clock Quality:   Class                   : 248   Accuracy                 : 254   Priority1                 : 246   Priority2                 : 248  ##### ##### For Transparent moxa# show ptp profile default parent  1588v2 PARENT DATA SET </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show PTP Profile Default Port

### Commands

**show ptp profile default port** [<interface-type> <interface-id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>port</b>	Display port information
	<interface-type>	Ethernet (interface-type)
	<interface-id>	Interface-id : <1-X>/<1-Y> slot number/port number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ptp profile default port Ethernet 1/1  1588v2 PORT DATA SET: Port Identity          : 00:90:E8:FF:FE:11:22:40-1 Port State             : Master Announce Interval(log) : 1 Announce Receipt Timeout : 3 Sync Interval(log)     : 0 Delay Req Interval(log) : 0 Pdelay Req Interval(log) : 0 Peer Mean Path Delay(ns) : 60  ##### #####  moxa# show ptp profile default port Ethernet 1/1  1588v2 PORT DATA SET: Port Identity          : 00:90:E8:FF:FE:11:22:40-1 Pdelay Req Interval(log) : 0 Peer Mean Path Delay(ns) : 60</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable PTP Service

### Commands

**ptp enable**

**ptp disable**

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>enable</b>	Enable PTP service
	<b>disable</b>	Disable PTP service
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config)# ptp enable moxa(config)# ptp disable</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Global Settings

### Commands

**ptp profile default mode** {boundary | transparent} **delay-mechanism** {e2e | p2p}

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>mode</b>	Mode related configuration of the PTP Clock
	boundary	PTP Clock is configured as boundary Clock
	transparent	PTP Clock is configured as transparent Clock
	<b>delay-mechanism</b>	Propagation delay mechanism configuration
e2e	End-to-end delay mechanism is applied	
p2p	Peer-to-peer delay mechanism is applied	
<b>Defaults</b>	End-to-End boundary clock	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default mode boundary delay-mechanism e2e	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Apply/Remove PTP Profile Default Priority1

### Commands

**ptp profile default priority1** <value>

**no ptp profile default priority1**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>priority1</b>	Configure the Priority1 parameters
<value>	0-255	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default priority1 128 moxa(config)# no ptp profile default priority1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Apply/Remove PTP Profile Default Priority2

### Commands

**ptp profile default priority2** <value>

**no ptp profile default priority2**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>priority2</b>	Configure the Priority2 parameters
	<value>	0-255
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default priority2 128 moxa(config)# no ptp profile default priority2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Apply/Remove PTP Profile Default Domain

### Commands

**ptp profile default profile domain** <domain-number>

**no ptp profile default profile domain**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>domain</b>	PTP domain parameters
	<domain-number>	0-255
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default domain 0 moxa(config)# no ptp profile default domain	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile Default Network-transport Settings

### Commands

**ptp profile default network-transport** {ethernet | ipv4 }

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>network-transport</b>	Network transport type related configuration
		ethernet
	ipv4	Internet Protocol version4 transport type
<b>Defaults</b>	802.3	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default network-transport 802.3	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable PTP Profile Default Two-Step Setting

### Commands

**ptp profile default two-step** {enable | disable}

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>two-step</b>	Generate follow-up message for synchronization event messages
	enable	Enable Two-Step mode
	disable	Disable Two-Step mode
<b>Defaults</b>	Two-step enabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default two-step enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Apply/Remove PTP Profile Default Maximum-step-removed Setting

### Commands

**ptp profile default maximum-step-removed** <max step removed>

**no ptp profile default maximum-step-removed**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>maximum-step-removed</b>	Configure maximum step removed for PTP
<b>Defaults</b>	254	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default maximum-step-removed 50	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile Default Accuracy-alert Setting

### Commands

**ptp profile default accuracy-alert** <nanosecond>

**no ptp profile default accuracy-alert**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>accuracy-alert</b>	Configure accuracy alert threshold for time synchronization status
	<nanosecond>	The value for the default accuracy alert
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ptp profile default accuracy-alert 300	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable TC BMCA Mode on Default profile

### Commands

**ptp profile default tc-bmca enable**

**ptp profile default tc-bmca disable**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP information
	<b>profile</b>	PTP profile selection
	<b>default</b>	Default profile
	<b>tc-bmca</b>	Enable or disable Best Master Clock Algorithm (BMCA) to prevent cyclical path looping when using Transparent Clock (recommend enabling)
	<b>enable/disable</b>	Enable TC BMCA mode/Disable TC BMCA mode
<b>Defaults</b>	ture	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	MSS (config)# ptp profile default tc-bmca enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Port Setting

### Commands

**ptp profile default**

**no ptp profile default**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface Ethernet 1/1 /* Enable port ptp */ moxa(config-if)# ptp profile default /* Disable port ptp */ moxa(config-if)# no ptp profile default	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile Default Announcement Interval

### Commands

**ptp profile default announce interval** <value>

**no ptp profile default announce interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>announce</b>	Configure the Announcement message
	<b>interval</b>	Configure the Announcement message interval
	<value>	Announcement: 0~4
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface Ethernet 1/1 moxa(config-if)# ptp profile default announce interval 0 moxa(config-if)# no ptp profile default announce interval	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile Default Synchronization Interval

### Commands

**ptp profile default sync interval** <value>

**no ptp profile default sync interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>sync</b>	Configure the Synchronization message
	<b>interval</b>	Configure the Synchronization message interval
	<value>	Synchronization: -3~5
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface Ethernet 1/1 moxa(config-if)# ptp profile default sync interval -3 moxa(config-if)# no ptp profile default sync interval	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile Default Delay Request Interval

### Commands

**ptp profile default delay-req interval** <value>

**no ptp profile default delay-req interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>delay-req</b>	Configure the Delay Request message
	<b>interval</b>	Configure the Delay Request message interval
	<value>	Delay Request: -3~5
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface Ethernet 1/1 moxa(config-if)# ptp profile default delay-req interval 0 moxa(config-if)# no ptp profile default delay-req interval	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile Default PDelay Request Interval

### Commands

**ptp profile default pdelay-req interval** <value>

**no ptp profile default pdelay-req interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>pdelay-req</b>	Configure the PDelay Request message
	<b>interval</b>	Configure the PDelay Request message interval
	<value>	PDelay Request: -3~5
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface Ethernet 1/1 moxa(config-if)# ptp profile default pdelay-req interval 0 moxa(config-if)# no ptp profile default pdelay-req interval	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile Default Announcement Timeout

### Commands

**ptp profile default announce timeout** <value>

**no ptp profile default announce timeout**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	PTP profile selection
	<b>default</b>	1588v2 default profile
	<b>announce</b>	Configure the Announcement message
	<b>timeout</b>	Configure the Announcement receipt timeout
	<value>	Announcement: 2-10
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config)# interface Ethernet 1/1 moxa(config-if)# ptp profile default announce timeout 3 moxa(config-if)# no ptp profile default announce timeout</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show IEC 61850-9-3 2016 Profile Information

### Commands

**show ptp profile 61850-9-3**

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>61850-9-3</b>	Show IEC 61850-9-3 2016 profile details
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ptp profile 61850-9-3  1588v2 CLOCK DATA SET PTP Clock Type      : Peer-to-Peer Boundary Clock PTP Device Profile  : IEC 61850-9-3-2016 Clock Identity      : 00:90:e8:ff:fe:d1:5a:53 Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 28 Priority1            : 129 Priority2            : 128 Clock Quality:   Class              : 248   Accuracy            : 254 Offset From Master(ns): 2.0 Mean Path Delay(ns) : 8.0 Steps Removed       : 2 Maximum Steps Removed : 255 Slave Port           : 5 Sync. Status         : LOCKED Accuracy Alert(ns)   : 1000 PTP Clock Time(TAI) : Wed Jan 20 19:10:20 2021  1588v2 PARENT DATA SET Parent Clock:   Parent Clock Identity : 00:90:e8:ff:fe:71:1e:a5   Parent Port Number    : 10</pre>	

	<pre> Grandmaster Clock: Grandmaster Clock Identity : 00:50:c2:ff:fe:c2:db:ad Grandmaster Clock Quality: Class           : 6 Accuracy        : 254 Priority1        : 10 Priority2        : 128  ##### ##### For Transparent moxa# show ptp profile 61850-9-3  1588v2 CLOCK DATA SET PTP Clock Type      : Peer-to-Peer Transparent Clock PTP Device Profile  : IEC 61850-9-3-2016 Clock Identity      : 00:90:e8:ff:fe:d1:5a:53 Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 4 Sync. Status        : Syncing Accuracy Alert (ns) : 1000 1588v2 PARENT DATA SET No Parent Data Set in Transparent Clock </pre>
<b>Error Messages</b>	N/A
<b>Related Commands</b>	<pre> show ptp profile 61850-9-3 parent show ptp profile 61850-9-3 clock </pre>

## Show PTP Profile 61850-9-3 Clock Information

### Commands

**show ptp profile 61850-9-3 clock**

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>61850-9-3</b>	Show IEC 61850-9-3 2016 profile details
	<b>clock</b>	Display the clock information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ptp profile 61850-9-3 clock  1588v2 CLOCK DATA SET PTP Clock Type      : Peer-to-Peer Boundary Clock PTP Device Profile  : IEC 61850-9-3-2016 Clock Identity      : 00:90:e8:ff:fe:d1:5a:53 Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 28 Priority1            : 129 Priority2            : 128 Clock Quality:   Class              : 248   Accuracy            : 254 Offset From Master(ns): 2.0 Mean Path Delay(ns) : 8.0 Steps Removed       : 2 Maximum Steps Removed : 255 Slave Port           : 5 Sync. Status         : LOCKED Accuracy Alert(ns)   : 1000 PTP Clock Time(TAI) : Wed Jan 20 19:10:20 2021  ##### ##### For Transparent moxa# show ptp profile 61850-9-3 clock  1588v2 CLOCK DATA SET PTP Clock Type      : Peer-to-Peer Transparent Clock PTP Device Profile  : IEC 61850-9-3-2016 Clock Identity      : 00:90:e8:ff:fe:d1:5a:53 Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 4 Sync. Status         : Syncing Accuracy Alert (ns) : 1000 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ptp profile 61850-9-3 parent	

## Show PTP Profile 61850-9-3 Parent Information

### Commands

show ptp profile 61850-9-3 parent

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>61850-9-3</b>	Show IEC 61850-9-3 2016 profile details
	<b>parent</b>	Display parent information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ptp profile 61850-9-3 parent 1588v2 PARENT DATA SET Parent Clock:   Parent Clock Identity   : 70:c9:c6:ff:fe:96:34:80   Parent Port Number     : 1 Grandmaster Clock:   Grandmaster Clock Identity : 00:90:e8:ff:fe:d1:5a:53   Grandmaster Clock Quality:   Class                   : 248   Accuracy                 : 254   Priority1                : 246   Priority2                : 248 ##### ##### For Transparent moxa# show ptp profile 61850-9-3 parent 1588v2 PARENT DATA SET No Parent Data Set in Transparent Clock </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show PTP Profile 61850-9-3 Port Information

### Commands

**show ptp profile 61850-9-3 port** [<interface-type> <interface-id>]

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>61850-9-3</b>	Show IEC 61850-9-3 2016 profile details
	<b>port</b>	Display the port information
	<interface-type>	Specify the interface type (Ethernet)
	<interface-id>	Specify the interface ID in the format <1-X>/<1-Y> (Slot Number/Port Number)
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ptp profile 61850-9-3 port Ethernet 1/1 1588v2 PORT DATA SET: Port Identity          : 00:90:e8:ff:fe:11:22:40-1 Port State             : Master Announce Interval(log) : 1 Announce Receipt Timeout : 3 Sync Interval(log)     : 0 Delay Req Interval(log) : 0 Pdelay Req Interval(log) : 0 Peer Mean Path Delay(ns) : 60  ##### ##### moxa# show ptp profile 61850-9-3 port Ethernet 1/1 1588v2 PORT DATA SET: Port Identity          : 00:90:e8:ff:fe:11:22:40-1 Port State             : TRANSMITTING_SYNCHRONIZED Pdelay Req Interval(log) : 0 Peer Mean Path Delay(ns) : 60 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## NTP Server

### Enable NTP Server

#### Commands

**ntp server enable**

<b>Syntax Description</b>	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>enable</b>	Enable the NTP server <CR> End of command
<b>Defaults</b>	NTP server: disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# configure terminal moxa(config)# ntp server enable </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Disable NTP Server

### Commands

#### ntp server disable

<b>Syntax Description</b>	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>disable</b>	Disable the NTP server
<b>Defaults</b>	NTP server: disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp server disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable NTP Server Authentication

### Commands

#### ntp server authentication

<b>Syntax Description</b>	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>authentication</b>	Enable the authentication
<b>Defaults</b>	NTP server authentication: disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ntp server authentication	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Disable NTP Server Authentication

### Commands

#### no ntp server authentication

<b>Syntax Description</b>	<b>no</b>	Disables the configuration / deletes the entry / resets to default value
	<b>ntp</b>	Configure NTP/SNTP parameters
	<b>server</b>	Configure NTP server parameters
	<b>authentication</b>	Disable the NTP authentication
<b>Defaults</b>	NTP server authentication: disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# no ntp server authentication	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## IEC 61850-9-3 2016 Profile Configuration

### Configure PTP Global Settings

#### Commands

**ptp profile 61850-9-3 mode** {boundary | transparent} delay-mechanism p2p}

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
	<b>mode</b>	Configure the PTP clock mode
	boundary	Set the PTP clock mode to Boundary Clock
	transparent	Set the PTP clock mode to Transparent Clock
	delay-mechanism	Configure the delay mechanism
	p2p	Apply the peer-to-peer delay mechanism
<b>Defaults</b>	Peer-to-peer boundary clock	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile 61850-9-3 mode boundary delay-mechanism p2p	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Configure PTP Profile 61850-9-3 Priority 1

#### Commands

**ptp profile 61850-9-3 priority1** <value>

**no ptp profile 61850-9-3 priority1**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
	<b>priority1</b>	Configure Priority 1 parameters
	<value>	Specify the priority (0-255)
<b>Defaults</b>	128	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile 61850-9-3 priority1 128 moxa (config)# no ptp profile 61850-9-3 priority1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile 61850-9-3 Priority 2

### Commands

**ptp profile 61850-9-3 priority2** <value>

**no ptp profile 61850-9-3 priority2**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
	<b>priority2</b>	Configure Priority 2 parameters
	<value>	Specify the priority (0-255)
<b>Defaults</b>	128	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile 61850-9-3 priority2 128 moxa (config)# no ptp profile 61850-9-3 priority2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the PTP Profile 61850-9-3 Domain Number

### Commands

**ptp profile 61850-9-3 domain** <domain-number>

**no ptp profile 61850-9-3 domain**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
	<b>domain</b>	Configure the PTP domain number
	<domain-number>	Specify the domain number (0-255)
<b>Defaults</b>	0	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile 61850-9-3 domain 0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable PTP Profile 61850-9-3 Two-step Settings

### Commands

**ptp profile 61850-9-3 two-step** enable

**ptp profile 61850-9-3 two-step** disable

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
	<b>two-step</b>	Configure the Two-step mode to generate follow-up message for synchronization event messages
	enable	Enable Two-step mode
disable	Disable Two-step mode	
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile 61850-9-3 two-step enable moxa (config)# ptp profile 61850-9-3 two-step disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile 61850-9-3 Maximum Step Removed

### Commands

**ptp profile 61850-9-3 maximum-step-removed** <max step removed>

**no ptp profile 61850-9-3 maximum-step-removed**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
	<b>maximum-step-removed</b>	Configure max steps removed parameters
	<max step removed>	Specify the maximum step removed for PTP (0-255)
<b>Defaults</b>	255	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile 61850-9-3 maximum-step-removed 50	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile 61850-9-3 Accuracy Alert Threshold

### Commands

**ptp profile 61850-9-3 accuracy-alert** <nanosecond>

**no ptp profile 61850-9-3 accuracy-alert**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
	<b>accuracy-alert</b>	Configure the accuracy alert threshold for Sync Status
	<nanosecond>	Specify the accuracy alert threshold in nanoseconds (50-250000000)
<b>Defaults</b>	1000	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile 61850-9-3 accuracy-alert 300	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable TC BMCA Mode on Profile 61850-9-3

### Commands

**ptp profile 61850-9-3 tc-bmca enable**

**ptp profile 61850-9-3 tc-bmca disable**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP information
	<b>profile</b>	PTP profile selection
	<b>61850-9-3</b>	IEC61850-9-3 2016 profile
	<b>tc-bmca</b>	Enable or disable Best Master Clock Algorithm (BMCA) to prevent cyclical path looping when using Transparent Clock (recommend enabling)
	<b>enable/disable</b>	Enable TC BMCA mode/Disable TC BMCA mode
<b>Defaults</b>	ture	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	MSS (config)# ptp profile 61850-9-3 tc-bmca enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile 61850-9-3 Port Settings

### Commands

**ptp profile 61850-9-3**

**no ptp profile 61850-9-3**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>61850-9-3</b>	Configure IEC 61850-9-3 2016 profile parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa (config)# interface Ethernet 1/1 /* Enable port ptp */ moxa (config-if)# ptp profile 61850-9-3 %note: Profile setting will be applied to all ports. /* Disable port ptp */ moxa (config-if)# no ptp profile 61850-9-3</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show C37.238-2017 Profile Information

### Commands

**show ptp profile C37.238**

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>c37.238</b>	Show C37.238-2017 profile details
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ptp profile c37.238  1588v2 CLOCK DATA SET   PTP Clock Type      : Peer-to-Peer Boundary Clock   PTP Device Profile  : IEEE C37.238-2017   Clock Identity      : 00:90:e8:ff:fe:d1:5a:53   Transport Type      : 802.3 Ethernet   Clock Domain        : 0   Two-Step Flag       : True   Number of PTP Ports : 28   Priority1            : 129   Priority2            : 128   Clock Quality:     Class              : 248     Accuracy            : 254   Offset From Master(ns): 2.0   Mean Path Delay(ns) : 8.0   Steps Removed       : 2   Maximum Steps Removed : 255   Slave Port          : 5   Sync. Status        : LOCKED   Accuracy Alert(ns)  : 1000   PTP Clock Time(TAI) : Wed Jan 20 19:10:20 2021  1588v2 PARENT DATA SET   Parent Clock:     Parent Clock Identity : 00:90:e8:ff:fe:71:1e:a5     Parent Port Number    : 10   Grandmaster Clock:</pre>	

	<pre> Grandmaster Clock Identity : 00:50:c2:ff:fe:c2:db:ad Grandmaster Clock Quality:   Class           : 6   Accuracy        : 254   Priority1       : 10   Priority2       : 128 ##### ##### For Transparent moxa# show ptp profile c37.238  1588v2 CLOCK DATA SET PTP Clock Type    : Peer-to-Peer Transparent Clock PTP Device Profile : IEEE C37.238-2017 Clock Identity    : 00:90:e8:ff:fe:d1:5a:53 Transport Type    : 802.3 Ethernet Clock Domain      : 0 Two-Step Flag     : True Number of PTP Ports : 4 Sync. Status      : Syncing Accuracy Alert (ns) : 1000 1588v2 PARENT DATA SET No Parent Data Set in Transparent Clock </pre>
<b>Error Messages</b>	N/A
<b>Related Commands</b>	<pre> show ptp profile c37.238 parent show ptp profile c37.238 clock </pre>

## Show PTP Profile C37.238 Clock Information

### Commands

**show ptp profile c37.238 clock**

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>c37.238</b>	Show C37.238-2017 profile details
	<b>clock</b>	Display the clock information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ptp profile c37.238 clock  1588v2 CLOCK DATA SET PTP Clock Type      : Peer-to-Peer Boundary Clock PTP Device Profile  : IEEE C37.238-2017 Clock Identity      : 00:90:e8:ff:fe:d1:5a:53 Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 28 Priority1            : 129 Priority2            : 128 Clock Quality:   Class              : 248   Accuracy            : 254 Offset From Master(ns): 2.0 Mean Path Delay(ns) : 8.0 Steps Removed       : 2 Maximum Steps Removed : 255 Slave Port          : 5 Sync. Status        : LOCKED Accuracy Alert(ns)  : 1000 PTP Clock Time(TAI) : Wed Jan 20 19:10:20 2021  ##### ##### For Transparent moxa# show ptp profile c37.238 clock  1588v2 CLOCK DATA SET PTP Clock Type      : Peer-to-Peer Transparent Clock PTP Device Profile  : IEEE C37.238-2017 Clock Identity      : 00:90:e8:ff:fe:d1:5a:53 Transport Type      : 802.3 Ethernet Clock Domain        : 0 Two-Step Flag       : True Number of PTP Ports : 4 Sync. Status        : Syncing Accuracy Alert (ns) : 1000 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ptp profile c37.238 parent	

## Show PTP Profile C37.238 Parent Information

### Commands

**show ptp profile c37.238 parent**

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>c37.238</b>	Show C37.238-2017 profile details
	<b>parent</b>	Display parent information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ptp profile c37.238 parent 1588v2 PARENT DATA SET Parent Clock:   Parent Clock Identity   : 70:c9:c6:ff:fe:96:34:80   Parent Port Number     : 1 Grandmaster Clock:   Grandmaster Clock Identity : 00:90:e8:ff:fe:d1:5a:53   Grandmaster Clock Quality:     Class                 : 248     Accuracy               : 254     Priority1              : 246     Priority2              : 248 ##### ##### For Transparent moxa# show ptp profile c37.238 parent 1588v2 PARENT DATA SET No Parent Data Set in Transparent Clock </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show PTP Profile C37.238 Port Information

### Commands

**show ptp profile c37.238 port** [<interface-type> <interface-id>]

<b>Syntax Description</b>	<b>ptp</b>	Display PTP information
	<b>profile</b>	Show PTP profile information
	<b>c37.238</b>	Show C37.238-2017 profile details
	<b>port</b>	Display the port information
	<interface-type>	Specify the interface type (Ethernet)
	<interface-id>	Specify the interface ID in the format <1-X>/<1-Y> (Slot Number/Port Number)
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ptp profile c37.238 port Ethernet 1/1 1588v2 PORT DATA SET:   Port Identity          : 00:90:e8:ff:fe:11:22:40-1   Port State             : TRANSMITTING_SYNCHRONIZED   Port State             : Master   Announce Interval(log) : 1   Announce Receipt Timeout : 3   Sync Interval(log)     : 0   Delay Req Interval(log) : 0   Pdelay Req Interval(log) : 0   Peer Mean Path Delay(ns) : 60  ##### #####  moxa# show ptp profile c37.238 port Ethernet 1/1 1588v2 PORT DATA SET:   Port Identity          : 00:90:e8:ff:fe:11:22:40-1   Pdelay Req Interval(log) : 0   Peer Mean Path Delay(ns) : 60</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure C37.238 2017 Profile Global Settings

### Commands

**ptp profile c37.238 mode** {boundary | transparent} delay-mechanism p2p

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>mode</b>	Configure the PTP clock mode
	boundary	Set the PTP clock mode to Boundary Clock
	transparent	Set the PTP clock mode to Transparent Clock
	delay-mechanism	Configure the delay mechanism
	p2p	Apply the peer-to-peer delay mechanism
<b>Defaults</b>	Peer-to-peer boundary clock	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 mode boundary delay-mechanism p2p	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile C37.237 Priority 1

### Commands

**ptp profile c37.238 priority1** <value>

**no ptp profile c37.238 priority1**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>priority1</b>	Configure Priority 1 parameters
	value>	Specify the priority (0-255)
<b>Defaults</b>	128	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 priority1 128 moxa (config)# no ptp profile c37.238 priority1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile C37.237 Priority 2

### Commands

**ptp profile c37.238 priority2** <value>

**no ptp profile c37.238 priority2**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>priority2</b>	Configure Priority 2 parameters
	<value>	Specify the priority (0-255)
<b>Defaults</b>	128	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 priority2 128 moxa (config)# no ptp profile c37.238 priority2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the PTP Profile C37.238 Domain Number

### Commands

**ptp profile c37.238 domain** <domain-number>

**no ptp profile c37.238 domain**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>domain</b>	Configure the PTP domain number
	<domain-number>	Specify the domain number (0-127, 254)
<b>Defaults</b>	0	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 domain 0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable PTP Profile C37.238 Two-step Settings

### Commands

**ptp profile c37.238 two-step enable**

**ptp profile c37.238 two-step disable**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>two-step</b>	Configure the Two-step mode to generate follow-up message for synchronization event messages
	enable	Enable Two-step mode
	disable	Disable Two-step mode
<b>Defaults</b>	Two-step enabled	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 two-step enable moxa (config)# ptp profile c37.238 two-step disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile C37.238 Maximum Step Removed

### Commands

**ptp profile c37.238 maximum-step-removed <max step removed>**

**no ptp profile c37.238 maximum-step-removed**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>maximum-step-removed</b>	Configure max steps removed parameters
	<b>&lt;max step removed&gt;</b>	Specify the maximum step removed for PTP
	<b>Defaults</b>	255
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 maximum-step-removed 50	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the PTP Profile C37.238 Accuracy Alert Threshold

### Commands

**ptp profile c37.238 accuracy-alert <nanosecond>**

**no ptp profile c37.238 accuracy-alert**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>accuracy-alert</b>	Configure the accuracy alert threshold for Sync Status
	<b>&lt;nanosecond&gt;</b>	Specify the accuracy alert threshold in nanoseconds (50-250000000)
	<b>Defaults</b>	1000
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 accuracy-alert 300	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile C37.238 Grandmaster ID

### Commands

**ptp profile c37.238 grandmaster-id** <grandmaster id>

**no ptp profile c37.238 grandmaster-id**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP parameters
	<b>profile</b>	Configure a PTP profile
	<b>c37.238</b>	Configure C37.238-2017 profile parameters
	<b>grandmaster-id</b>	Configure the Grandmaster ID
	<b>&lt;grandmaster id&gt;</b>	Specify the Grandmaster ID
<b>Defaults</b>	255	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# ptp profile c37.238 grandmaster-id 100	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable TC BMCA Mode on Profile c37.238

### Commands

**ptp profile c37.238 tc-bmca enable**

**ptp profile c37.238 tc-bmca disable**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP information
	<b>profile</b>	PTP profile selection
	<b>c37.238</b>	C37.238 2017 profile
	<b>tc-bmca</b>	Enable or disable Best Master Clock Algorithm (BMCA) to prevent cyclical path looping when using Transparent Clock (recommend enabling)
	<b>enable/disable</b>	Enable TC BMCA mode/Disable TC BMCA mode
<b>Defaults</b>	ture	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	MSS (config)# ptp profile c37.238 tc-bmca enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PTP Profile C37.238 Port Settings

### Commands

**ptp profile c37.238**

**no ptp profile c37.238**

<b>Syntax Description</b>	<b>ptp</b>	Configure PTP information
	<b>profile</b>	PTP profile selection
	<b>c37.238</b>	C37.238 2017 profile
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# interface Ethernet 1/1 /* Enable port ptp */ moxa (config-if)# ptp profile c37.238 %note: Profile setting will be applied to all ports. /* Disable port ptp */ moxa (config-if)# no ptp profile c37.238	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Port

## Port Interface

### Port Setting

#### Show Interface Status

##### Commands

**show interface status**

<b>Syntax Description</b>	<b>show</b>	Show running system information				
	<b>interface</b>	Display interface information				
	<b>status</b>	The status of the interface				
<b>Defaults</b>	N/A					
<b>Command Modes</b>	Privileged EXEC					
<b>Usage Guidelines</b>	N/A					
<b>Examples</b>	moxa# show interface status					
	Port	Status	Duplex	Speed	Negotiation	MDI/MDIX
	-----	-----	-----	-----	-----	-----
	Eth1/1	connected	Full	1 Gbps	Auto	MDIX(Auto)
	Eth1/2	connected	Full	1 Gbps	Auto	MDIX(Auto)
	Eth1/3	not connected	Half	-	Auto	-
	Eth1/4	not connected	Half	-	Auto	-
	Eth2/1	not present	-	-	-	-
	Eth2/2	not present	-	-	-	-
	Eth2/3	not present	-	-	-	-
	Eth2/4	not present	-	-	-	-
	Eth3/1	not connected	Half	-	Auto	-
	Eth3/2	not connected	Half	-	Auto	-
Eth3/3	not connected	Half	-	Auto	-	
<b>Error Messages</b>	N/A					
<b>Related Commands</b>	N/A					

## Show Interface Type and ID

### Commands

**show interfaces** [<interface-type> <interface-id> ]

**show interfaces** [{ [<interface-type> <interface-id>] [{ description | storm-control | flowcontrol | status }] ] }

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general
	<b>interfaces</b>	Display interface information
	interface-type	The Ethernet type
	interface-id	The slot number/port number
	description	Description about the interface
	storm-control	Broadcast, multicast, and unicast storm control suppression levels for an interface
	flowcontrol	Receive or send flow control value for an interface
	status	The status of the interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show interfaces ethernet 1/1  Eth1/1 up, line protocol is down (not connect) Bridge Port Type: Customer Bridge Port  Interface SubType: gigabitEthernet Interface Alias: Slot1/1 Media Type: 1000TX,RJ45,PTP  Hardware Address is 00:00:00:00:00:05 MTU 1522 bytes, Half duplex, 1 Gbps, Auto-Negotiation HOL Block Prevention enabled. CPU Controlled Learning disabled. Auto-MDIX invalid Input flow-control is off,output flow-control is off Port State: Discarding  Link Up/Down Trap is enabled  Reception Counters   Octets           : 0   Unicast Packets  : 0   Multicast Packets : 0   Octets           : 0   Unicast Packets  : 0   Multicast Packets : 0   Broadcast Packets : 0   Discarded Packets : 0   Error Packets    : 0   Unknown Protocol : 0   CRC Errors       : 0   Symbol Errors    : 0   Good CRC Frame Size Errors: 0   Oversized w/ Bad CRC : 0  Transmission Counters   Octets           : 0   Unicast Packets  : 0   Multicast Packets : 0   Broadcast Packets : 0   Discarded Packets : 0   Error Packets    : 0</pre>	

	Bad CRC : 0
	Error Drops : 0
	Timeout Drops : 0
	Error Packets : 0
<b>Error Messages</b>	N/A
<b>Related Commands</b>	N/A

## Show Port-channel Interface

### Commands

#### show interfaces port-channel

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>interfaces</b>	Display interface information
	<b>port-channel</b>	Display the port-channel interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show interfaces port-channel  Port : Eth1/2 -----  Port State = Down, Not in Bundle Reason for port-down : Oper status of the port is down Channel Group : 1 Mode : LACP Actual Port-channel = Null Configured port-channel = Po1 LACP port-priority = 128 LACP Wait-time = 2 secs LACP Port Identifier = 2 LACP Activity : Active LACP Timeout : Long LACP Error State : None  Aggregation State : Aggregation, Defaulted                  LACP Port  Admin Oper Port  State  Priority  Key  Key ----- Eth1/2  Down  128      1    1  Port-channel : Po1 -----  Number of Ports = 1 Protocol = LACP Aggregator-MAC 00:90:e8:72:56:2e Maximum number of Ports = 8 Port-Channel Speed = 0 Mbps </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Interface Description

### Commands

#### show interface description

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information	
	<b>interface</b>	Display interface information	
	<b>description</b>	Description about the interface	
<b>Defaults</b>	N/A		
<b>Command Modes</b>	Privileged EXEC		
<b>Usage Guidelines</b>	N/A		
<b>Examples</b>	moxa# show interfaces description		
	Interface	AdminStatus OperProtocol Description	
	-----	-----	-----
	Eth1/1	up down	
	Eth1/2	up down	
	Eth1/3	up down	
	Eth1/4	up down	
	Eth2/1	up down	
	Eth2/2	up down	
	Eth2/3	up down	
	Eth2/4	up down	
	Eth3/1	up down	
	Eth3/2	up down	
	Eth3/3	up down	
	Eth3/4	up down	
	Eth4/1	up down	
	Eth4/2	up down	
Eth4/3	up down		
Eth4/4	up down		
Eth5/1	up down		
<b>Error Messages</b>	N/A		
<b>Related Commands</b>	N/A		

## Show Flow Control

### Commands

**show flow-control** [ interface [ { port-channel <port-channel-id> | ethernet <slot>/<port> } ] ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>flow-control</b>	Display flow-control information
	interface	Protocol-specific configuration of the interface
	port-channel	The port channel interface
	port-channel-id	The port channel ID
	ethernet	The Ethernet interface
	slot/port	The slot number or port number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show flow-control	
	<pre> Port   Admin   Oper    Tx Pause  Rx Pause  HC TxPause  HC RxPause ----- Eth1/1 off     off     0         0         0           0 Eth1/2 off     off     0         0         0           0 Eth1/3 off     off     0         0         0           0 Eth1/4 off     off     0         0         0           0 Eth2/1 off     off     0         0         0           0 Eth2/2 off     off     0         0         0           0 Eth2/3 off     off     0         0         0           0 Eth2/4 off     off     0         0         0           0 Eth3/1 off     off     0         0         0           0 Eth3/2 off     off     0         0         0           0 Eth3/3 off     off     0         0         0           0 Eth3/4 off     off     0         0         0           0 Eth4/1 off     off     0         0         0           0 Eth4/2 off     off     0         0         0           0 Eth4/3 off     off     0         0         0           0 Eth4/4 off     off     0         0         0           0 Eth5/1 off     off     0         0         0           0 Eth5/2 off     off     0         0         0           0 Eth5/3 off     off     0         0         0           0 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Linkup Delay Status

### Commands

**show linkup-delay**

**show linkup-delay** [ interface <iftype> <ifnum> ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general
	<b>linkup-delay</b>	Display linkup-delay information
	interface	Interface-related configuration
	iftype	The Ethernet type
	ifnum	The slot number or port number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show linkup-delay LinkUp Delay Table ----- Interface Id           : Eth1/1 Link Up Delay System Status   : DISABLED Link Up Delay Port Status    : DISABLED Link Up Delay Port Time      : 2 Seconds Link Up Delay Remaining Time : 0 Seconds  LinkUp Delay Table ----- Interface Id           : Eth1/2 Link Up Delay System Status   : DISABLED Link Up Delay Port Status    : DISABLED Link Up Delay Port Time      : 2 Seconds Link Up Delay Remaining Time : 0 Seconds </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Shutdown Settings

### Commands

**shutdown**

**no shutdown**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>shutdown</b>	Configure shutdown parameters
<b>Defaults</b>	Physical ports are enabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# shutdown	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Description Settings

### Commands

**description** <description of this interface>

**no description**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>description</b>	Configure description parameters
	description of this interface	The description of the interface
<b>Defaults</b>	Empty string	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# description moxa	
<b>Error Messages</b>	% Port Setting: Invalid: data.portTable[0].description must be shorter than or equal to 127 characters	
<b>Related Commands</b>	N/A	

## Configure Duplex Settings

### Commands

**duplex** { full | half }

<b>Syntax Description</b>	<b>duplex</b>	Configure duplex parameters
	full	Set the port to full-duplex mode
	half	Set the port to half-duplex mode
<b>Defaults</b>	The port is full-duplex without auto-negotiation by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# no auto-negotiation moxa(config-if)# duplex full	
<b>Error Messages</b>	% Port Setting: Invalid: Fiber port can only be configured to full duplex/auto-mdix. % Port Setting: Invalid: Speed, Duplex and MDI/MDIX can only be configured when the port exists.	
<b>Related Commands</b>	speed { 10   100 }	

## Configure Speed Settings

### Commands

**speed** { 10 | 100 }

<b>Syntax Description</b>	<b>speed</b>	Configure port speed parameters
	10	Set the port to run at 10 Mbps
	100	Set the port to run at 100 Mbps
<b>Defaults</b>	The port is set to 100 Mbps by default if auto-negotiation is disabled on the port	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# no auto-negotiation moxa(config-if)# speed 100	
<b>Error Messages</b>	% Port Setting: Invalid: Speed cannot configure a speed which is over the ability of the port. % Port Setting: Invalid: If a speed is equal to or faster than 10G, the port cannot configure autoNego/duplex/speed. % Port Setting: Invalid: Speed, Duplex and MDI/MDIX can only be configured when the port exists.	
<b>Related Commands</b>	duplex { full   half }	

## Enable/Disable Flow Control Setting

### Commands

**flowcontrol** { on | off }

<b>Syntax Description</b>	<b>flowcontrol</b>	Configure flow-control parameters
	on	Enable flow control
	off	Disable flow control
<b>Defaults</b>	Flow control is disabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# flowcontrol off	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure MDIX Setting

### Commands

**mdix** { auto | mdi | mdix }

<b>Syntax Description</b>	<b>mdix</b>	Configure MDI/MDIX parameters
	auto	Set the port as an auto-crossover port
	mdi	Set the port as an MDI port
	mdix	Set the port as an MDIX port
<b>Defaults</b>	Auto-crossover is enabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# mdix auto	
<b>Error Messages</b>	% Port Setting: Invalid: Fiber port can only be configured to full duplex/auto-mdix. % Port Setting: Invalid: Speed, Duplex and MDI/MDIX can only be configured when the port exists.	
<b>Related Commands</b>	N/A	

## Linkup Delay

### Enable/Disable Linkup Delay

#### Commands

**linkup-delay** { enable | disable }

**no linkup-delay**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>linkup-delay</b>	Configure linkup-delay parameters
	enable	Enable linkup-delay in the system
	disable	Disable linkup-delay in the system
<b>Defaults</b>	System-wide linkup-delay is disabled by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# linkup-delay disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	linkup-delay linkup-delay timer <integer (1-1000)>	

## Configure Linkup Delay Timer

### Commands

**linkup-delay timer** <integer (1-1000)>

<b>Syntax Description</b>	<b>linkup-delay</b>	Configure linkup-delay parameters
	<b>timer</b>	Set the timer for linkup-delay
	integer (1-1000)	Timer value ranger from 1 to 1000 seconds
<b>Defaults</b>	The linkup delay timer is 2 seconds by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# linkup-delay timer 2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	linkup-delay [ enable   disable ] linkup-delay	

## Configure Auto-Negotiation Setting

### Commands

**auto-negotiation**

**no auto-negotiation**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>auto-negotiation</b>	Configure auto-negotiation parameters
<b>Defaults</b>	Auto-negotiation is enabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# auto-negotiation	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	speed { 10   100 } duplex { full   half }	

## Link Aggregation

### Port Channel

#### Configure Interface Port Channel

### Commands

**interface port-channel** <port-channel-id>

**no interface port-channel** [<port-channel-id>]

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>interface</b>	Configure interface parameters
	<b>port-channel</b>	The port-channel interface
	port-channel-id	Configure port-channel ID parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface port-channel 10 moxa(config-if)# no shutdown moxa(config-if)# exit moxa(config)# no interface port-channel 10	
<b>Error Messages</b>	'Invalid: Link Aggregation/Port-Channel group is out of range.' 'Invalid: Port channel should be activated before setting the selection policy configuration.' 'Invalid: The port-channel does not exist.'	
<b>Related Commands</b>	show port-channel load-balance	

## Configure Port Channel Shutdown Settings

### Commands

**shutdown**

**no shutdown**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>shutdown</b>	Shut down the port-channel
<b>Defaults</b>	N/A	
<b>Command Modes</b>	port channel Interface Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface port-channel 10 moxa(config-if)# no shutdown moxa(config-if)# shutdown	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show port-channel port	

## Configure Port Channel Load Balance

### Commands

**port-channel load-balance** { src-mac | dest-mac | src-dest-mac } [ <port-channel-id>]

**no port-channel load-balance** [ <port-channel-id>]

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>port-channel</b>	Configure port-channel parameters
	<b>load-balance</b>	Configure load balancing policy parameters
	src-mac	Load distribution is based on the source MAC address
	dest-mac	Load distribution is based on the destination MAC address
	src-dest-mac	Load distribution is based on the source and destination MAC address
	<port-channel-id>	Configure port-channel ID parameters
<b>Defaults</b>	Port-channel load balancing is set to source/destination MAC address (src-dest-mac) by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface port-channel 10 moxa(config-if)# no shutdown moxa(config-if)# exit moxa(config-if)# port-channel load-balance src-mac 10 moxa(config-if)# no port-channel load-balance src-mac 10	
<b>Error Messages</b>	'Invalid: Link Aggregation/Port-Channel group is out of range.' 'Invalid: Port channel should be activated before setting the selection policy configuration.' 'Invalid: The port-channel does not exist.'	
<b>Related Commands</b>	show port-channel load-balance	

## Configure Channel Group Mode

### Commands

**channel-group** <port-channel-id> **mode** { on | active | passive }

**no channel-group**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>channel-group</b>	Configure port-channel parameters
	port-channel-id	Configure channel group number parameters
	<b>mode</b>	Configure mode for port-channel parameters
	on	Configure the interface to use static trunk channel without LACP
	active	Configure LACP negotiation to start unconditionally
	passive	Configure LACP negotiation to start only when a LACP packet is received from the peer
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# channel-group 10 mode on moxa(config-if)# channel-group 10 mode active moxa(config-if)# channel-group 10 mode passive moxa(config-if)# no channel-group</pre>	
<b>Error Messages</b>	<pre>'Invalid: Switch shall have at least 2 ports.'</pre> <pre>'Invalid: This port cannot join as it exceeds the maximum number of port channels.'</pre> <pre>'Invalid: Interface index duplication.'</pre> <pre>'Invalid: Link Aggregation/Port-Channel group is out of range.'</pre> <pre>'Invalid: When a port joins the port channel, the Interface Duplexity should be Full Duplex.'</pre> <pre>'Invalid: Port-channel cannot be created when flow control on the port is enabled.'</pre> <pre>'Invalid: This port-channel is used by Turbo Ring/Turbo Chain/Dual Homing, it could not be destroyed.'</pre> <pre>'Invalid: The port-channel does not exist.'</pre> <pre>'Invalid: In the same port-channel, the member port mode should be the same.'</pre> <pre>'Invalid: Port-channel cannot be created when ports are operating at different speeds.'</pre>	
<b>Related Commands</b>	<pre>show port-channel [&lt;channel-group-ID&gt;] {detail   load-balance   port   port-channel   summary   protocol } show interface [&lt;interface-type&gt; &lt;interface-id&gt; ] port-channel</pre>	

## Configure LACP Wait Time

### Commands

**lacp wait-time** < wait-time-value >

**no lacp wait-time**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lacp</b>	Configure LACP parameters
	<b>wait-time</b>	Configure LACP wait-time parameters
	wait-time-value	Configure the LACP wait-time value
<b>Defaults</b>	The default wait time is 2 seconds	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# lacp wait-time 5 moxa(config-if)# no lacp wait-time moxa(config-if)# end</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure LACP Timeout Settings

### Commands

**lACP timeout** { long | short }

**no lACP timeout**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lACP</b>	Configure LACP parameters
	<b>timeout</b>	Configure timeout parameters
	long	Configure the longest timeout of 90 seconds
	short	Configure the shortest timeout of 3 seconds
<b>Defaults</b>	LACP timeout is set to long be default	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# lACP timeout short moxa(config-if)#no lACP timeout moxa(config-if)# end	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Link Aggregation Information

### Commands

**show port-channel** [<port-channel-id>] [{ detail | load-balance | port | port-channel | summary | protocol }]

<b>Syntax Description</b>	<b>show</b>	Display configuration / status information
	<b>port-channel</b>	Display port-channel information
	port-channel-id	Display channel group information
	detail	Display detailed information
	load-balance	Display load-balance scheme among ports in the port-channel
	port	Display port-channel port information
	port-channel	Display port-channel information
	summary	Display summary per channel group
	protocol	Display protocol used in the port-channel
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show port-channel 10 detail moxa# show port-channel 10 load-balance moxa# show port-channel 10 port moxa# show port-channel 10 port-channel moxa# show port-channel 10 summary moxa# show port-channel	
<b>Error Messages</b>	'Invalid: The port-channel does not exist.'	
<b>Related Commands</b>	interface port-channel channel-group <channel-group-id> mode { on   active   passive}	

## Show Port Channel Interfaces

### Commands

**show interfaces** { [ { <interface-type> <interface-id > } ] port-channel }

<b>Syntax Description</b>	<b>show</b>	Display configuration / status information
	<b>interfaces</b>	Display interface specific information
	<b>interface-type</b>	Display interface type
	<b>interface-id</b>	Display interface id
	<b>port-channel</b>	Display port-channel information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show interfaces ethernet 0/1 port-channel	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	channel-group <channel-group-id> mode { on   active   passive} show port-channel [<port-channel-id>] [{ detail   load-balance   port   port-channel   summary   protocol } ]	

## Energy Efficient Ethernet (EEE)

### Display EEE General Information

#### Show EEE global information

### Commands

**show eee global info**

<b>Syntax Description</b>	<b>eee</b>	Display eee information
	<b>global info</b>	Display global information of eee
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show eee global info EEE status: Enabled	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	eee enable	

#### Show Port EEE status and capability

### Commands

**show eee port info** [<interface-type> <interface-id>]

<b>Syntax Description</b>	<b>eee</b>	Display eee information			
	<b>port info</b>	Display eee port information			
	<b>interface-type</b>	Interface type			
	<b>interface-id</b>	Interface number			
<b>Defaults</b>	N/A				
<b>Command Modes</b>	Privileged EXEC				
<b>Usage Guidelines</b>	N/A				
<b>Examples</b>	moxa# show eee port info ethernet 1/1				
	Port	Energy Efficient Ethernet (EEE)	EEE Status	Local Capability	Neighbor Capability
	-----	-----	-----	-----	-----
<b>Error Messages</b>	Eth1/1	Enabled	Active	Supported	Supported
<b>Error Messages</b>	N/A				

<b>Related Commands</b>	moxa(config-if)# eee
-------------------------	----------------------

## Show local EEE TLV

### Commands

#### show lldp local

<b>Syntax</b>	<b>lldp</b>	Display lldp information
<b>Description</b>	<b>local</b>	Display local lldp info
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show lldp local  Eth1/1: Port Id SubType           : Interface Alias Port Id                   : Eth7/4 Port Description          : Ethernet Interface Port 28 Enabled Tx Tlvs           : Port Description, System Name  Extended 802.3 TLV Info -MAC PHY Configuration &amp; Status Auto-Neg Support &amp; Status : Not Supported, Disabled Advertised Capability Bits : 0000 Operational MAU Type      : 0 -Link Aggregatino Capability &amp; Status       : Not Capable, Not In Aggregation Aggregated Port Id       : 0 -Maximum Frame Size      : 1522  -Energy Efficient Ethernet TxWakeTime: 10 us RxWakeTime: 10 us FallbackTime: 10 us TxEchoTime: 10 us RxEchoTime: 10 us  Exxteded 802.1 TLV Info -Port VLAN Id             : 1 -Vlan Name Vlan Id      Vlan Name      TxStatus -----      - 1            1              Disabled </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa(config-if)# lldp tlv-select dot3tlv eee	

## Show neighbor EEE TLV

### Commands

**show lldp peers** <interface-type> <interface-id> detail

<b>Syntax</b>	<b>lldp</b>	Display lldp information
<b>Description</b>	<b>neighbors</b>	Display neighbors lldp info
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show lldp peers gigabitethernet 1/3 detail  Capability Codes  : (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device, (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other  Chassis Id SubType      : Mac Address Chassis Id              : 00:01:03:05:07:13 Port Id SubType         : Interface Alias Port Id                 : Eth1/1 Port Description        : Ethernet Interface Port 01 System Name             : moxa System Desc             : Not Advertised Local Intf              : Eth1/3 Time Remaining         : 93 Seconds System Capabilities Tlv : Not Advertised Management Address     : Not Advertised  Extended 802.3 TLV Info -MAC PHY Configuration &amp; Status Auto Negotiation Tlv   : Not Advertised -Link Aggregation Capability &amp; Status    : Not Capable, Not In Aggregation Aggregated Port Id     : 0 -Maximum Frame Size    : 9216 -Energy Efficient Ethernet TxWakeTime: 10 us RxWakeTime: 10 us FallbackTime: 10 us TxEchoTime: 10 us RxEchoTime: 10 us  Extended 802.1 TLV Info -Port VLAN Tlv        : Not Advertised -Vlan Name Vlan Name Tlv         : Not Advertised  Total Entries Displayed : 1</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa(config-if)# lldp tlv-select dot3tlv eee	

## EEE General Configuration

### EEE Global Configuration

#### Commands

**eee** {enable | disable}

<b>Syntax</b>	<b>eee</b>	Configures global eee parameter
<b>Description</b>	enable	Enables EEE setting in the switch on all ports
	disable	Disables EEE setting in the switch on all ports
<b>Defaults</b>	enable	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# eee enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show eee global info	

### EEE Port Configuration

#### Commands

**eee**

**no eee**

<b>Syntax</b>	<b>eee</b>	Enables eee feature on the specified interface
<b>Description</b>	<b>no eee</b>	Disables eee feature on the specified interface
<b>Defaults</b>	disabled	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# eee	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show eee port info	

### EEE TLV Configuration

#### Commands

**lldp tlv-select dot3tlv eee**

**no lldp tlv-select dot3tlv eee**

<b>Syntax</b>	<b>lldp tlv-select dot3tlv eee</b>	Enables eee tlv feature on the specified interface
	<b>no lldp tlv-select dot3tlv eee</b>	Disables eee tlv feature on the specified interface
<b>Description</b>		
<b>Defaults</b>	disabled	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# lldp tlv-select dot3tlv eee	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp neighbors	



# Layer 2 Switching

## VLAN

### IEEE 802.1Q

#### Show VLAN Device Information

##### Commands

##### show vlan device info

<b>Syntax Description</b>	<b>vlan</b>	Display VLAN bridge status and information
	<b>device</b>	The VLAN device
	<b>info</b>	Information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show vlan device info  vlan device configurations ----- vlan Status : Enabled vlan Oper status : Enabled gvrp status : Enabled gmrp status : Enabled gvrp Oper status : Enabled gmrp Oper status : Enabled Bridge Mode : Customer Bridge Base-Bridge Mode : Vlan Aware Bridge vlan Operational Learning Mode : IVL Hybrid Default Learning Mode : IVL Version number : 1 Max vlan id : 4094 Max supported vlans : 256	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	gvrp gmrp bridge-mode	

## Show VLAN Interface Status

### Commands

**show vlan** [{brief | id <vlan-range> | summary | ascending}]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>vlan</b>	Display the VLAN interface status
	brief	Display the VLAN entry related information of all active VLANs and VLANs (that are not active) for which the port details are configured.
	id	The VLAN index
	vlan-range	The VLAN index range (ex: 1-10 means the VID 1 to VID 10)
	summary	Display the total number of VLANs
	ascending	Display information for all VLANs in ascending order
	<b>Defaults</b>	N/A
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show vlan brief  vlan database ----- vlan ID       : 1 Member Ports  : Eth1/1, Eth1/2, Eth1/3, Eth1/4, Eth2/1, Eth2/2                 Eth2/3, Eth2/4, Eth3/1, Eth3/2, Eth3/3, Eth3/4                 Eth4/1, Eth4/2, Eth4/3, Eth4/4, Eth5/1, Eth5/2                 Eth5/3, Eth5/4, Eth6/1, Eth6/2, Eth6/3, Eth6/4                 Eth7/1, Eth7/2, Eth7/3, Eth7/4 Untagged Ports : Eth1/1, Eth1/2, Eth1/3, Eth1/4, Eth2/1, Eth2/2                 Eth2/3, Eth2/4, Eth3/1, Eth3/2, Eth3/3, Eth3/4                 Eth4/1, Eth4/2, Eth4/3, Eth4/4, Eth5/1, Eth5/2                 Eth5/3, Eth5/4, Eth6/1, Eth6/2, Eth6/3, Eth6/4                 Eth7/1, Eth7/2, Eth7/3, Eth7/4 Forbidden Ports : None Name           : Status        : Permanent Egress Ethertype : 0x8100 -----</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>vlan &lt;vlan-id&gt; ports add &lt;interface-type&gt; &lt;1/a-b&gt; untagged &lt;interface-type&gt; &lt;1/a-b&gt; forbidden &lt;interface-type&gt; &lt;1/a-b&gt; vlan active vlan name</pre>	

## Show VLAN Port Configuration

### Commands

**show vlan port config port** [port {port-channel <integer> | < interface-type > < interface-id > }]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>vlan</b>	Display VLAN interface status
	<b>port</b>	The port interface
	<b>config</b>	The port's configuration
	<b>port</b>	The port interface
	port-channel <integer>	The port channel ID This number is the max number of trunk group IDs
	interface-type	The Ethernet type
	interface-id	Interface-id : <1-X>/<1-Y> Slot Number/Port Number ; Integer : <1-Z> Port Channel ID Note: X,Y,Z are project dependent values. X means the numbers of max slot.

		Y means the number of max module port Z means the number of max trunk group ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show vlan port config port ethernet 1/3  Do not enable IEEE802.1x or MAB or is not managed by VLAN Assignment: moxa# show vlan port config port ethernet 2/7  Vlan Port configuration table ----- Port Eth 2/7 Bridge Port Type : Customer Bridge Port Port vlan ID : 1 Port Acceptable Frame Type : Admit Only Untagged and Priority Tagged Port Ingress Filtering : Enabled Port Mode : Access Port Gvrp Status : Enabled Port Gmrp Status : Enabled Port Gvrp Failed Registrations : 0 Gvrp last pdu origin : 00:00:00:00:00:00 Port Restricted Vlan Registration : Disabled Port Restricted Group Registration : Disabled Default Priority : 3 Filtering Criteria : Default -----  Managed by VLAN Assignment: moxa# show vlan port config port ethernet 2/8  Vlan Port configuration table ----- Port Eth 2/8 Bridge Port Type : Customer Bridge Port Port Vlan ID: 4091 (Vlan Assignment) Port vlan ID : 1 Port Acceptable Frame Type : Admit Only Untagged and Priority Tagged Port Ingress Filtering : Enabled Port Mode : Access Port Gvrp Status : Enabled Port Gmrp Status : Enabled Port Gvrp Failed Registrations : 0 Gvrp last pdu origin : 00:00:00:00:00:00 Port Restricted Vlan Registration : Disabled Port Restricted Group Registration : Disabled Default Priority : 3 Filtering Criteria : Default ----- </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre> Switchport pvid Switchport acceptable-frame-type Switchport ingress-filter Switchport mode gvrp gmrp vlan restricted group restricted switchport filtering-utility-criteria </pre>	

## Show MAC Address Table Information

### Commands

**show mac-address-table** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface <interface-type> <interface-id> ]

**show mac-address-table aging-time**

**show mac-address-table count** [vlan <vlan-id>]

**show mac-address-table dynamic multicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

**show mac-address-table dynamic unicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

**show mac-address-table static multicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

**show mac-address-table static unicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information																				
	<b>mac-address-table</b>	Display MAC address information																				
	<b>address</b>	MAC address entry																				
	<b>aging-time</b>	Maximum age of a Mac address table entry																				
	<b>count</b>	Number of MAC addresses present on all the VLANs or on a specified VLAN																				
	<b>dynamic</b>	Dynamic learned MAC address																				
	<b>static</b>	Static configured MAC address																				
	<b>multicast</b>	Multicast MAC address																				
	<b>unicast</b>	Unicast MAC address																				
	vlan	The VLAN interface																				
	vlan-range	The VLAN ID range for which the details will be displayed. This value ranges from 1 to 4094. For example, 4000-4010 will show information for those VLAN IDs.																				
	interface-type	The Ethernet type																				
	port-channel	The port-channel																				
	interface-id	<1-X>/<1-Y> Slot Number/Port Number ; <1~Z> Port-Channel ID Note: X,Y,Z are project dependent values. X means the numbers of max slot. Y means the number of max module port Z means the number of max trunk group ID																				
<b>Defaults</b>	N/A																					
<b>Command Modes</b>	Privileged EXEC/ User EXEC																					
<b>Usage Guidelines</b>	N/A																					
<b>Examples</b>	<pre>moxa# show mac-address-table</pre> <table border="1"> <thead> <tr> <th>vlan</th> <th>Mac Address</th> <th>Type</th> <th>ConnectionId</th> <th>Ports</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>00:00:5e:00:01:02</td> <td>Learnt</td> <td></td> <td>Eth1/3</td> </tr> <tr> <td>1</td> <td>00:21:cc:62:f7:0b</td> <td>Learnt</td> <td></td> <td>Eth1/3</td> </tr> <tr> <td>1</td> <td>00:21:cc:72:a8:d7</td> <td>Learnt</td> <td></td> <td>Eth1/3</td> </tr> </tbody> </table> <p>Total Mac Addresses displayed: 3</p>		vlan	Mac Address	Type	ConnectionId	Ports	1	00:00:5e:00:01:02	Learnt		Eth1/3	1	00:21:cc:62:f7:0b	Learnt		Eth1/3	1	00:21:cc:72:a8:d7	Learnt		Eth1/3
vlan	Mac Address	Type	ConnectionId	Ports																		
1	00:00:5e:00:01:02	Learnt		Eth1/3																		
1	00:21:cc:62:f7:0b	Learnt		Eth1/3																		
1	00:21:cc:72:a8:d7	Learnt		Eth1/3																		
<b>Error Messages</b>	N/A																					
<b>Related Commands</b>	mac-address-table																					

## Show MAC Address Table for Dynamic Multicast and Unicast

### Commands

**show mac-address-table dynamic multicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>]  
[interface {port-channel <integer> | <interface-type> <interface-id> }]

**show mac-address-table dynamic unicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>]  
[interface {port-channel <integer> | <interface-type> <interface-id> }]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>mac-address-table</b>	Display MAC address information
	<b>dynamic</b>	Display dynamically learned MAC addresses
	<b>multicast</b>	The multicast MAC addresses
	<b>unicast</b>	The unicast MAC addresses
	vlan	The VLAN interface
	vlan-range	The VLAN ID range for which the details will be displayed. This value ranges from 1 to 4094. For example, 4000-4010 will show information for those VLAN IDs.
	interface-type port-channel	The Ethernet type The port-channel
	interface-id	<1-X>/<1-Y> Slot Number/Port Number ; <1~Z> Port-Channel ID Note: X,Y,Z are project dependent values. X means the numbers of max slot. Y means the number of max module port Z means the number of max trunk group ID
	<b>Defaults</b>	N/A
<b>Command Modes</b>	Privileged EXEC/User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show mac-address-table dynamic unicast	
	<pre> vlan   Mac Address      Type   ConnectionId   Ports ----   - 1      00:00:5e:00:01:02  Learnt                Eth1/3 1      00:05:1b:a1:ae:62  Learnt                Eth1/3 1      00:0c:29:9b:83:e9  Learnt                Eth1/3 .... Total Mac Addresses displayed: 44 iss# show mac-address-table dynamic multicast  vlan   Mac Address      Type   ConnectionId   Ports ----   - Total Mac Addresses displayed: 0 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac-address-table	

## Show MAC Address Table for Static Multicast and Unicast

### Commands

**show mac-address-table static multicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>]  
[interface {port-channel <integer> | <interface-type> <interface-id> }]

**show mac-address-table static unicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface  
{port-channel <integer> | <interface-type> <interface-id> }]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>mac-address-table</b>	Display MAC address information
	<b>static</b>	Static entry
	<b>multicast</b>	The multicast MAC address
	<b>unicast</b>	The unicast MAC address
	vlan	The VLAN interface
	vlan-range	The VLAN ID range for which the details will be displayed. This value ranges from 1 to 4094. For example, 4000-4010 will show information for those VLAN IDs.
	interface-type	The Ethernet type
	port-channel	The port-channel
	interface-id	<1-X>/<1-Y> Slot Number/Port Number ; <1~Z> Port-Channel ID Note: X,Y,Z are project dependent values. X means the numbers of max slot. Y means the number of max module port Z means the number of max trunk group ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show mac-address-table static multicast vlan 1  Static Multicast Table ----- Vlan      : 1 Mac Address   : 01:00:00:00:11:22 Receive Port  : Eth1/3 Member Ports  : Eth1/1 Forbidden Ports : Status       : Permanent -----  Vlan      : 1 Mac Address   : 01:00:00:11:22:33 Receive Port  : Member Ports  : Eth1/1, Eth1/2, Eth1/3, Eth1/4, Eth1/5, Eth1/6                 Eth1/7, Eth1/8, Eth1/9, Eth1/10, Eth1/11, Eth1/12 Forbidden Ports : Status       : Permanent -----  Total Mac Addresses displayed: 2  iss# show mac-address-table static unicast  vlan  Mac Address      RecvPort Status      ConnectionId      Ports ----  - 1     00:12:23:34:45:56    Permanent          Eth1/3 1     00:31:13:31:13:13    DeleteOnReset      Eth1/3 1     00:44:33:44:33:44    Permanent          Eth1/4  Total Mac Addresses displayed: 3</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac-address-table	

## Show GVRP Statistics

### Commands

**show gvrp statistics** [{port {port-channel <integer> | <interface-type> <interface-id>}]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>gvrp statistics</b>	Display GVRP statistics
	interface-type	The Ethernet type
	port-channel	The port-channel
	interface-id	The slot number/port number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show gvrp statistics port ethernet 1/3  GVRP Statistics for Port Eth1/3 ----- Total valid GVRP Packets Received: 18 Join Emptys          0 Join In              1 Leave In              0 Leave All             17 Leave Empty           0 Empty                0 Total valid GVRP Packets Transmitted: 324 Join Emptys          0 Join In              324 Leave In              0 Leave All             0 Leave Empty           0 Empty                0  moxa# show gmrp statistics port ethernet 1/3  GMRP Statistics for Port Eth1/3 ----- Total valid GMRP Packets Received 0: Join Emptys          0 Join In              0 Leave In              0 Leave All             0 Leave Empty           0 Empty                0 Total valid GMRP Packets Transmitted:358 Join Emptys          0 Join In              358 Leave In              0 Leave All             0 Leave Empty           0 Empty                0 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	vlan active	

## Show Management VLAN

### Commands

**show management vlan**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>management</b>	Display Management VLAN information
	<b>vlan</b>	The VLAN interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show management vlan  Management VLAN-List 1,2, .....	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	Management vlan No management vlan	

## Create/Delete a VLAN

### Commands

**vlan** <vlan-id>

**no vlan** <vlan-id>

**vlan active**

**vlan name** < vlan name string >

<b>SyntaxDescription</b>	<b>vlan/no vlan</b>	Create/delete a VLAN
	vlan-id	The VLAN identifier
	<b>active</b>	Activate the VLAN
	name < vlan name string >	The VLAN name string consisting of a total of 32 characters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# vlan 100 moxa(config-vlan)# vlan active moxa(config)# no vlan 100 moxa(config)#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	interface vlan <vlan-id> show vlan	

## Configure VLAN Mode

### Commands

**ports add** {member ([<iftype> <iface\_list>][port-channel <integer>]) | untagged ([<iftype> <iface\_list>][port-channel <integer>]) | forbidden ([<iftype> <iface\_list>][port-channel <integer>])}

**vlan ports set member** ([<iftype> <iface\_list>][port-channel <integer>]) [untagged ([<iftype> <iface\_list>][port-channel <integer>])] [forbidden ([<iftype> <iface\_list>][port-channel <integer>])]

**vlan ports add** {member | untagged | forbidden} [<interface-type> <slot/port-port,slot/port,...>] [port-channel <integer>]

**no ports** [<interface-type> <slot/port-port,slot/port,...>] [port-channel <integer>] [untagged ([<interface-type> <slot/port-port,slot/port,...>] [port-channel <integer>])] [forbidden ([<interface-type> <slot/port-port,slot/port,...>] [port-channel <integer>])]

<b>Syntax Description</b>	<b>ports/no ports</b>	Set/delete member/untagged/forbidden port
	<b>add</b>	Add member/untag/forbidden port
	<b>set</b>	Overwrite member/untagged/forbidden port
	<b>slot/port-port</b>	The slot number/port number
	interface-type	The Ethernet type
	port-channel	<1-N> Set the list of port channel interfaces or a specific port channel identifier.
	member	Configure the ports to be set as a member of the VLAN
	untagged	Configure the ports that will be used by the VLAN to transmit egress traffic as untagged packets.
	forbidden	Configures the ports to never receive packets from the VLAN
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Config VLAN mode	
<b>Usage Guidelines</b>	This command can only be executed from within VLAN configuration mode. From Configuration mode, enter <code>vlan &lt;vlan-id&gt;</code> to enter VLAN config mode.	
<b>Examples</b>	<pre>moxa(config)# vlan 10 moxa(config-vlan)#ports add member ethernet 1/3 untagged all moxa(config-vlan)#ports add member ethernet 1/3 untagged ethernet 1/3 forbidden ethernet 1/2</pre>	
<b>Error Messages</b>	<p>"Invalid: If the port is in Egress Ports, then the port can not be in Forbidden Ports."</p> <p>"Invalid: The untagged port must be a member of the VLAN."</p> <p>"Invalid: If Forbidden Ports exist, Egress Ports should not be empty."</p> <p>"Invalid: Port {!s}/{!s} must be at least one VLAN member port."</p> <p>"Invalid: Port-Channel {!s} must be at least one VLAN member port."</p> <p>"Invalid: If a port is in Forbidden Ports, then the port can not be in Egress Ports or Untagged Ports."</p> <p>"Invalid: Duplicated VID {!s}."</p> <p>"Invalid: The port-channel does not exist."</p> <p>"Invalid: In Trunk mode, the non-PVID VID should be a tagged VLAN member."</p>	
<b>Related Commands</b>	<pre>vlan active switchport mode show vlan show mac-address-table count</pre>	

## Configure a Static Unicast MAC Address in the Forwarding Database

### Commands

**mac-address-table static unicast** <aa:aa:aa:aa:aa:aa> vlan <vlan-id> set [interface ([<interface-type> <slot/port-port,slot/port,...>] [<interface-type> <slot/port-port,slot/port,...>] [port-channel <a,b,c-d>] )] [status { permanent }]

**no mac-address-table static unicast** <aa:aa:aa:aa:aa:aa> vlan <vlan-id>

<b>Syntax Description</b>	<b>mac-address-table</b>	Configure mac-address-table parameters
	<b>static</b>	The statically configured MAC address
	<b>unicast</b>	Configure the unicast MAC address
	aa:aa:aa:aa:aa:aa	The unicast MAC address
	vlan	Configure the VLAN
	vlan-id	The VLAN ID
	set	Set the unicast MAC address to a specified port
	interface-type	The Ethernet type The port-channel
	interface-id	<1-X>/<1-Y> Slot Number/Port Number ; <1~Z> Port-Channel ID Note: X,Y,Z are project dependent values. X means the numbers of max slot. Y means the number of max module port Z means the number of max trunk group ID
	status	Specifies the status of the static unicast entry permanent - entry remains even after the next reset of the bridge deleteonreset - entry remains until the next reset of the bridge deleteontimeout - entry remains it is aged out
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)#mac-address-table static unicast 00:11:22:33:22:11 vlan 1 set ethernet 1/2 status permanent	
<b>Error Messages</b>	"Invalid: Unicast MAC address is allowed." "Invalid: Repetitive MAC Address." "Invalid: Invalid Forward Ports." "Invalid: Configuration fail." "Invalid: The interface is not a member of Egress Port of VLAN."	
<b>Related Commands</b>	mac-address-table static multicast vlan vlan ports add show mac-address-table static unicast	

## Globally Enable/Disable GVRP on All Ports

### Commands

**gvrp** {enable | disable}

<b>Syntax Description</b>	<b>gvrp</b>	Configure GVRP parameters
	enable	Enable on all ports and start the GVRP on the switch
	disable	Disable GVRP on all ports.
<b>Defaults</b>	GVRP is disabled by default	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	Configure the whole system GVRP status	
<b>Examples</b>	moxa(config)# gvrp enable	
<b>Error Messages</b>	Invalid: GVRP should be disabled when port 4 is in access mode.	
<b>Related Commands</b>	bridge-mode show vlan device info show gvrp statistics	

## Enable/Disable GVRP on Specific Ports

### Commands

**gvrp**

**no gvrp**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>gvrp</b>	Configure GVRP parameters GVRP: Enable GVRP on the specific port(s) No GVRP: Disable GVRP on the specific port(s)
<b>Defaults</b>	GVRP is disabled by default	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# interface Ethernet 1/1 moxa(config-if)# gvrp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show vlan port config show gvrp statistics	

## Configure MAC Address Table Aging Time

### Commands

**mac-address-table aging-time** <10-300 seconds>

**no mac-address-table aging-time**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>mac-address-table</b>	Configure the MAC-address-table
	<b>aging-time</b>	Maximum age of an entry in the MAC address table
	second	The aging time ranging from 10 to 300 seconds
<b>Defaults</b>	300s	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# mac-address-table aging-time 100	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mac-address-table aging-time	

## Configure PVID on a Specified Port

### Commands

**switchport pvid** <vlan-id>

**no switchport pvid**

<b>Syntax Description</b>	<b>switchport</b>	Configure the switch port
	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>pvid</b>	Configure port-based VLAN parameters
	vlan-id	The VLAN ID, ranging from 1 to 4094.
<b>Defaults</b>	1	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	<p>If a PVID does not exist for this system, it will be created automatically after configuration.</p> <p>If the port is configured to be in Access Mode, the actions below will be applied automatically.</p> <p>Remove this port from member port list if it is bound to another VID which is different from PVID</p> <p>Modify this port into an untagged member of this PVID</p> <p>If the port is configured to be in Trunk Mode, the port will automatically be modified into a tagged member of this PVID.</p>	
<b>Examples</b>	moxa(config-if)# switchport pvid 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	switchport vlan vlan active switchport acceptable-frame-type	

## Configure VLAN-dependent BPDU Frames

### Commands

**switchport acceptable-frame-type** {all | tagged | untaggedAndPrioritytagged }

<b>Syntax Description</b>	<b>switchport</b>	Configure the switch port
	<b>acceptable-frame-type</b>	Configure acceptable-frame-type parameters
	all	Configures the acceptable frame type as all which are acceptable and subjected to ingress filtering.
	tagged	Configures the acceptable frame type as tagged.
	untaggedAndPrioritytagged	Configures the acceptable frame type as untagged and priority tagged.
<b>Defaults</b>	all	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# switchport acceptable-frame-type untaggedAndPrioritytagged	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	switchport switchport pvid switchport ingress-filter switchport mode show vlan port config	

## Enable/Disable Ingress Filter

### Commands

**switchport ingress-filter**

**no switchport ingress-filtering**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>switchport</b>	The switch port
	<b>ingress-filtering</b>	Enable ingress-filtering
<b>Defaults</b>	disable	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# switchport ingress-filter moxa (config-if)# no switchport ingress-filter	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	switchport switchport acceptable-frame-type show vlan port config	

## Configure Switch Port Operation Mode

### Commands

**switchport mode** {access | trunk | hybrid}

<b>Syntax Description</b>	<b>switchport</b>	Configure the switch port
	<b>mode</b>	Configure switch port mode parameters
	access	Configure the port as an access port that accepts and sends only untagged packets. This kind of port is added as a member to a specific VLAN and only carries traffic for the VLAN to which the port is assigned. The port can only be set as an access port if the following 4 conditions are met: GVRP is disabled for that port. The acceptable frame type is set as "Admit untagged and pri-tagged". The port is not a tagged member of any VLAN. The PVID is the same as the only untagged VLAN it joined.
	trunk	Configures the port as trunk port that accepts and sends only tagged frames. This kind of port is added as members of several existing VLANs, and carries traffic for all of them. The port can only be set as a trunk port. if the following 2 conditions are met: The acceptable frame type is set as "Admit tagged only" The port is not an untagged member of any VLAN.
hybrid	Configures the port as a hybrid port that accepts and sends both tagged and untagged frames	
<b>Defaults</b>	The default port operation mode is set to Access	
<b>Command Modes</b>	Configuration	
<b>Usage Guidelines</b>	When changing from trunk or hybrid to access mode, the following changes will be automatically applied: Forces the port to become an untagged member of the PVID domain If the port exists in another VLAN, it will be removed Forces the accept frame type to be set to "Admit untagged and pri-tagged" When changing from access or hybrid to trunk mode, the following changes will be automatically applied: Forces the port to become a tagged member of the PVID domain If the port was an untagged member in another VLAN, it will change into a tagged member. Forces the accept frame type to be set to "Admit tagged only" When changing from access or trunk to hybrid mode, there will be no changes	
<b>Examples</b>	moxa (config-if)# switchport mode hybrid	
<b>Error Messages</b>	"Invalid: Acceptable-frame-type of VLAN trunk port should not be untagged." "Invalid: Access port only join one VLAN with untagged member."	

	"Invalid: In access mode, port PVID should be the same with the only joined VLAN id." "Invalid: Acceptable Frame Type is invalid in {} {!s}." "Invalid: GVRP should be disabled when {} {!s} is in access mode."
<b>Related Commands</b>	switchport port gvrp vlan ports switchport acceptable-frame-type show vlan port config

## Configure Restricted VLAN Registration

### Commands

#### vlan restricted

<b>Syntax Description</b>	<b>vlan restricted</b>	Configure restricted VLAN parameters Enable or disable the restricted VLAN registration feature on the port. Enabled means the creation or modification of a dynamic VLAN entry is permitted only for VLANs for which static VLAN registration entries exist. Disabled means the creation or modification of a dynamic VLAN entry is permitted for all VLANs.
<b>Defaults</b>	Restricted VLAN registration is disabled by default	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# vlan restricted	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show vlan port config	

## Create Filtering Utility Criteria

### Commands

#### switchport filtering-utility-criteria {default | enhanced}

<b>Syntax Description</b>	<b>switchport</b>	Configure the switch port
	<b>filtering-utility-criteria</b>	Configure VLAN filtering utility criteria
	default	Only allow the learning of a source MAC from a packet received on the port if there is at least one member port for a VLAN mentioned in the packet.
	enhanced	Only allow the learning of source MAC from a packet received on the port if the following conditions are met: At least one VLAN that uses the FID indicates the reception port and at least one other port with a port state of learning or forwarding in its member set Ingress to the VLAN is permitted through a port other than the source and reception ports. This port can be or not be a member of the VLAN.
<b>Defaults</b>	By default, the VLAN filtering utility criteria is set to default	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# switchport filtering-utility-criteria default	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show vlan port config	

## Set VLAN Access Port

### Commands

**switchport access** vlan <vlan-id>

<b>Syntax Description</b>	<b>switchport access</b>	Configure the port as an access port
	vlan <vlan-id>	The specified VLAN ID for which this access port will carry traffic, ranging from 1 to 4094.
<b>Defaults</b>	The port mode is set to access port by default	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	Disregarding the current operation mode of the port, this command will change the port to access mode and the following changes will automatically apply: Forces the acceptable frame type to be set to "untagged AND priority tagged" Sets PVID to specified VLAN Changes the port into an untagged member of a specified VLAN and removes this port from any other VLANs. Sets the port mode to access mode	
<b>Examples</b>	moxa(config-if)# switchport access vlan 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show vlan port config show vlan	

## Configure VLAN Management

### Commands

**management vlan** <vlan-id>

**no management vlan**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>management</b>	Configure management
	<b>vlan</b>	Configure the management VLAN
	vlan-id	The management VLAN ID (1-4096)
<b>Defaults</b>	The default management VLAN ID is set to 1	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	Configure L2 switch management interface	
<b>Examples</b>	moxa(config)# management vlan 1	
<b>Error Messages</b>	"Invalid: Management VLAN" + {!s} does not exist." "Invalid: Device only support single management VLAN."	
<b>Related Commands</b>	No management vlan	

# Q-in-Q

## Show Q-in-Q Configuration

### Show Q-in-Q Information

#### Commands

**show qinq**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qinq</b>	Display Q-in-Q configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show qinq Global Configuration ----- Global Enable : Disabled Bridge Mode : Customer Bridge	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa(config)# qinq enable moxa(config)# qinq disable	

## Show Q-in-Q Port Information

### Commands

**show qinq port-info** [ { <interface-type> <interface-id> | port-channel <integer> } ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qinq</b>	Display Q-in-Q configuration
	<b>port-info</b>	Q-in-Q port related configuration
	<interface-type>	Interface type
	<interface-id>	Interface ID
	port-channel	Port channel interface
	<integer>	Port channel ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show qinq port-info Interface  Port Type                Ingress TPID  Egress TPID -----  - Eth1/1    Customer Network Port    0x8100        0x8100 Eth1/2    Customer Network Port    0x8100        0x8100 Eth1/3    Customer Network Port    0x8100        0x8100 Eth1/4    Customer Network Port    0x8100        0x8100 Eth1/5    Customer Network Port    0x8100        0x8100 Eth1/6    Customer Network Port    0x8100        0x8100 Eth1/7    Customer Network Port    0x8100        0x8100 Eth1/8    Customer Network Port    0x8100        0x8100 Eth1/9    Customer Network Port    0x8100        0x8100 Eth1/10   Customer Network Port    0x8100        0x8100 Eth1/11   Customer Network Port    0x8100        0x8100 Eth1/12   Customer Network Port    0x8100        0x8100 Eth1/13   Customer Network Port    0x8100        0x8100 Eth1/14   Customer Network Port    0x8100        0x8100 Eth1/15   Customer Network Port    0x8100        0x8100 Eth1/16   Customer Network Port    0x8100        0x8100 ... </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre> moxa(config-if)# switchport port-type customer-edge-port moxa(config-if)# qinq tpid ingress 0x9100 moxa(config-if)# qinq tpid egress 0x9200 </pre>	

## Show Q-in-Q Tunneling

### Commands

**show qinq tunneling** [ { <interface-type> <interface-id> | port-channel <integer> } ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qinq</b>	Display Q-in-Q configuration
	<b>tunneling</b>	Q-in-Q tunneling configuration
	<interface-type>	Interface type
	<interface-id>	Interface ID
	port-channel	Port channel interface
	<integer>	Port channel ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show qinq tunneling Q-in-Q Tunneling Configuration for Eth1/1 ----- Spanning Tree           : Disabled GVRP                    : Disabled GMRP                    : Disabled IEEE 802.1X             : Disabled LLDP                    : Disabled IGMP                    : Disabled ...</pre>	
<b>Error Messages</b>	% Invalid Port-channel	
<b>Related Commands</b>	moxa(config-if)# qinq tunneling dot1x enable	

## show Q-in-Q customer-vlan mapping

### Commands

**show qinq customer-vlan mapping** [ { <interface-type> <interface-id> | port-channel <integer> } ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qinq</b>	Display Q-in-Q configuration
	<b>customer-vlan</b>	Customer VLAN related parameter
	<b>mapping</b>	Customer VLAN mapping configuration
	<interface-type>	Interface type
	<interface-id>	Interface ID
	port-channel	Port channel interface
<integer>	Port channel ID	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show qinq customer-vlan mapping  Customer VLAN ID  Service VLAN ID  Interface ----- 10                 1                               Eth1/1 ...</pre>	
<b>Error Messages</b>	% Invalid Port-channel	
<b>Related Commands</b>	moxa(config-qinq)# customer-vlan 10 service-vlan 1 port eth 1/1	

## Configure Q-in-Q Settings

### Enable Q-in-Q

#### Commands

**qinq** { enable | disable }

<b>Syntax Description</b>	<b>qinq</b>	Configure Q-in-Q parameters
	<b>enable</b>	Enable Q-in-Q on the switch
	<b>disable</b>	Disable Q-in-Q on the switch
<b>Defaults</b>	The feature is disabled by default.	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# qinq enable	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show qinq	

### Configure Q-in-Q

#### Commands

**qinq**

<b>Syntax Description</b>	<b>qinq</b>	Configure Q-in-Q parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	Enter Q-in-Q configuration mode	
<b>Examples</b>	moxa(config)# qinq moxa(config-qinq)#	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Q-in-Q TPID

### Commands

**qinq tpid** { ingress | egress } { 0x88A8 | 0x9100 | 0x9200 }

<b>Syntax Description</b>	<b>qinq</b>	Configure Q-in-Q parameters
	<b>tpid</b>	TPID configuration
	ingress	Ingress TPID configuration
	egress	Egress TPID configuration
	0x88A8	Configure TPID to 0x88A8
	0x9100	Configure TPID to 0x9100
	0x9200	Configure TPID to 0x9200
<b>Defaults</b>	0x88A8	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	Configure TPID related parameters	
<b>Examples</b>	<pre>moxa(config)# qinq tpid ingress 0x9100 moxa(config)# qinq tpid egress 0x9200</pre>	
<b>Error Messages</b>	<p>Invalid: Configuring ingress TPID requires Q-in-Q. Enable Q-in-Q and try again.</p> <p>Invalid: Configuring egress TPID requires Q-in-Q. Enable Q-in-Q and try again.</p> <p>Invalid: Configuring ingress TPID requires a provider network port. Choose a provider port and try again.</p> <p>Invalid: Configuring egress TPID requires a provider network port. Choose a provider port and try again.</p> <p>Invalid: Ingress TPID not available on port channel member ports. Choose a different port, and then try again.</p> <p>Invalid: Egress TPID not available on port channel member ports. Choose a different port, and then try again.</p>	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show qinq port-info [ { <iftyp> <ifnum>   port-channel <integer> } ]	

## Configure Q-in-Q Switchport Port Type

### Commands

**switchport port-type** { provider-network-port | customer-edge-port | customer-network-port }

<b>Syntax Description</b>	switchport	Configure switchport
	port-type	TPID configuration
	provider-network-port	Configure port type to provider network port
	customer-edge-port	Configure port type to customer edge port
	customer-network-port	Configure port type to customer network port
<b>Defaults</b>	Customer-network-port	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	Configure bridge port type	
<b>Examples</b>	<pre>moxa(config-if)# switchport port-type provider-network-port</pre>	
<b>Error Messages</b>	<p>Invalid: Specifying port type requires Q-in-Q. Enable Q-in-Q and try again.</p> <p>Invalid: Port type must match port-channel. Change port-channel or match port type, and then try again.</p> <p>Invalid: Assigning a VLAN mapping configuration requires a customer edge port. Configure port as customer edge port or choose another port, and then try again.</p> <p>Invalid: Port type not configurable on port channel member ports. Choose a different port, and then try again.</p>	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show qinq port-info [ { <iftyp> <ifnum>   port-channel <integer> } ]	

## Enable Q-in-Q Tunneling

### Commands

**qinq tunneling** { stp | gvrp | gmrp | dot1x | lldp | igmp | all } { enable | disable }

<b>Syntax Description</b>	<b>qinq</b>	Configure Q-in-Q parameters
	<b>tunneling</b>	Q-in-Q tunneling related configuration
	stp	Configure Spanning Tree related parameter
	gvrp	Configure GVRP related parameter
	gmrp	Configure GMRP related parameter
	dot1x	Configure IEEE 802.1X related parameter
	lldp	Configure LLDP related parameter
	igmp	Configure IGMP related parameter
	all	Configure all supported protocol
	enable	Configure tunneling into enable mode
disable	Configure tunneling into disable mode	
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	Configure Q-in-Q tunneling protocol	
<b>Examples</b>	<pre>moxa(config-if)# qinq tunneling stp enable moxa(config-if)# qinq tunneling all disable</pre>	
<b>Error Messages</b>	<p>Invalid: Configuring tunneling requires Q-in-Q. Enable Q-in-Q and try again.</p> <p>Invalid: Configuring tunneling requires customer network port or customer edge port port type. Change port type or choose a different port, and then try again.</p> <p>Invalid: Configuring IEEE 802.1X tunneling requires physical port. Choose a physical port and try again.</p> <p>Invalid: Configuring LLDP tunneling requires physical port. Choose a physical port and try again.</p> <p>Invalid: Configuring IEEE 802.1X tunneling must be set on physical port. Choose a different port, and then try again.</p> <p>Invalid: Configuring LLDP tunneling must be set on physical port. Choose a different port, and then try again.</p> <p>Invalid: Tunneling not available on port channel member ports. Choose a different port, and then try again.</p>	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show qinq tunneling [ { <iftype> <ifnum>   port-channel <integer> } ]	

## Configure Customer VLAN

### Commands

**customer-vlan** <short(1-4094)> service-vlan <short(1-4094)> interface { <interface-type> <interface-id> | port-channel <integer> }

**no customer-vlan** <short(1-4094)> interface { <interface-type> <interface-id> | port-channel <integer> }

<b>Syntax Description</b>	<b>customer-vlan</b>	Configure customer VLAN related parameter
	<short(1-4094)>	The range (1-4094) is for VLAN ID
	service-vlan	Configure Service VLAN related parameter
	<short(1-4094)>	The range (1-4094) is for VLAN ID
	interface	Set VLAN mapping on the specified interface
	<interface-type>	Interface type
	<interface-id>	Interface ID
	port-channel	Port channel interface
	<integer>	Port channel ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Q-in-Q Configuration Mode	
<b>Usage Guidelines</b>	Configure or delete customer/service VLAN mapping parameters	
<b>Examples</b>	<pre>moxa(config-qinq)# qinq moxa(config-qinq)# customer-vlan 10 service-vlan 5 interface eth 1/1</pre>	
	<pre>moxa(config-qinq)# no customer-vlan 10 interface eth 1/1</pre>	
<b>Error Messages</b>	Invalid: Configuring customer VLAN mapping requires Q-in-Q. Enable Q-in-Q and try again.	
	Invalid: Assigning a VLAN mapping configuration requires a customer edge port. Configure port as customer edge port or choose another port, and then try again.	
	Invalid: Service VLAN must be an active VLAN. Choose an active VLAN ID or configure one, and then try a again	
	Invalid: A customer VLAN ID can only map to one service VLAN ID. Change customer VLAN ID or service VLAN ID and try again.	
	Invalid: VLAN mapping not available on port channel member ports. Choose a different port, and then try again.	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show qinq customer-vlan mapping [ { <interface-type> <interface-id>   port-channel <integer> } ]	

# GARP

## Show GARP Timer

### Commands

**show garp timer** [port {port-channel <integer> | <interface-type> <interface-id>}]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>garp timer</b>	Display GARP timer information
	interface-type	The Ethernet type
	port-channel	The port-channel
	interface-id	The slot number/port number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show garp timer Garp Port Timer Info (in milli seconds) ----- Port   Join-time   Leave-time   Leave-all-time ----- Eth1/1  200         600          10000 Eth1/2  200         600          10000 Eth1/3  200         600          10000 Eth1/4  200         600          10000 Eth2/1  200         600          10000 Eth2/2  200         600          10000 Eth2/3  200         600          10000 Eth2/4  200         600          10000 .....</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	garp timer no shutdown garp	

## Configure GARP Timer on a Specified Port

### Comments

garp timer {join | leave | leaveall} <time in milli seconds>

<b>Syntax Description</b>	<b>join</b>	Configure the time (ms) interval which a GARP participant should wait for its join message to be acknowledged before re-sending the join message. The join message is retransmitted only once. This countdown starts once the initial join message is sent. The join message is sent by a GARP participant to another GARP participant for registering.
	<b>leave</b>	Configures the time (ms) interval a GARP participant should wait for any join message before removing attribute details.
	<b>leaveall</b>	Configures the time (ms) interval for which the details of the registered attributes are maintained.
<b>Defaults</b>	join - 200ms leave - 600ms leaveall - 10000ms	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# garp timer join 250	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show garp timer	

# MAC

## Static Unicast

### Configure a Static Unicast MAC Address in the Forwarding Database

#### Commands

**mac-address-table static unicast** <aa:aa:aa:aa:aa:aa> vlan <vlan-id> **set** [interface ([<interface-type> <slot/port-port,slot/port,...>] [<interface-type> <slot/port-port,slot/port,...>] [port-channel <a,b,c-d>] )] [status { permanent }]

**no mac-address-table static unicast** <aa:aa:aa:aa:aa:aa> vlan <vlan-id>

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>mac-address-table</b>	Configure MAC address table parameters
	<b>static</b>	Statically configured MAC address
	<b>unicast</b>	The unicast MAC address
	<b>set</b>	Overwrite port
	interface-type	The Ethernet type The port-channel
	interface-id	The slot number/port number
	status	Specify the status of the static unicast entry: permanent - entry remains even after the next reset of the bridge
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# mac-address-table static unicast aa:aa:aa:bb:bb:cc vlan 168 set interface ethernet 2/4 status permanent	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac-address-table static multicast vlan vlan ports add show mac-address-table static unicast	

# MAC Address Table

## Show MAC Address Table Information

### Commands

**mac-address-table** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface <interface-type> <interface-id> ]

**mac-address-table aging-time**

**mac-address-table count** [vlan <vlan-id>]

**mac-address-table dynamic multicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

**mac-address-table dynamic unicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

**mac-address-table static multicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

**mac-address-table static unicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>] [interface {port-channel <integer> | <interface-type> <interface-id> }]

<b>Syntax Description</b>	<b>mac-address-table</b>	Display MAC address information																				
	address	The MAC address entry																				
	<b>aging-time</b>	The maximum age of a MAC address table entry																				
	<b>count</b>	The number of MAC addresses present on all VLANs or on a specified VLAN																				
	<b>dynamic</b>	Dynamically learned MAC address																				
	<b>static</b>	Statically configured MAC address																				
	<b>multicast</b>	The multicast MAC address																				
	<b>unicast</b>	The unicast MAC address																				
	vlan	The VLAN interface																				
	vlan-range	The VLAN ID range for which the details will be displayed. This value ranges from 1 to 4094. For example, 4000-4010 will show information for those VLAN IDs.																				
	interface-type	The Ethernet type																				
	port-channel	The port-channel																				
	interface-id	The slot number/port number																				
<b>Defaults</b>	N/A																					
<b>Command Modes</b>	Privileged EXEC/ User EXEC																					
<b>Usage Guidelines</b>	N/A																					
<b>Examples</b>	<pre>moxa# show mac-address-table</pre> <table border="1"> <thead> <tr> <th>vlan</th> <th>Mac Address</th> <th>Type</th> <th>ConnectionId</th> <th>Ports</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>00:00:5e:00:01:02</td> <td>Learnt</td> <td></td> <td>Eth1/3</td> </tr> <tr> <td>1</td> <td>00:21:cc:62:f7:0b</td> <td>Learnt</td> <td></td> <td>Eth1/3</td> </tr> <tr> <td>1</td> <td>00:21:cc:72:a8:d7</td> <td>Learnt</td> <td></td> <td>Eth1/3</td> </tr> </tbody> </table> <p>Total Mac Addresses displayed: 3</p>		vlan	Mac Address	Type	ConnectionId	Ports	1	00:00:5e:00:01:02	Learnt		Eth1/3	1	00:21:cc:62:f7:0b	Learnt		Eth1/3	1	00:21:cc:72:a8:d7	Learnt		Eth1/3
vlan	Mac Address	Type	ConnectionId	Ports																		
1	00:00:5e:00:01:02	Learnt		Eth1/3																		
1	00:21:cc:62:f7:0b	Learnt		Eth1/3																		
1	00:21:cc:72:a8:d7	Learnt		Eth1/3																		
<b>Error Messages</b>	N/A																					
<b>Related Commands</b>	mac-address-table																					

# QoS

## Classification

### Configure Mapping Rule for DSCP Priority

#### Commands

**qos ip-dscp-mapping dscp-priority** <dscp-priority(0-63)> cos-priority <cos-priority(0-7)>

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>ip-dscp-mapping</b>	Configure mapping rules for DSCP priority
	<b>dscp-priority</b>	The DSCP priority
	dscp-priority(0-63)	The Differentiated Services Code Point (DSCP) value
	cos-priority	The CoS priority
	cos-priority(0-7)	The Class of Service (CoS) value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# qos ip-dscp-mapping dscp-priority 0 cos-priority 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa # show qos ip-dscp-mapping [dscp-priority <integer (0-63)>]	

### Configure COS Mapping Rule

#### Commands

**qos cos-mapping cos-priority** <cos-priority(0-7)> queue-id <queue-id(1-8)>

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>cos-mapping</b>	Configure mapping rules for CoS priority
	<b>cos-priority</b>	The CoS priority
	cos-priority(0-7)	The VLAN priority
	queue-id	The queue index
	queue-id(1-8)	The queue index value, ranging from 1 to 8
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# qos cos-mapping cos-priority 1 queue-id 2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa# show qos cos-mapping [cos-priority <integer (0-7)>]	

### Configure QoS Default Priority Setting

#### Commands

**qos default-priority** <default-priority(0-7)>

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>default-priority</b>	Configure the default user priority
	default-priority(0-7)	The VLAN priority
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos default-priority 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa # show qos defaultPriority [ interface <iftype> <ifnum> ]	

## Configure QoS P-bit Preference

### Commands

**qos pbit-preference** {dscp | cos}

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>pbit-preference</b>	Configure pbit preference parameters
	dscp	Use DSCP priority
	cos	Use CoS priority
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)#qos pbit-preference dscp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa # show qos pbit-preference [interface <iftyp> <ifnum>]	

## Show QoS DSCP Mapping Rule

### Commands

**show qos ip-dscp-mapping** [dscp-priority <integer (0-63)>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qos</b>	Display QoS information
	<b>ip-dscp-mapping</b>	Display the QoS DSCP mapping table
	dscp-priority	The DSCP priority
	dscp-priority (0-63)	The Differentiated Services Code Point (DSCP) value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa # show qos ip-dscp-mapping dscp-priority 1  QoS DSCP Priority Mapping ----- Dscp Priority 1 mapping to CoS Priority 0  moxa# show qos ip-dscp-mapping  QoS DSCP Priority Mapping ----- Dscp Priority 0 mapping to CoS Priority 0 Dscp Priority 1 mapping to CoS Priority 0 Dscp Priority 2 mapping to CoS Priority 0 Dscp Priority 3 mapping to CoS Priority 0 Dscp Priority 4 mapping to CoS Priority 0 Dscp Priority 5 mapping to CoS Priority 0 Dscp Priority 6 mapping to CoS Priority 0 ..... Dscp Priority 63 mapping to CoS Priority 7</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa (config)# qos ip-dscp-mapping dscp-priority <dscp-priority(0-63)> cos-priority <cos-priority(0-7)>	

## Show QoS COS Mapping Rule

### Commands

**show qos cos-mapping** [cos-priority <integer (0-7)>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qos</b>	Display QoS information
	<b>cos-mapping</b>	Display the QoS CoS mapping table
	cos-priority	The CoS priority
	(0-7)	The VLAN priority value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show qos cos-mapping cos-priority 1  QoS CoS Priority Mapping ----- CoS Priority 1 mapping to Queue ID 2  moxa # show qos cos-mapping  QoS CoS Priority Mapping ----- CoS Priority 0 mapping to Queue ID 1 CoS Priority 1 mapping to Queue ID 2 CoS Priority 2 mapping to Queue ID 3 CoS Priority 3 mapping to Queue ID 4 CoS Priority 4 mapping to Queue ID 5 CoS Priority 5 mapping to Queue ID 6 CoS Priority 6 mapping to Queue ID 7 CoS Priority 7 mapping to Queue ID 8</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa (config)# qos cos-mapping cos-priority <cos-priority(0-7)> queue-id <queue-id(1-8)>	

## Show QoS Default Priority Setting

### Commands

**show qos default-priority** [ interface <iftype> <ifnum> ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qos</b>	Display QoS information
	<b>default-priority</b>	Display the QoS default user priority
	interface	Interface information
	iftype	The interface type
	ifnum	The interface index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa # show qos default-priority interface ethernet 1/1  QoS Default Priority ----- Interface Ethernet 1/1 Default Priority is 3  moxa # show qos default-priority  QoS Default Priority ----- Interface Ethernet 1/1 Default Priority is 3 Interface Ethernet 1/2 Default Priority is 3 Interface Ethernet 1/3 Default Priority is 3 Interface Ethernet 1/4 Default Priority is 3 Interface Ethernet 2/1 Default Priority is 3 Interface Ethernet 2/2 Default Priority is 3 ..... Interface Ethernet 7/4 Default Priority is 3</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa (config)# qos default-priority <default-priority(0-7)>	

## Show QoS P-bit Preference

### Commands

**show qos pbit-preference** [interface <iftype> <ifnum>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qos</b>	Display QoS information
	<b>pbit-preference</b>	Display the pbit preference
	interface	Interface information
	iftype	The interface type
	ifnum	The interface index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	If no interface is entered, the QoS pbit preference is shown for all ports.	
<b>Examples</b>	<pre>moxa # show qos pbit-preference interface ethernet 1/1  QoS P-bit Preference Status ----- Interface Ethernet 1/1 P-bit Preference is CoS  moxa # show qos pbit-preference  QoS P-bit Preference Status ----- Interface Ethernet 1/1 P-bit Preference is CoS Interface Ethernet 1/2 P-bit Preference is CoS Interface Ethernet 1/3 P-bit Preference is CoS Interface Ethernet 1/4 P-bit Preference is CoS Interface Ethernet 2/1 P-bit Preference is CoS Interface Ethernet 2/2 P-bit Preference is CoS Interface Ethernet 2/3 P-bit Preference is CoS Interface Ethernet 2/4 P-bit Preference is CoS ..... Interface Ethernet 7/4 P-bit Preference is CoS</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa (config)# qos pbit-preference {dscp   cos}	

## Ingress Rate Limit

### Configure Ingress Rate Limit Simple Token Bucket Conform Action: None

#### Commands

**qos rate-limit-type simple-token-bucket cir** <cir(1-1000)> [**cbs** <cbs(10-10240)>] **conform-action do-nothing violate-action drop**

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>rate-limit-type</b>	Configure QoS rate limit parameters
	<b>simple-token-bucket</b>	Simple Token Bucket
	<b>cir</b>	Committed Information Rate
	cir(1-1000)	Committed information rate in Mbps
	<b>cbs</b>	Committed Burst Size
	cbs(10-10240)	Committed burst size in KByte
	<b>conform-action</b>	Configure the conform action parameter
	<b>do-nothing</b>	Do not perform any action
	<b>violate-action</b>	Configure the violate action parameter
<b>drop</b>	Drop the packet	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos rate-limit-type simple-token-bucket cir 100 cbs 2000 conform-action do-nothing violate-action drop	
<b>Error Messages</b>	'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['meterCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {} {}`.format(pre_m_obj['shaperCbsValue'], max_size) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj[key], max_size) 'Invalid: In Simple token bucket mode, when violation action is not drop, conform action and violate action should be the same.'	
<b>Related Commands</b>	moxa # show qos rate-limit [interface <iftype> <ifnum>	

## Configure Ingress Rate Limit Simple Token Bucket Conform Action: Remark-cos

### Commands

**qos rate-limit-type simple-token-bucket cir** <cir(1-1000)> [**cbs** <cbs(10-10240)>] **conform-action remark-cos** <cos-priority(0-7)> **violate-action** {drop | remark-cos <cos-priority(0-7)>}

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>rate-limit-type</b>	Configure QoS rate limit parameters
	<b>simple-token-bucket</b>	Simple Token Bucket
	<b>cir</b>	Committed Information Rate
	cir(1-1000)	Committed information rate in Mbps
	<b>cbs</b>	Committed Burst Size
	cbs(10-10240)	Committed burst size in KByte
	<b>conform-action</b>	Configure the conform action parameter
	<b>remark-cos</b>	Remark packet CoS priority
	cos-priority(0-7)	The VLAN priority value
	<b>violate-action</b>	Configure the violate action parameter
	drop	Drop the packet
	remark-cos	Remark the packet CoS priority
	cos-priority(0-7)	The VLAN priority value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos rate-limit-type simple-token-bucket cir 500 cbs 2000 conform-action remark-cos 6 violate-action drop	
<b>Error Messages</b>	'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['meterCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCirValue'], max_rate) 'Invalid: {} is greater than the maximum of { {}'.format(pre_m_obj['shaperCbsValue'], max_size) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj[key], max_size) 'Invalid: In Simple token bucket mode, when violation action is not drop, conform action and violate action should be the same.'	
<b>Related Commands</b>	moxa # show qos rate-limit [interface <iftype> <ifnum>]	

## Configure Ingress Rate Limit Simple Token Bucket Conform Action: Remark-dscp

### Commands

**qos rate-limit-type simple-token-bucket cir** <cir(1-1000)> [**cbs** <cbs(10-10240)>] **conform-action remark-dscp** <dscp-priority(0-63)> **violate-action** {drop | remark-dscp <dscp-priority(0-63)>}

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>rate-limit-type</b>	Configure QoS rate limit parameters
	<b>simple-token-bucket</b>	Simple Token Bucket
	<b>cir</b>	Committed Information Rate
	cir(1-1000)	Committed information rate in Mbps
	<b>cbs</b>	Committed Burst Size
	cbs(10-10240)	Committed burst size in KByte
	<b>conform-action</b>	Configure the conform action parameter
	<b>remark-dscp</b>	Remark the packet DSCP priority
	dscp-priority(0-63)	The Differentiated Services Code Point (DSCP) value
	<b>violate-action</b>	Configure the violate action parameter
	<b>drop</b>	Drop the packet
	<b>remark-dscp</b>	Remark the packet DSCP priority
dscp-priority(0-63)	The Differentiated Services Code Point (DSCP) value	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos rate-limit-type simple-token-bucket cir 500 cbs 2000 conform-action remark-dscp 50 violate-action drop	
<b>Error Messages</b>	'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['meterCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}`.format(pre_m_obj['shaperCbsValue'], max_size) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj[key], max_size) 'Invalid: In Simple token bucket mode, when violation action is not drop, conform action and violate action should be the same.'	
<b>Related Commands</b>	moxa # show qos rate-limit [interface <iftyp> <ifnum>]	

## Configure Ingress Rate Limit srTCM Conform Action: None

### Commands

**qos rate-limit-type srtcm cir** <cir(1-1000)> [cbs <cbs(1-10240)>] [ebs <ebs(1-10240)>] **conform-action none exceed-action drop violate-action drop**

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>rate-limit-type</b>	Configure QoS rate limit parameters
	<b>srtcm</b>	Single Rate Three Color Marker
	<b>cir</b>	Committed Information Rate
	cir(1-1000)	Committed information rate in Mbps
	<b>cbs</b>	Committed Burst Size
	cbs(10-10240)	Committed burst size in KByte
	<b>ebs</b>	Excess Burst Size (or PBS)
	ebs(10-10240)	Excess burst size that unit of KByte
	<b>conform-action</b>	Configure the conform action parameter
	<b>none</b>	Do not perform any action
	<b>exceed-action</b>	Configure the exceed action parameter
	<b>drop</b>	Drop the packet
	<b>violate-action</b>	Configure the violate action parameter
<b>drop</b>	Drop the packet	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos rate-limit-type srtcm cir 500 cbs 2000 ebs 2500 conform-action none exceed-action drop violate-action drop	
<b>Error Messages</b>	'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['meterCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCbsValue'], max_size) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj[key], max_size) 'Invalid: In srTCM mode, when exceed action is remark-cos, conform action should be remark-cos and violate action should not be remark-dscp.' 'Invalid: In srTCM mode, when exceed action is remark-dscp, conform action should be remark-dscp and violate action should not be remark-cos.'	
<b>Related Commands</b>	moxa # show qos rate-limit [interface <iftype> <ifnum>]	

## Configure Ingress Rate Limit srTCM Conform Action: Remark-cos

### Commands

**qos rate-limit-type srtcm cir** <cir(1-1000)> [cbs <cbs(10-10240)>] [ebs <ebs(10-10240)>] **conform-action remark-cos** <cos-priority(0-7)> **exceed-action** {drop | remark-cos <cos-priority(0-7)>} **violate-action** {drop | remark-cos <cos-priority(0-7)>}

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>rate-limit-type</b>	Configure QoS rate limit parameters
	<b>srtcm</b>	Single Rate Three Color Marker
	<b>cir</b>	Committed Information Rate
	cir(1-1000)	Committed information rate in Mbps
	<b>cbs</b>	Committed Burst Size
	cbs(10-10240)	Committed burst size that in KByte
	<b>ebs</b>	Excess Burst Size (or PBS)
	ebs(10-10240)	Excess burst size in KByte
	<b>conform-action</b>	Configure the conform action parameter
	<b>remark-cos</b>	Remark the packet CoS priority
	cos-priority(0-7)	The VLAN priority value
	<b>exceed-action</b>	Configure the exceed action parameter
	<b>drop</b>	Drop the packet
	<b>remark-cos</b>	Remark the packet CoS priority
	cos-priority(0-7)	The VLAN priority value
	<b>violate-action</b>	Configure the violate action parameter
<b>drop</b>	Drop the packet	
<b>remark-cos</b>	Remark the packet CoS priority	
cos-priority(0-7)	The VLAN priority value	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos rate-limit-type srtcm cir 500 cbs 2000 ebs 2500 conform-action remark-cos 7 exceed-action drop violate-action drop	
<b>Error Messages</b>	'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['meterCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCbsValue'], max_size) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj[key], max_size) 'Invalid: In srTCM mode, when exceed action is remark-cos, conform action should be remark-cos and violate action should not be remark-dscp.' 'Invalid: In srTCM mode, when exceed action is remark-dscp, conform action should be remark-dscp and violate action should not be remark-cos.'	
<b>Related Commands</b>	moxa # show qos rate-limit [interface <iftype> <ifnum>]	

## Configure Ingress Rate Limit srTCM Conform Action: Remark-dscp

### Commands

**qos rate-limit-type srtcm cir** <cir(1-1000)> [cbs <cbs(10-10240)>] [ebs <ebs(10-10240)>] **conform-action remark-dscp** <dscp-priority(0-63)> **exceed-action** {drop | remark-dscp <dscp-priority(0-63)>} **violate-action** {drop | remark-dscp <dscp-priority(0-63)>}

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>rate-limit-type</b>	Configure QoS rate limit parameters
	<b>srtcm</b>	Single Rate Three Color Marker
	<b>cir</b>	Committed Information Rate
	cir(1-1000)	Committed information rate in Mbps
	<b>cbs</b>	Committed Burst Size
	cbs(10-10240)	Committed burst size in KByte
	<b>ebs</b>	Excess Burst Size (or PBS)
	ebs(10-10240)	Excess burst size that in KByte
	<b>conform-action</b>	Configure the conform action parameter
	<b>remark-dscp</b>	Remark the packet CoS priority
	dscp-priority(0-63)	Differentiated Services Code Point(DSCP) value
	<b>exceed-action</b>	Configure the exceed action parameter
	<b>drop</b>	Drop the packet
	<b>remark-dscp</b>	Remark the packet CoS priority
	dscp-priority(0-63)	The Differentiated Services Code Point (DSCP) value
	<b>violate-action</b>	Configure the violate action parameter
<b>drop</b>	Drop the packet	
<b>remark-dscp</b>	Remark the packet CoS priority	
<dscp-priority(0-63)>	The Differentiated Services Code Point (DSCP) value	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos rate-limit-type srtcm cir 500 cbs 2000 ebs 2500 conform-action remark-dscp 63 exceed-action drop violate-action drop	
<b>Error Messages</b>	'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['meterCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCirValue'], max_rate) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj['shaperCbsValue'], max_size) 'Invalid: {} is greater than the maximum of {}'.format(pre_m_obj[key], max_size) 'Invalid: In srTCM mode, when exceed action is remark-cos, conform action should be remark-cos and violate action should not be remark-dscp.' 'Invalid: In srTCM mode, when exceed action is remark-dscp, conform action should be remark-dscp and violate action should not be remark-cos.'	
<b>Related Commands</b>	moxa # show qos rate-limit [interface <iftype> <ifnum>]	

## Show Ingress Rate Limit Parameters

### Commands

**show qos rate-limit** [interface <iftype> <ifnum>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qos</b>	Display QoS information
	<b>rate-limit</b>	Display QoS rate limit information
	interface	Interface information
	iftype	The interface type
	ifnum	The interface index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa # show qos rate-limit interface ethernet 1/1  QoS Rate Limit Statue of Interface Ethernet 1/1 ----- Meter Type           : Simple Token Bucket CIR                  : Disable CBS                  : Disable EBS                  : Disable Color Mode           : Blind Confirm Action       : None Remark CoS Value     : None Remark DSCP Value    : None Exceed Action        : Drop Remark CoS Value     : None Remark DSCP Value    : None Violate Action       : Drop Remark CoS Value     : None Remark DSCP Value    : None  moxa # show qos rate-limit  QoS Rate Limit Statue of Interface Ethernet 1/1 ----- Meter Type           : Simple Token Bucket CIR                  : Disable CBS                  : Disable EBS                  : Disable Color Mode           : Blind Confirm Action       : None Remark CoS Value     : None Remark DSCP Value    : None Exceed Action        : Drop Remark CoS Value     : None Remark DSCP Value    : None Violate Action       : Drop Remark CoS Value     : None Remark DSCP Value    : None  QoS Rate Limit Statue of Interface Ethernet 1/2 ----- Meter Type           : Simple Token Bucket CIR                  : Disable CBS                  : Disable EBS                  : Disable Color Mode           : Blind ..... </pre>	
<b>Error Messages</b>	N/A	

<b>Related Commands</b>	moxa(config-if)# qos rate-limit-type {simple-token-bucket   srtcm} [cir <cir(1-1000)>] [cbs <cbs(1-10240)>] [ebs <ebs(1-10240)>] [conform-action {none   remark-cos <cos-priority(0-7)>   remark-dscp <dscp-priority(0-63)>}] [exceed-action {drop   remark-cos <cos-priority(0-7)>   remark-dscp <dscp-priority(0-63)>}] [violate-action {drop   remark-cos <cos-priority(0-7)>   remark-dscp <dscp-priority(0-63)>}]
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## Scheduler

### Configure QoS Scheduler Type Setting

#### Commands

**qos scheduler-type** {strict-priority | wrr}

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>scheduler-type</b>	Configure QoS scheduler parameters
	strict-priority	Strict Priority
	wrr	Weighted Round Robin
<b>Defaults</b>	The QoS scheduler type is set to strict priority by default	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos scheduler-type wrr	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa # show qos scheduler [ interface <iftype> <ifnum> ]	

### Show QoS Scheduler Setting

#### Commands

**show qos scheduler** [ interface <iftype> <ifnum> ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qos</b>	Display QoS information
	<b>scheduler</b>	Display QoS scheduler
	interface	The interface information
	iftype	The interface type
	ifnum	The interface index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa # show qos scheduler interface ethernet 1/1  QoS Scheduler Algorithm ----- Interface Ethernet 1/1 Scheduler Algorithm is : Strict Priority  moxa# show qos scheduler  QoS Scheduler Algorithm ----- Interface Ethernet 1/1 Scheduler Algorithm is : Strict Priority Interface Ethernet 1/2 Scheduler Algorithm is : Strict Priority Interface Ethernet 1/3 Scheduler Algorithm is : Strict Priority Interface Ethernet 1/4 Scheduler Algorithm is : Strict Priority Interface Ethernet 2/1 Scheduler Algorithm is : Strict Priority Interface Ethernet 2/2 Scheduler Algorithm is : Strict Priority Interface Ethernet 2/3 Scheduler Algorithm is : Strict Priority Interface Ethernet 2/4 Scheduler Algorithm is : Strict Priority Interface Ethernet 3/1 Scheduler Algorithm is : Strict Priority .....</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa (config-if)# qos scheduler-type {strict-priority   wrr}	

## Egress Shaper

### Configure Shaper Setting

#### Commands

**qos shaper cir** <cir(1-1000)> **cbs** <cbs(10-10240)>

<b>Syntax Description</b>	<b>qos</b>	Configure QoS parameters
	<b>shaper</b>	Configure QoS shaper parameters
	<b>cir</b>	Committed Information Rate
	cir(1-1000)	The Committed Information Rate in Kbps
	<b>cbs</b>	Committed Burst Size
	cbs(10-10240)	The Committed Burst Size in KByte
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config-if)# qos shaper cir 500 cbs 2000	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa# show qos shaper [interface <iftype> <ifnum>]	

### Show Shaper Setting

#### Commands

**show qos shaper** [interface <iftype> <ifnum>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>qos</b>	Display QoS information
	<b>shaper</b>	Display QoS shaper information
	interface	The interface information
	iftype	The interface type
	ifnum	The interface index
	<b>Defaults</b>	N/A
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show qos shaper interface ethernet 1/1 QoS Shaper Statue of Interface Ethernet 1/1 ----- CIR : 1000 CBS : 2000 ----- - moxa# show qos shaper QoS Shaper Statue of Interface Ethernet 1/1 ----- CIR : Disable CBS : Disable QoS Shaper Statue of Interface Ethernet 1/2 ----- CIR : Disable CBS : Disable .....	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa(config-if)# qos shaper cir <cir(1-1000)> cbs <cbs(10-10240)>	

# Multicast

## IGMP Snooping

### Enable/disable System-based IGMP Snooping

#### Commands

**igmp-snooping** {enable | disable}

<b>Syntax Description</b>	<b>igmp-snooping</b>	Configure IGMP Snooping parameters
	enable	Enable system-based IGMP Snooping
	disable	Disable system-based IGMP Snooping
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	GMRP has to be disabled in order to enable IGMP snooping	
<b>Examples</b>	moxa# configure terminal moxa(config)# igmp-snooping enable moxa# configure terminal moxa(config)# igmp-snooping disable	
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID cannot have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'	
<b>Related Commands</b>	moxa# show igmp-snooping globals	

### Configure VLAN-based IGMP Snooping

#### Commands

**igmp-snooping**

**no igmp-snooping**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>igmp-snooping</b>	Configure IGMP Snooping parameters
<b>Defaults</b>	VLAN-based IGMP Snooping is disabled by default	
<b>Command Modes</b>	Config-VLAN Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# igmp-snooping moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# no igmp-snooping	
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID cannot have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'	
<b>Related Commands</b>	moxa# show igmp snooping [vlan < vlanid> ]	

## Configure IGMP Querier Role

### Commands

**igmp-snooping querier**

**no igmp-snooping querier**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>igmp-snooping</b>	Configure IGMP Snooping parameters
	<b>querier</b>	Configure the IGMP Snooping role
<b>Defaults</b>	By default, the switch is configured as a non-querier	
<b>Command Modes</b>	Config-VLAN Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# igmp-snooping moxa(config-vlan)# igmp-snooping querier moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# igmp-snooping moxa(config-vlan)# no igmp-snooping querier	
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID ca not have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'	
<b>Related Commands</b>	moxa# show igmp-snooping [vlan < vlanid> ]	

## Configure IGMP Snooping Version

### Commands

**igmp-snooping version {v1 | v2 | v3}**

<b>Syntax Description</b>	<b>igmp-snooping</b>	Configure IGMP Snooping parameters
	<b>version</b>	The operating version of the IGMP Snooping switch for a specific VLAN
	v1	Configure IGMP Snooping to Version 1
	v2	Configure IGMP Snooping to Version 2
	v3	Configure IGMP Snooping to Version 3
<b>Defaults</b>	The default IGMP Snooping version is v2	
<b>Command Modes</b>	Config-VLAN Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# igmp-snooping moxa(config-vlan)# igmp-snooping version v3	
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID cannot have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'	
<b>Related Commands</b>	moxa# show igmp-snooping [vlan < vlanid> ]	

## Configure IGMP Snooping General Query Interval

### Commands

**igmp-snooping query-interval** <integer (20 - 600) second>

**no igmp-snooping query-interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>igmp-snooping</b>	Configure IGMP Snooping parameters
	<b>query-interval</b>	The interval in which the general queries are sent by the IGMP Snooping switch when configured as a querier
	integer (20-600)	The general query interval period in seconds
<b>Defaults</b>	The default IGMP Snooping general query interval is set to 125 seconds	
<b>Command Modes</b>	Config-VLAN Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# igmp-snooping query-interval 200  moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# no igmp-snooping query-interval	
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID cannot have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'	
<b>Related Commands</b>	moxa# show igmp-snooping [vlan <vlanid> ]	

## Assign IGMP Snooping Router Port

### Commands

**igmp-snooping router-port** [<interface-type> <slot/port-port,slot/port,...>] [port-channel <integer>]

**no igmp-snooping router-port** [<interface-type> <slot/port-port,slot/port,...>] [port-channel <integer>]

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>igmp-snooping</b>	Configure IGMP Snooping parameters
	<b>router-port</b>	The IGMP Snooping router port status
	interface-type	The interface type
	slot/port-port, slot/port,	The interface list (slot number/port ID, slot number/port ID-port ID....)
	port-channel	The port-channel interface
	integer	The port-channel index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Config-VLAN Mode	
<b>Usage Guidelines</b>	IGMP snooping of VLAN must enabled	
<b>Examples</b>	<pre>moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# igmp-snooping moxa(config-vlan)# igmp-snooping router-port ethernet 1/1-3 ----- moxa# configure terminal moxa(config)# vlan 2 moxa(config-vlan)# igmp-snooping moxa(config-vlan)# no igmp-snooping router-port ethernet 1/1-3</pre>	
	<pre>'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.'</pre> <pre>'Invalid: VLAN ID cannot have duplicated data.'</pre> <pre>'Invalid: VLAN ID must exist in the VLAN configuration.'</pre> <pre>'Invalid: The port-channel does not exist.'</pre> <pre>'Invalid: this port is a member port of port-channel.'</pre> <pre>'Invalid: this port is not a member port of VLAN.'</pre>	
<b>Related Commands</b>	moxa# show igmp-snooping router-port [Vlan <vlan-id/vfi-id>]	

## Show System IGMP Snooping Information

### Commands

**show igmp-snooping globals**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>igmp-snooping</b>	Display IGMP Snooping information
	<b>globals</b>	IGMP Snooping system-based information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show igmp-snooping globals IGMP Snooping global status is enabled</pre>	
<b>Error Messages</b>	<pre>'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.'</pre> <pre>'Invalid: VLAN ID cannot have duplicated data.'</pre> <pre>'Invalid: VLAN ID must exist in the VLAN configuration.'</pre> <pre>'Invalid: The port-channel does not exist.'</pre> <pre>'Invalid: this port is a member port of port-channel.'</pre> <pre>'Invalid: this port is not a member port of VLAN.'</pre>	
<b>Related Commands</b>	moxa(config)# igmp-snooping {enable   disable}	

## Show IGMP Information of VLAN

### Commands

**show igmp-snooping** [vlan <vlan-id/vfi-id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>igmp-snooping</b>	Display IGMP Snooping information
	<b>vlan</b>	Protocol specific information for the VLAN
	vlan-id/vfi-id	The VLAN ID range between 1-4094 and the VFI ID range between 4096-65535
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show igmp-snooping vlan 1 IGMP Snooping VLAN Configuration for the VLAN 1 IGMP Snooping enabled IGMP Snooping configured version V2 IGMP Snooping is configured as Non-Querier IGMP Snooping is acting as Non-Querier General Query Interval is 125 seconds Startup Query Interval is 31 seconds Startup Query Count is 2 Other Querier Present Interval is 255 seconds</pre>	
<b>Error Messages</b>	<pre>'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.'</pre> <pre>'Invalid: VLAN ID cannot have duplicated data.'</pre> <pre>'Invalid: VLAN ID must exist in the VLAN configuration.'</pre> <pre>'Invalid: The port-channel does not exist.'</pre> <pre>'Invalid: this port is a member port of port-channel.'</pre> <pre>'Invalid: this port is not a member port of VLAN.'</pre>	
<b>Related Commands</b>	<pre>moxa(config-vlan)# igmp-snooping moxa(config-vlan)# igmp-snooping querier moxa(config-vlan)# igmp-snooping version {v1   v2   v3} moxa(config-vlan)# igmp-snooping query-interval &lt;(20 - 600) second&gt;</pre>	

## Show IGMP Information of Forwarding Database

### Commands

**show igmp-snooping forwarding-database** [vlan <vlan-id/vfi-id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information																
	<b>igmp-snooping</b>	Display IGMP Snooping information																
	<b>forwarding-database</b>	Display the forwarding database																
	vlan	Protocol specific information for the VLAN																
	vlan-id/vfi-id	The VLAN ID range between 1-4094 and the VFI ID range between 4096-65535																
<b>Defaults</b>	N/A																	
<b>Command Modes</b>	User EXEC Privileged EXEC																	
<b>Usage Guidelines</b>	N/A																	
<b>Examples</b>	<pre>moxa# show igmp-snooping forwarding-database vlan1</pre> <table border="1"> <thead> <tr> <th>VLAN</th> <th>Group Address</th> <th>Source Address</th> <th>Port List</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>12.0.0.10</td> <td>227.1.1.1</td> <td>Eth1/1, Eth1/3, Eth1/4</td> </tr> <tr> <td>1</td> <td>12.0.0.20</td> <td>227.1.1.1</td> <td>Eth1/1, Eth1/3, Eth1/4</td> </tr> <tr> <td>1</td> <td>12.0.0.30</td> <td>227.1.1.1</td> <td>Eth1/1, Eth1/2, Eth1/4</td> </tr> </tbody> </table>		VLAN	Group Address	Source Address	Port List	1	12.0.0.10	227.1.1.1	Eth1/1, Eth1/3, Eth1/4	1	12.0.0.20	227.1.1.1	Eth1/1, Eth1/3, Eth1/4	1	12.0.0.30	227.1.1.1	Eth1/1, Eth1/2, Eth1/4
VLAN	Group Address	Source Address	Port List															
1	12.0.0.10	227.1.1.1	Eth1/1, Eth1/3, Eth1/4															
1	12.0.0.20	227.1.1.1	Eth1/1, Eth1/3, Eth1/4															
1	12.0.0.30	227.1.1.1	Eth1/1, Eth1/2, Eth1/4															
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID cannot have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'																	
<b>Related Commands</b>	N/A																	

## Show IGMP Information of Group Membership Table

### Commands

**show igmp-snooping groups** [vlan <vlan-id/vfi-id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information										
	<b>igmp-snooping</b>	Display IGMP Snooping information										
	<b>groups</b>	The group table information										
	vlan	Protocol specific information for the VLAN										
	vlan-id/vfi-id	The VLAN ID range between 1-4094 and the VFI ID range between 4096-65535										
<b>Defaults</b>	N/A											
<b>Command Modes</b>	User EXEC Privileged EXEC											
<b>Usage Guidelines</b>	N/A											
<b>Examples</b>	<pre>moxa# show igmp-snooping groups vlan 1</pre> <table border="1"> <thead> <tr> <th>VLAN</th> <th>Group Address</th> <th>Filter Mode</th> <th>Port List</th> <th>Source Address</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>224.1.1.1</td> <td>EXCLUDE</td> <td>Eth 1/1</td> <td>192.168.127.251</td> </tr> </tbody> </table>		VLAN	Group Address	Filter Mode	Port List	Source Address	1	224.1.1.1	EXCLUDE	Eth 1/1	192.168.127.251
VLAN	Group Address	Filter Mode	Port List	Source Address								
1	224.1.1.1	EXCLUDE	Eth 1/1	192.168.127.251								
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID cannot have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'											
<b>Related Commands</b>	N/A											

## Show IGMP Information of Router Port

### Commands

**show igmp-snooping router-port** [vlan <vlan-id/vfi-id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>igmp-snooping</b>	Display IGMP Snooping information
	<b>router-port</b>	The IGMP Snooping router port status
	vlan	Protocol specific information for the VLAN
	vlan-id/vfi-id	The VLAN ID range between 1-4094 and the VFI ID range between 4096-65535
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show igmp-snooping router-port  VLAN Static Router Port List -----  1 Eth 1/1  VLAN Dynamic Router Port List ----- 1 Eth 1/3</pre>	
<b>Error Messages</b>	'Invalid: If IGMP snooping is enabled, then GMRP must be disabled.' 'Invalid: VLAN ID cannot have duplicated data.' 'Invalid: VLAN ID must exist in the VLAN configuration.' 'Invalid: The port-channel does not exist.' 'Invalid: this port is a member port of port-channel.' 'Invalid: this port is not a member port of VLAN.'	
<b>Related Commands</b>	<pre>moxa(config-vlan)# igmp-snooping router-port [&lt;interface-type&gt; &lt;slot/port- port,slot/port,...&gt;] [port-channel &lt;integer&gt;]</pre>	

# GMRP

## Show Global GMRP information

### Commands

#### show vlan device info

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>show vlan device info</b>	Display the VLAN device information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode.	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show vlan device info vlan device configurations ----- vlan Status : Enabled vlan Oper status : Enabled gvrp status : Disabled gmrp status : Disabled gvrp Oper status : Disabled gmrp Oper status : Disabled Mac-vlan Status : Disabled Subnet-vlan Status : Disabled Protocol-Vlan Status : Enabled Bridge Mode : Provider Edge Bridge Base-Bridge Mode : Vlan Aware Bridge Traffic Classes : Enabled vlan Operational Learning Mode : IVL Hybrid Default Learning Mode : IVL Version number : 1 Max Vlan id : 4158 Max supported vlans : 4160 Global mac learning status : Enabled Filtering Utility Criteria : Enabled Unicast mac learning limit : 768	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa(config)# set gmrp enable	

## Show Port GMRP Information

### Commands

**show vlan port config** [{port <interface-id> }]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>show vlan port config</b>	Display VLAN port configuration
	port interface-id	The input port number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode.	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show vlan port config 1/1  vlan Port configuration table ----- Port 1-1 Bridge Port Type           : Customer Bridge Port Port Vlan ID                : 1 Port Acceptable Frame Type : Admit All Port Mac Learning Status   : Enabled Port Ingress Filtering     : Disabled Port Mode                   : Hybrid Port Gvrp Status           : Enabled Port Gmrp Status           : Disabled Port Gvrp Failed Registrations : 0 Gvrp last pdu origin       : 00:00:00:00:00:00 Port Restricted Vlan Registration : Disabled Port Restricted Group Registration : Enabled Mac Based Support          : Disabled Subnet Based Support       : Disabled Port-and-Protocol Based Support : Enabled Default Priority           : 0 Filtering Utility Criteria : Default Port Protected Status      : Disabled Ingress EtherType         : 0x8100 Egress EtherType          : 0x8100 Egress TPID Type          : Portbased Allowable TPID 1          : 0x0 Allowable TPID 2          : 0x0 Allowable TPID 3          : 0x0 Reflection Status         : Disabled </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre> moxa(config)# set port gmrp enable moxa(config-if)# group restrict enable </pre>	

## Configure GMRP Global Setting

### Commands

**gmrp** { enable | disable }

<b>Syntax Description</b>	<b>gmrp</b>	Configure the GMRP parameters
	enable	Enable GMRP on all switch ports and automatically start the GARP on the switch if the GARP is disabled.
	disable	Disable GMRP on all switch ports.
<b>Defaults</b>	Global GMRP is disabled by default	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# gmrp enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa# show vlan device info	

## Configure GMRP Port Setting

### Commands

**gmrp**

**no gmrp**

<b>Syntax Description</b>	<b>gmrp</b>	Configure the GMRP parameters
<b>Defaults</b>	GMRP is enabled by default	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# interface ethernet 1/1 moxa(config-if)# no gmrp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa# show vlan port config	

## Configure GMRP Group Restricted Setting

### Commands

**group restricted** {enable | disable }

<b>Syntax Description</b>	<b>group restricted</b>	Configure the restricted group registration on a specified port
	enable	Enable restricted group registration on the port
	disable	Disable restricted group registration on the port
<b>Defaults</b>	GMRP group restriction is disabled by default	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# group restricted	
<b>Error Messages</b>	Wrong interface type for port	
<b>Related Commands</b>	moxa# show vlan port config	

## Static Multicast

### Show MAC Address Table for Static Multicast

#### Commands

**show mac-address-table static multicast** [vlan <vlan-range>] [address <aa:aa:aa:aa:aa:aa>][{interface {port-channel <integer> | <interface-type> <interface-id>}]

<b>Syntax Description</b>	<b>mac-address-table</b>	Display the MAC address table information
	<b>static multicast</b>	Display static multicast address information
	vlan <vlan-range>	Display all entries in the FDB table for the specified VLANs
	address <aa:aa:aa:aa:aa:aa>	Display the specified multicast MAC address in the FDB table
	interface <interface-type> <interface-id> / Port-channel <integer>	Display all specified interface entries in the FDB table
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC User EXEC	
<b>Usage Guidelines</b>	Display static multicast address table	
<b>Examples</b>	moxa# show mac-address-table static multicast Static Multicast Table ----- Vlan : 1 Mac Address : 01:02:03:04:05:06 Member Ports : Eth1/1 Forbidden Ports : Eth1/2 Status : Permanent ----- Total Mac Addresses displayed: 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac-address-table static multicast	

## Configure MAC Address Table for Static Multicast

### Commands

**mac-address-table static multicast** <aa:aa:aa:aa:aa:aa> vlan <vlan-id> {add | set} interface [<interface-type> <slot/port-port,slot/port,...>] [port-channel I <integer>] [forbidden-ports [<interface-type> <slot/port-port,slot/port,...>] [port-channel <integer>]] [status permanent]

<b>Syntax Description</b>	<b>mac-address-table</b>	Configure the MAC address table
	<b>static multicast</b>	Configure the static multicast address
	aa:aa:aa:aa:aa:aa	The multicast destination MAC address
	vlan <vlan-id>	The VLAN ID of the VLAN the multicast destination MAC address belongs to
	add	Add the new interface port and forbidden port.
	set	Overwrite the new interface port and forbidden port
	interface	Configure member ports details.
	forbidden-ports	Configure the set of ports to which frames destined for a specific multicast MAC address must not be forwarded, such as from GMRP.
	status	The status of the static multicast entry.
	permanent	Entry remains even after the next reset of the bridge
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Configure the static multicast address	
<b>Examples</b>	moxa(config)# mac-address-table static multicast 01:02:03:04:05:06 vlan 1 add interface ethernet 1/1-2 forbidden-ports ethernet 2/1-2	
<b>Error Messages</b>	"Invalid: Duplicate MAC Address." "Invalid: Configuration fail." "Invalid: The port is not included in VLAN egress ports." "Invalid: The MAC+VID entry must be removed from Port Security first." "Invalid: The port must remove from port security." "Invalid: Reserved multicast address (01:80:C2) is not allowed to set static multicast." "Invalid: Egress Ports and Forbidden Ports are overlapping."	
<b>Related Commands</b>	show mac-address-table static multicast	

# IP Configuration (L2)

## Configure IP Management Address

### Commands

**ip management address** { dhcp | ipv4-address ipv4-netmask [ ipv4-gateway ] }

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>management</b>	Configure IPv4 management address parameters
	<b>address</b>	Configure the IPv4 management address of the device
	dhcp	Assign the IPv4 address by DHCP
	ipv4-address	The IPv4 address
	ipv4-netmask	The IPv4 subnet mask
	ipv4-gateway	The IPv4 gateway
<b>Defaults</b>	ipv4-address: 192.168.127.253 ipv4-netmask: 255.255.255.0 ipv4-gateway: 0.0.0.0	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip management address dhcp moxa(config)# ip management address 10.1.1.1 255.255.255.0 10.1.1.254	
<b>Error Messages</b>	Invalid: Invalid IPv4 Management Address ipv4-address/ipv4-netmask. Invalid: Gateway ipv4-gateway is not reachable.	
<b>Related Commands</b>	N/A	

# Network Interface (L3)

## Configure the Interface Settings

### Commands

**interface vlan** <vlanid>

**no interface vlan** <vlan\_id>

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>interface</b>	Configure interface parameters
	<b>vlan</b>	VLAN interface
	vlanid	VLAN ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 10	
<b>Error Messages</b>	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with other Interface IPv4 address. Invalid: [data.I3VlanIfTable] must contain less than or equal to 256 items. Invalid: Interface name is duplicated. Invalid: No such interface.	
<b>Related Commands</b>	N/A	

## Configure Interface Alias Description

### Commands

**description** <string(63)>

**no description**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>description</b>	Set the mnemonic name of this interface
	<string(63)>	The specific mnemonic name for the interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface 10 moxa(config-if)# description "Switch interface 10"	
<b>Error Messages</b>	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with other Interface IPv4 address. Invalid: [data.I3VlanIfTable] must contain less than or equal to 256 items. Invalid: Interface name is duplicated. Invalid: No such interface.	
<b>Related Commands</b>	N/A	

## Enable/Disable the Interface

### Commands

**shutdown**

**no shutdown**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>shutdown</b>	Shutdown the interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 10 moxa(config-if)# shutdown	
<b>Error Messages</b>	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with other Interface IPv4 address. Invalid: [data.I3VlanIfTable] must contain less than or equal to 256 items. Invalid: Interface name is duplicated. Invalid: No such interface.	
<b>Related Commands</b>	N/A	

## Configure the IPv4 Address for the Interface

### Commands

**ip address** <ip-address> <subnet-mask>

**no ip address** <ip-address>

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ip address</b>	Configure the interface IPv4 address
	<ip-address>	IPv4 address string
	<subnet-mask>	Should be 255.255.255.255.
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config)# interface vlan 10 moxa(config-if)# ip address 10.10.10.10 255.255.255.255 moxa(config-if)# no ip address 10.10.1.2</pre>	
<b>Error Messages</b>	<p>Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask']</p> <p>Invalid: This IPv4 address overlaps with other Interface IPv4 address.</p> <p>Invalid: [data.I3VlanIfTable] must contain less than or equal to 256 items.</p> <p>Invalid: Interface name is duplicated.</p> <p>Invalid: No such interface.</p>	
<b>Related Commands</b>	N/A	

## Show Interface Information

### Commands

**show ip interface** [ vlan <vlan-id> ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>ip</b>	IP related information
	<b>interface</b>	Interface related information
	<b>vlan</b>	VLAN related information
	<vlan-id>	Specified vlan ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip interface  vlan1 is up, line protocol is up Internet Address is 192.168.127.250/24 Broadcast Address 192.168.127.255  vlan40 is up, line protocol is up Internet Address is 192.168.40.253/24 Broadcast Address 192.168.40.255  vlan30 is up, line protocol is down Internet Address is 30.100.1.253/24 Broadcast Address 30.100.1.2550</pre>	
<b>Error Messages</b>	% Invalid interface Index	
<b>Related Commands</b>	N/A	

## Configure Interface MTU

### Commands

**ip mtu** <mtu size>

<b>Syntax Description</b>	<b>ip</b>	Configure IP related configuration
	<b>mtu</b>	Maximum transmission unit
	mtu size	The size of the allowable MTU in bytes; the legitimate range is 1400 to 3000.
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface VLAN Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 10 moxa(config-if)# ip mtu 2000	
<b>Error Messages</b>	Invalid input detected	
<b>Related Commands</b>	N/A	

## Show MTU Settings of the Existing Interfaces

### Commands

**show interfaces mtu** [vlan <vlan\_id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>interfaces</b>	Display interface information
	<b>mtu</b>	Maximum transmission unit size
	vlan	VLAN related information
	<vlan id>	Specified VLAN ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	# show interfaces mtu  vlan1     MTU size is 1500  vlan40    MTU size is 1518	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable Proxy ARP

### Commands

**ip proxy-arp**

**no ip proxy-arp**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ip</b>	Configure IP related configuration
	<b>proxy-arp</b>	Proxy ARP related configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface VLAN Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 10 moxa(config-if)# ip proxy-arp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show ARP Status for the Existing Interfaces

### Commands

**show ip proxy-arp**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>ip</b>	IP related configuration
	<b>proxy-arp</b>	Proxy-arp status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip proxy-arp PROXY ARP Status ----- vlan1 : Disabled vlan2 : Disabled vlan3 : Disabled	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure DNS Server Settings

### Commands

**ip management name-server** server-index server-address

**no ip management name-server** server-index

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ip</b>	Configure IP parameters
	<b>management</b>	Configure IPv4 management address parameters
	<b>name-server</b>	Configure the IPv4 DNS address of the device
	server-index	Index of DNS, range from 1 to 2
	server-address	IPv4 address of DNS
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip management name-server 1 1.1.1.1 moxa(config)# no ip management name-server 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Redundancy

## Layer 2 Redundancy

### Spanning Tree

#### Enable/Disable Spanning Tree

##### Commands

**spanning-tree**

**no spanning-tree**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
<b>Defaults</b>	Spanning Tree Protocol is disabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree moxa(config-if)# no spanning-tree	
<b>Error Messages</b>	Invalid: Port channel member port cannot be assigned to a redundant protocol. Invalid: Redundant Protocol and Port Security cannot be enabled on the same port. Invalid: Redundant Protocol and 802.1x/MAB cannot be enabled on the same port. Invalid: The port-channel group does not exist.	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree summary	

#### Configure Spanning Tree Compatibility

##### Commands

**spanning-tree compatibility { stp | rstp }**

**no spanning-tree compatibility**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/resets to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>compatibility</b>	The Spanning Tree compatibility version
	stp	Spanning Tree Protocol configuration
	rstp	Rapid Spanning Tree configuration
<b>Defaults</b>	Spanning Tree Protocol compatibility is set to rstp by default.	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	The "no spanning-tree compatibility" command will restore the default value	
<b>Examples</b>	moxa# configure terminal moxa(config)# spanning-tree compatibility stp moxa(config)# spanning-tree compatibility rstp moxa(config)# no spanning-tree compatibility	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree show spanning-tree detail	

## Configure Spanning Tree Priority

### Commands

**spanning-tree priority** <value (0-61440)>

**no spanning-tree priority**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration / deletes the entry / resets to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>priority</b>	Configure switch priority for Spanning Tree instances
	value	The switch priority value ranging from 0 to 61440
<b>Defaults</b>	The default priority is set to 32768	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	The "no spanning-tree priority" command will restore the default value	
<b>Examples</b>	moxa# configure terminal moxa(config)# spanning-tree priority 61440 moxa(config)# no spanning-tree priority	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree show spanning-tree detail	

## Configure Spanning Tree Forward Time

### Commands

**spanning-tree forward-time** <seconds (4-30)>

**no spanning-tree forward-time**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/deletes the entry/resets to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>forward-time</b>	The interval (in seconds) in which a port stays in its current state before moving to next state
	seconds	The forwarding time ranging from 4 to 30 seconds
<b>Defaults</b>	The default forwarding time is 15 seconds	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	Command "no spanning-tree forward-time" will reset to default value $2 * (\text{ForwardDelay} - 1) \geq \text{MaxAge} \geq 2 * (\text{Hello Time} + 1)$	
<b>Examples</b>	moxa# configure terminal moxa(config)# spanning-tree forward-time 16 moxa(config)# no spanning-tree forward-time	
<b>Error Messages</b>	% RSTP: $2 * (\text{Forward time} - 1) \geq \text{Max age time} \geq 2 * (\text{Hello time} + 1)$	
<b>Related Commands</b>	show spanning-tree show spanning-tree detail	

## Configure Spanning Tree Hello Time

### Commands

**spanning-tree hello-time** <seconds (1-2)>

**no spanning-tree hello-time**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/deletes the entry/resets to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>hello-time</b>	The interval (in seconds) between the transmission of configuration BPDUs
	seconds	The hello time interval ranging from 1 to 2 seconds
<b>Defaults</b>	The default hello time is set to 2 seconds	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	The "no spanning-tree hello-time" command will restore the default value $2 * (\text{ForwardDelay} - 1) \geq \text{MaxAge} \geq 2 * (\text{Hello Time} + 1)$	
<b>Examples</b>	moxa# configure terminal moxa(config)# spanning-tree hello-time 1 moxa(config)# no spanning-tree hello-time	
<b>Error Messages</b>	% RSTP: $2 * (\text{Forward time} - 1) \geq \text{Max age time} \geq 2 * (\text{Hello time} + 1)$	
<b>Related Commands</b>	show spanning-tree show spanning-tree detail	

## Configure Spanning Tree Maximum Age

### Commands

**spanning-tree max-age** <seconds (6-40)>

**no spanning-tree max-age**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>max-age</b>	The maximum age (in seconds) before learnt STP information is discarded
	seconds	The maximum age ranging from 6 to 40 seconds
<b>Defaults</b>	The STP maximum age is set to 20 seconds by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	The "no spanning-tree max-age" command will restore the default value $2 * (\text{ForwardDelay} - 1) \geq \text{MaxAge} \geq 2 * (\text{Hello Time} + 1)$	
<b>Examples</b>	moxa# configure terminal moxa(config)# spanning-tree max-age 21 moxa(config)# no spanning-tree max-age	
<b>Error Messages</b>	% RSTP: $2 * (\text{Forward time} - 1) \geq \text{Max age time} \geq 2 * (\text{Hello time} + 1)$	
<b>Related Commands</b>	show spanning-tree show spanning-tree detail	

## Configure Spanning Tree Transmission Hold Counter

### Commands

**spanning-tree transmit hold-count** <value (1-10)>

**no spanning-tree transmit hold-count**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol
	<b>transmit</b>	Transmission hold counter configuration
	<b>hold-count</b>	Configure the hold counter to limit the maximum transmission rate of the switch
	value	The transmission hold counter value ranging from 1 to 10
<b>Defaults</b>	The STP hold counter is set to 6 by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	The "no spanning-tree transmit hold-count" command will restore the default value	
<b>Examples</b>	moxa# configure terminal moxa(config)# spanning-tree transmit hold-count 10 moxa(config)# no spanning-tree transmit hold-count	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail	

## Configure Spanning Tree Auto-edge

### Commands

**spanning-tree auto-edge**

**no spanning-tree auto-edge**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol
	<b>auto-edge</b>	Configure the automatic detection of bridges attached to an interface
<b>Defaults</b>	Spanning Tree auto-edge is enabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree auto-edge moxa(config-if)# no spanning-tree auto-edge	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 detail	

## Configure Spanning Tree Cost

### Commands

**spanning-tree cost** <value (0-200000000)>

**no spanning-tree cost**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol
	<b>cost</b>	Configure the path cost
	value	The Spanning Tree cost ranging from 0 to 200000000
<b>Defaults</b>	The default path cost is set to 0	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	The "spanning-tree cost 0" command will auto-detect the cost based on port speed The "no spanning-tree cost" command will restore the default value	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree cost 20000 moxa(config-if)# no spanning-tree cost	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 detail show spanning-tree interface ethernet 1/1 detail	

## Configure Spanning Tree Link Type

### Commands

**spanning-tree link-type** { point-to-point | shared }

**no spanning-tree link-type**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>link-type</b>	Configure the link type as a point-to-point link or as a shared LAN segment on which another bridge is present
	point-to-point	Set the link a a point-to-point link
	shared	Set the link as a shared link
<b>Defaults</b>	The default Spanning Tree link-type is set to auto-detect	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	The "no spanning-tree link-type" command will auto-detect the interface link type based on the port duplex mode	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree link-type point-to-point moxa(config-if)# spanning-tree link-type shared moxa(config-if)# no spanning-tree link-type	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 show spanning-tree interface ethernet 1/1 detail	

## Configure Spanning Tree Portfast

### Commands

**spanning-tree portfast**

**no spanning-tree portfast**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>portfast</b>	Specify ports that have only hosts connected to enable immediate transition to a forwarding state
<b>Defaults</b>	Spanning Tree Portfast is disabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	Shut down the interface before enabling the Portfast function The Portfast function cannot be enabled on a port that has loop guard enabled	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree portfast moxa(config-if)# no spanning-tree portfast	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 show spanning-tree interface ethernet 1/1 detail	

## Configure Spanning Tree Port Priority

### Commands

**spanning-tree port-priority <value (0-240)>**

**no spanning-tree port-priority**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>port-priority</b>	Configure the port priority value
	value	The Spanning Tree port priority ranging from 0 to 240
<b>Defaults</b>	The default Spanning Tree port priority is set to 128	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	The "no spanning-tree port-priority" command will restore the default value	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree port-priority 16 moxa(config-if)# no spanning-tree port-priority	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 show spanning-tree interface ethernet 1/1 detail	

## Enable/Disable MSTP

### Commands

**mstp** { enable | disable }

<b>Syntax Description</b>	<b>mstp</b>	Configure MSTP related parameters
	enable	Enable MSTP
	disable	Disable MSTP
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# mstp enable  moxa# configure moxa(config)# mstp disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the Compatibility Version for Multiple Spanning Tree Protocol

### Commands

**spanning-tree mst compatibility** { stp | rstp | mstp }

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>compatibility</b>	Spanning tree compatibility version
	stp	Spanning Tree Protocol configuration
	rstp	Rapid Spanning Tree configuration
	mstp	Multiple Spanning Tree
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# spanning-tree mst compatibility mstp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Remove Multiple Spanning Tree Protocol Compatibility

### Commands

**no spanning-tree mst compatibility**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>mst</b>	Multiple Spanning Tree
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>compatibility</b>	Spanning tree compatibility version
<b>Defaults</b>	mstp (if MSTP enabled) or rstp (if MSTP disabled)	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# no spanning-tree compatibility	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the Maximum Number of Hops Permitted in MST

### Commands

**spanning-tree mst max-hops** <short(6-40)>

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>max-hops</b>	Maximum number of hops allowed
	short(6-40)	Value for maximum hops
<b>Defaults</b>	20	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# spanning-tree mst max-hops 40	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Map VLANs to an MST Instance

### Commands

**spanning-tree mst instance** <short(1-16)> **vlan** <vlan\_range> [**priority** <short(0 -61440)>]

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Value for maximum hops
	<b>vlan</b>	VLAN range associated with a spanning tree instance
	vlan_range	Range (1-4094) of VLANs separated by a hyphen, or a series of VLANs separated by a comma
	<b>priority</b>	Switch priority configuration for spanning tree instance
	short(0-61440)	Priority value
<b>Defaults</b>	20	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# spanning-tree mst instance 2 vlan 5-10  moxa(config)# spanning tree mst instance 3 vlan 15-50 priority 4096	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Delete the MST Instance or Remove VLANs from MST Instance

### Commands

**no spanning-tree mst instance** <short(1-16)> [**vlan** <vlan\_range >]

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>vlan</b>	VLAN range associated with a spanning tree instance
	vlan_range	Range (1-4094) of VLANs separated by a hyphen, or a series of VLANs separated by a comma
<b>Defaults</b>	No	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# no spanning-tree mst instance 2  moxa(config)# no spanning tree mst instance 1 vlan 5	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Bridge Priority for Spanning Tree

### Commands

**spanning-tree mst** {**instance** <short(1-16)> | **cist**} **priority** <short(0 -61440)>

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>Cist</b>	Common Internal Spanning Tree
	<b>priority</b>	Switch priority configuration for spanning tree instance
	short(0-61440)	Priority value
<b>Defaults</b>	Priority: 32768	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# spanning-tree mst instance 1 priority 28672	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Reset Bridge Priority for the Spanning Tree to Its Default Value

### Commands

**no spanning-tree mst {instance <short(1-16)> | cist} priority**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>cist</b>	Common Internal Spanning Tree
	<b>priority</b>	Switch priority configuration for spanning tree instance
<b>Defaults</b>	Priority: 32768	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# no spanning-tree mst instance 1 priority	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Set Up Spanning Tree MST Region Name

### Commands

**spanning-tree mst { name <string(32)> | revision <short(0-65535)> }**

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>name</b>	Configure name for the MST region
	string(32)	Configuration name
	<b>revision</b>	Configure revision number for the MST region
short(0-65535)	Revision number for the MST region	
<b>Defaults</b>	Name: MAC address, Revision: 0	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# spanning-tree mst name MSTP moxa(config)# spanning-tree mst revision 20	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Delete Spanning Tree MST Region Name

### Commands

**no spanning-tree mst { name | revision }**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>name</b>	Configuration name
	<b>revision</b>	Configure revision number for the MST region
<b>Defaults</b>	Name: MAC address, Revision: 0	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# no spanning-tree mst name moxa(config)# no spanning-tree mst revision	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure MSTP Timer

### Commands

**spanning-tree mst** { **forward-time** <seconds(4-30)> | **hello-time** <seconds(1-2)> | **max-age** <seconds(6-40)> }

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>forward-time</b>	Interval (in seconds) until which a port stays in a state before moving to next state
	seconds(4-30)	Forward delay value
	<b>hello-time</b>	Interval (in seconds) between the transmission of configuration BPDUs
	seconds(1-2)	Hello time value
	<b>max-age</b>	Maximum age (in seconds) for learnt STP information before discarding
	seconds(6-40)	Value representing maximum age
<b>Defaults</b>	forward time: 15, hello-time: 2, max-age: 20	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa-(config)# spanning-tree mst forward-time 16 moxa-(config)# spanning-tree mst hello-time 1 moxa-(config)# spanning-tree mst max-age 30	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Reset the MSTP Timer to the Default Value

### Commands

**no spanning-tree mst** { **forward-time** | **hello-time** | **max-age** }

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>forward-time</b>	Interval (in seconds) until which a port stays in a state before moving to next state
	<b>hello-time</b>	Interval (in seconds) between the transmission of configuration BPDUs
	<b>max-age</b>	Maximum age (in seconds) for learnt STP information before discarding
<b>Defaults</b>	forward time: 15, hello-time: 2, max-age: 20	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa-(config)# no spanning-tree mst forward-time moxa-(config)# no spanning-tree mst hello-time moxa-(config)# no spanning-tree mst max-age	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable Spanning Tree MST Instance on This Port

### Commands

```
spanning-tree mst { instance <short(1-16)> | cist | all }
```

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>cist</b>	Common Internal Spanning Tree
	<b>all</b>	All instances on the device including CIST
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree mst instance 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Disable Spanning Tree MST Instance on This Port

### Commands

```
no spanning-tree mst { instance <short(1-16)> | cist | all }
```

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>cist</b>	Common Internal Spanning Tree
<b>all</b>	All instances on the device including CIST	
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# no spanning-tree mst instance 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Spanning Tree Properties of an Interface for MSTP

### Commands

```
spanning-tree mst {instance <short(1-16)> | cist } { cost <integer(1-200000000)> | port-priority <short(0-240)> }
```

<b>Syntax Description</b>	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>cist</b>	Common Internal Spanning Tree
	<b>cost</b>	The cost associate with the port
	integer(1-200000000 )	The cost value associated with the port
	<b>port-priority</b>	Port priority
short(0-240)	Port priority value	
<b>Defaults</b>	cost: 0, port-priority: 128	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree mst instance 1 cost 200 moxa(config-if)# spanning-tree mst instance 1 port-priority 144	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Reset Spanning Tree Properties of an Interface to Default Value

### Commands

```
no spanning-tree mst { instance <short(1-16)> | cist } { cost | port-priority }
```

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>cist</b>	Common Internal Spanning Tree
	<b>cost</b>	The cost associate with the port
	<b>port-priority</b>	Port priority
<b>Defaults</b>	cost: 0, port-priority: 128	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# no spanning-tree mst instance 1 cost moxa(config-if)# no spanning-tree mst instance 1 port-priority	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Multiple Spanning Tree Information

### Commands

**show spanning-tree mst** [**instance** <short(1-16)>] [**detail**]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>detail</b>	Detailed information for the spanning tree mst instance
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show spanning-tree mst moxa# show spanning-tree mst detail moxa# show spanning-tree mst instance 1 moxa# show spanning-tree mst instance 1 detail	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Multiple Spanning Tree Instance Configuration

### Commands

**show spanning-tree mst configuration**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple spanning tree instance
	<b>configuration</b>	Multiple spanning tree instance configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show spanning-tree mst configuration	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Multiple Spanning Tree Port Specific Configuration

### Commands

**show spanning-tree mst** [**instance** <short(1-16)>] **interface** { <iftype> <ifnum> | **port-channel** <integer> } [{ **stats** | **detail** }]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>spanning-tree</b>	Configure the related spanning tree parameters
	<b>mst</b>	Multiple Spanning Tree
	<b>instance</b>	An MST instance
	short(1-16)	Instance ID
	<b>interface</b>	Detailed information for the spanning tree mst instance
	iftype	Interface type
	ifnum	Interface ID
	<b>port-channel</b>	Port channel interface
	integer	Port channel ID
	<b>stats</b>	Input and output packets by switching path for the interface
	<b>detail</b>	Detailed multiple spanning tree port specific configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show spanning-tree mst interface ethernet 1/1 moxa# show spanning-tree mst interface port-channel 1  moxa# show spanning-tree mst instance 1 interface ethernet 1/1 moxa# show spanning-tree mst instance 1 interface port-channel 1  moxa# show spanning-tree mst interface ethernet 1/1 stats moxa# show spanning-tree mst interface port-channel 1 detail  moxa# show spanning-tree mst instance 1 interface ethernet 1/1 stats moxa# show spanning-tree mst instance 1 interface port-channel 1 detail</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Spanning Tree BPDU Guard

### Commands

**spanning-tree bpduguard**

**no spanning-tree bpduguard**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>bpduguard</b>	Configures an interface to transition into the error-disabled state when it receives a BPDU
<b>Defaults</b>	Spanning Tree BPDU guard is disabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree bpduguard moxa(config-if)# no spanning-tree bpduguard</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>show spanning-tree detail show spanning-tree interface gigabitethernet 0/1 bpduguard show spanning-tree interface gigabitethernet 0/1 detail</pre>	

## Configure Spanning Tree BPDU Filter

### Commands

**spanning-tree bpdudfilter**

**no spanning-tree bpdudfilter**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>bpdudfilter</b>	Configure BPDU filtering
<b>Defaults</b>	Spanning Tree BPDU filtering is disabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree bpdudfilter moxa(config-if)# no spanning-tree bpdudfilter	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 show spanning-tree interface ethernet 1/1 detail	

## Configure Spanning Tree Root Guard

### Commands

**spanning-tree rootguard**

**no spanning-tree rootguard**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>rootguard</b>	Configure Root Guard
<b>Defaults</b>	Spanning Tree root guard is disabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	The Root guard function cannot be enabled on a port that has loop guard enabled	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree rootguard moxa(config-if)# no spanning-tree rootguard	
<b>Error Messages</b>	% RSTP: loopGuard and rootGuard should be exclusive	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 show spanning-tree interface ethernet 1/1 detail	

## Configure Spanning Tree Loop Guard

### Commands

**spanning-tree loopguard**

**no spanning-tree loopguard**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>loopguard</b>	Configure Loop Guard
<b>Defaults</b>	Spanning Tree loop guard is disabled by default	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	The loop guard function cannot be enabled on a port that has portfast enabled The loop guard function cannot be enabled on a port that has root guard enabled	
<b>Examples</b>	moxa# configure terminal moxa(config)# interface ethernet 1/1 moxa(config-if)# spanning-tree loopguard moxa(config-if)# no spanning-tree loopguard	
<b>Error Messages</b>	% RSTP: loopGuard and rootGuard should be exclusive	
<b>Related Commands</b>	show spanning-tree detail show spanning-tree interface ethernet 1/1 show spanning-tree interface ethernet 1/1 detail	

## Configure Spanning Tree Errordisable Recovery Interval

### Commands

**spanning-tree errordisable recovery-interval** <second (30-65535)>

**no spanning-tree errordisable recovery-interval**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>spanning-tree</b>	Configure Spanning Tree Protocol
	<b>errordisable</b>	Configure the error-disable timer
	<b>recovery-interval</b>	The interval (in seconds) for a port to recover from error-disabled state
	second	The errordisable recovery interval ranging from 30 to 65535 seconds
<b>Defaults</b>	The default error-disabled recovery interval is set to 300 seconds	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# spanning-tree errordisable recovery-interval 30	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show spanning-tree detail	

## Clear Spanning Tree Detected Protocols

### Commands

**clear spanning-tree detected protocols interface** { <interface-id> | port-channel <integer> }

<b>Syntax Description</b>	<b>clear</b>	Clear the configuration
	<b>spanning-tree</b>	Configure Spanning Tree Protocol parameters
	<b>detected</b>	Spanning Tree detected protocols
	<b>protocols</b>	Spanning Tree detected protocols
	<b>interface</b>	Configure the interface
	interface-id	The interface ID
	port-channel	The port channel
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# clear spanning-tree detected protocols interface ethernet 1/1 moxa# clear spanning-tree detected protocols interface port-channel 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Spanning Tree Bridge Information

### Commands

**show spanning-tree bridge**

<b>Syntax Description</b>	<b>show</b>	Display the Configuration/statistics/general information
	<b>spanning-tree</b>	Spanning Tree-related information
	<b>bridge</b>	Spanning Tree bridge information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show spanning-tree bridge  <pre> Bridge ID           HelloTime  MaxAge  FwdDly  Protocol ----- 80:00:00:01:02:03:04:05  2 sec    20 sec  15 sec   rstp </pre> moxa#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Spanning Tree Root Information

### Commands

**show spanning-tree root**

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>spanning-tree</b>	Spanning Tree-related information
	<b>root</b>	Spanning Tree root information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show spanning-tree root  <pre> Root ID           RootCost  MaxAge  FwdDly  RootPort ----- 00:00:00:00:00:00:00:00  0 sec    20 sec  15 sec   0 </pre> moxa#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Spanning Tree Interface Information

### Commands

**show spanning-tree interface** { ethernet <slot/port> | port-channel <id> }

**show spanning-tree interface** { ethernet <slot/port> | port-channel <id> } detail

**show spanning-tree interface** { ethernet <slot/port> | port-channel <id> } inconsistency

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>spanning-tree</b>	Spanning Tree-related information
	<b>interface</b>	Spanning Tree interface information
	ethernet <slot/port>	The Ethernet slot or port number
	port-channel <id>	The port channel ID
	detail	Detailed information about the port and bridge
	inconsistency	Spanning Tree inconsistent state information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show spanning-tree interface ethernet 1/2 moxa# show spanning-tree interface ethernet 1/2 inconsistency moxa# show span in eth 1/1</pre>	
	<pre> Root      State      Cost      Prio  Type -----  -----  -----  -----  ----- Disabled  Disable    200000000  128   SharedLAN  moxa# show span in eth 1/1 incon BPDU Inconsist: False Root Inconsist: False Loop Inconsist: False  moxa#</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Spanning Tree Details

### Commands

**show spanning-tree** [detail]

**show spanning-tree active** [detail]

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>spanning-tree</b>	Spanning Tree related information
	<b>detail</b>	Detailed Spanning Tree information
	<b>active</b>	Spanning Tree information of active ports
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show spanning-tree Root ID      Priority    0       Address 00:00:00:00:00:00       Cost    0       Port    0       Max Age 20 sec       Forward Delay 15 sec       Hello Time 2 sec Spanning tree Protocol has been disabled Bridge ID    Priority 32768       Address 00:01:02:03:04:05       Hello Time 2 sec       Max Age 20 sec       Forward Delay 15 sec Port  Enable  Role   State  Cost    Prio    Type Eth1/1 Disabled Disabled Disabled 200000000 128  SharedLan Eth1/2 Disabled Disabled Disabled 200000000 128  SharedLan Eth1/3 Disabled Disabled Disabled 200000000 128  SharedLan Eth1/4 Disabled Disabled Disabled 200000000 128  SharedLan moxa# show spanning-tree detail Spanning tree Protocol has been disabled Bridge Identifier has priority 32768, Address 00:01:02:03:04:05 Configured Hello time 2 sec, Max Age 20 sec Forward Delay 15 sec Number of Topology Changes 0 Time since topology Change 0 seconds ago Transmit Hold-Count 6 Root Times:Max Age 20 sec      Forward Delay 15 sec Hello Time 2 sec Port 1 [Eth1/1] is Disabled, Disabled Port PathCost 200000000, Port Priority 128, Port Identifier 128.1 Designated Root has priority 0, address 00:00:00:00:00:00 Designated Port Id is 0.0, Designated PathCost 0 No of Transition to forwarding State :0 Auto-Edge is disabled PortFast is enabled, Oper-Edge is disabled BPDU Filtering is disabled. BPDU Guard is enabled. Root Guard is disabled. Loop Guard is disabled. Admin LinkType is Auto, Oper LinkType is Shared-Lan BPDUs : sent 0 , received 0 Timers: Hello - 0, Forward Delay - 0, Topology Change - 0, Error Disabled Recovery Interval 300 sec </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Turbo Ring v2

### Show Turbo Ring v2 Status

#### Commands

**show turbo-ring-v2** { config | status }

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>turbo-ring-v2</b>	Display Turbo Ring v2 information
	config	Ring configuration information
	status	Ring status information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC/Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show turbo-ring-v2 config Turbo Ring V2 Module is enabled   Ring 1:     Enable: enabled   Set as master: disabled     1st port:  Eth1/1     2nd port:  Eth1/2   Ring 2:     Enable: disabled     Set as master: disabled     1st port:  Eth1/3     2nd port:  Eth1/4   Coupling:   Enable: disabled   Mode: Ring coupling(primary)   Coupling Port: Eth2/1 moxa# show turbo-ring-v2 status Turbo Ring V2 status:   Ring 1:     Status: Healthy     Master/Slave: Master   Master ID: 00:90:e8:00:bb:cc     1st Ring Port Status: Eth1/1 Forwarding     2nd Ring Port Status: Eth1/2 Blocked   Ring 2:     Status:     Master/Slave:---   Master ID: 00:00:00:00:00:00   1st Ring Port Status:---     2nd Ring Port Status:---   Coupling:   Mode:---   Coupling Port: ---</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	turbo-ring-v2	

## Configure Redundancy Mode Setting

### Commands

**turbo-ring-v2** { enable | disable }

<b>Syntax Description</b>	<b>turbo-ring-v2</b>	Configure Turbo Ring V2 parameters
	enable	Enable Turbo Ring V2
	disable	Disable Turbo Ring V2
<b>Defaults</b>	Turbo Ring V2 is disabled by default	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# turbo-ring-v2 enable	
<b>Error Messages</b>	Invalid: A maximum of two redundant protocols can be enabled. Invalid: Turbo Chain and Turbo Ring V2 cannot be enabled at the same time. Invalid: Two redundant protocols cannot use the same port. Invalid: Turbo Ring V2 and STP/RSTP cannot be enabled at the same time.	
<b>Related Commands</b>	show turbo-ring-v2 config	

## Configure Ring Settings

### Commands

**turbo-ring-v2** ring-id **primary interface** { port-channel <integer (1-65535)> | <interface-type> <interface-id> } **secondary interface** { port-channel <integer (1-65535)> | <interface-type> <interface-id> }

**no turbo-ring-v2** ring-id

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>turbo-ring-v2</b>	Configure Turbo Ring V2 parameters
	ring-id	Configure the ring ID (1-2)
	<b>primary interface</b>	The first ring port
	<b>interface</b>	The port interface
	interface-type	Ethernet
	interface-id	The slot number/port number <1-7>/<1-4>
	port-channel	The port channel interface
	<b>secondary interface</b>	The second ring port
	<b>interface</b>	The port interface
	interface-type	Ethernet
	interface-id	The slot number/port number <1-7>/<1-4>
port-channel	The port channel interface	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	At least one turbo ring domain or coupling must be enabled. Two turbo ring domains and coupling cannot be enabled at the same time.	
<b>Examples</b>	moxa(config)# turbo-ring-v2 1 primary interface ethernet 2/1 secondary interface ethernet 2/2	
<b>Error Messages</b>	Invalid: The first and second ring ports cannot be on the same port. Invalid: A ring port cannot belong to both rings. Invalid: A port channel must be created first to be able to assign to a ring port.	
<b>Related Commands</b>	show turbo-ring-v2 { config   status }	

## Configure the Switch as the Ring Master

### Commands

**turbo-ring-v2 ring-id master**

**no turbo-ring-v2 ring-id master**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>turbo-ring-v2</b>	Configure Turbo Ring V2 parameters
	ring-id	Configure the ring ID (1-2)
	<b>master</b>	Enable ring master
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# turbo-ring-v2 1 master master - Set turbo ring v2 ring id as master	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show turbo-ring-v2 { config   status }	

## Configure the Primary Port of Ring Coupling

### Commands

**turbo-ring-v2 coupling primary interface <interface-type> <interface-id>**

**no turbo-ring-v2 coupling**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>turbo-ring-v2</b>	Configure Turbo Ring V2 parameters
	<b>coupling</b>	Configure ring coupling parameters
	<b>primary</b>	Coupling primary mode
	<b>interface</b>	The port interface
	interface-type	Ethernet
	interface-id	The slot number/port number <1-7>/<1-4>
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	At least one turbo ring domain or coupling must be enabled. Two turbo ring domains and coupling cannot be enabled at the same time.	
<b>Examples</b>	moxa(config)# turbo-ring-v2 coupling primary interface ethernet 2/1	
<b>Error Messages</b>	Invalid: Ring coupling cannot be enabled when both rings are enabled. Invalid: There can be one ring enabled if you want to enable ring coupling. Invalid: A ring coupling port cannot be an active ring port.	
<b>Related Commands</b>	show turbo-ring-v2	

## Configure Backup Port of Ring Coupling

### Commands

**turbo-ring-v2 coupling backup interface** <interface-type> <interface-id>

**no turbo-ring-v2 coupling**

<b>Syntax Description</b>	<b>turbo-ring-v2</b>	Configure Turbo Ring V2 parameters
	<b>coupling</b>	Configure ring coupling parameters
	<b>backup</b>	Coupling backup mode
	<b>interface</b>	The port interface
	interface-type	Ethernet
	interface-id	The slot number/port number <1-7>/<1-4>
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	At least one turbo ring domain or coupling must be enabled. Two turbo ring domains and coupling cannot be enabled at the same time.	
<b>Examples</b>	moxa(config)# turbo-ring-v2 coupling backup interface ethernet 2/1	
<b>Error Messages</b>	Invalid: Ring coupling cannot be enabled when both rings are enabled. Invalid: There can be one ring enabled if you want to enable ring coupling. Invalid: A ring coupling port cannot be an active ring port.	
<b>Related Commands</b>	show turbo-ring-v2 { config   status }	

## Turbo Chain

### Show Turbo Chain Information

#### Commands

**show turbo-chain**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>turbo-chain</b>	Display Turbo Chain information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show turbo-chain Admin Status: Disabled Role: Member Port Role Port Number Port State ----- Member Port Eth1/1 --- Member Port Eth1/2 ---	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Turbo Chain Setting

### Commands

**turbo-chain** { enable | disable }

**turbo-chain role** { head | member | tail } **primary interface** { port-channel <port-channel-id (1-65535)> | <interface-type> <interface-id> } **secondary interface** { port-channel <port-channel-id (1-65535)> | <interface-type> <interface-id> }

<b>Syntax Description</b>	<b>turbo-chain</b>	Configure Turbo Chain parameters
	enable	Enable Turbo Chain
	disable	Disable Turbo Chain
	<b>role</b>	Configure the role of the switch in the Turbo Chain
	head	Set the switch as the Turbo Chain head
	member	Set the switch as a Turbo Chain member
	tail	Set the switch as the Turbo Chain tail
	<b>primary interface</b>	Configure the Turbo Chain primary port
		The interface of Turbo Chain
	port-channel	The port channel interface
	port-channel-id	The port channel ID
	interface-type	Ethernet interface
	interface-id	Slot number/port number
<b>secondary interface</b>	Configure the Turbo Chain secondary port	
	The interface of Turbo Chain	
<b>Defaults</b>	Turbo Chain is disabled by default	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config)# turbo-chain disable moxa(config)# turbo-chain role member primary interface ethernet 1/1 secondary interface ethernet 1/2</pre>	
<b>Error Messages</b>	<p>% Turbo Chain: Invalid: Two Identical Turbo Chain Ports.</p> <p>% Turbo Chain: Invalid: The port-channel does not exist.</p> <p>% Turbo Chain: Invalid: The port-channel does not exist.</p> <p>% L2 Redundancy: Invalid: Two redundant protocols cannot use the same port.</p> <p>% L2 Redundancy: Invalid: Port channel member port cannot be assigned to a redundant protocol.</p> <p>% L2 Redundancy: Invalid: Redundant Protocol and Port Security cannot be enabled on the same port.</p> <p>% L2 Redundancy: Invalid: Redundant Protocol and 802.1x/MAB cannot be enabled on the same port.</p> <p>% L2 Redundancy: Invalid: The port-channel group does not exist.</p> <p>% L2 Redundancy: Invalid: The port-channel group is used by Turbo Ring/Turbo Chain/Dual Homing. It cannot be deleted.</p> <p>% L2 Redundancy: Invalid: A maximum of two redundant protocols can be enabled.</p> <p>% L2 Redundancy: Invalid: Turbo Chain and Turbo Ring V2 cannot be enabled at the same time.</p> <p>% L2 Redundancy: Invalid: Turbo Chain and STP/RSTP cannot be enabled at the same time.</p>	
<b>Related Commands</b>	show turbo-chain	

## MRP

### Show MRP Information

#### Commands

##### show mrp

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>mrp</b>	Display MRP information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	MOXA# show mrp  MRP Ring : Enabled Role : Ring Manager Ring State Machine : Primary Ring Port Link Up React on link Change : Enabled VLAN ID : 1 Domain ID : C3D687FE-789E-03A1-ACDB-E5BFCBBC27B6 ----- Interface Port Number Port Status ----- Ring Port 1 Eth1/3 Forwarding Ring Port 2 Eth1/4 Link down  MRP Interconnection : Enabled Interconnection State : Interconnection Port Idle Interconnection Role : Client Interconnection Mode : RC-Mode Interconnection ID : 0 ----- Interface Port Number Port Status ----- Interconnection Port Eth2/1 Forwarding	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Enable/Disable the MRP Ring

#### Commands

##### mrp ring { enable | disable }

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>ring</b>	Configure MRP ring settings
	enable	Enable the MRP ring
	disable	Disable the MRP ring
<b>Defaults</b>	The MRP ring is disabled by default.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp ring enable	
<b>Error Messages</b>	% L2 Redundancy: Invalid: A maximum of two redundant protocols can be enabled. % L2 Redundancy: Invalid: Turbo Ring V2 and MRP can not be enabled at the same time. % L2 Redundancy: Invalid: Turbo Chain and MRP can not be enabled at the same time. % L2 Redundancy: Invalid: STP/RSTP/MSTP and MRP can not be enabled at the same time.	
<b>Related Commands</b>	show mrp	

## Configure MRP Role Settings

### Commands

**mrp role** { manager | client }

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>role</b>	Configure MRP role settings
	manager	Set the MRP role to Manager
	client	Set the MRP role to Client
<b>Defaults</b>	The default MRP role is Client.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp role manager	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Configure MRP Ring VLAN ID

### Commands

**mrp ring vlan-id** <integer(1-4094)>

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>ring</b>	Configure MRP ring settings
	<b>vlan-id</b>	Configure the MRP VLAN ID
	<integer(1-4094)>	Specify the MRP VLAN ID (1-4094)
<b>Defaults</b>	The default MRP VLAN ID is 1.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp ring vlan-id 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Configure MRP Ring Domain Settings

### Commands

**mrp ring domain** { default | profinet }

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>ring</b>	Configure the MRP ring settings
	<b>domain</b>	Configure domain UUID settings
	default	Set the domain UUID to the default UUID
	profinet	Set the domain UUID to the PROFINET UUID
<b>Defaults</b>	The default Domain UUID is the Default UUID.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp ring domain profinet	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Enable/Disable MRP React-on-Link Change

### Commands

**mrp react-on-lnk-chg** { enable | disable }

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>react-on-lnk-chg</b>	Configure MRP react on MRC link change settings
	enable	Enable MRP react on link change
	disable	Disable MRP react on link change
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp react-on-lnk-chg enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Configure MRP Primary/Secondary Interface Settings

### Commands

**mrp primary interface** <iftype> <ifnum> **secondary interface** <iftype> <ifnum>

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>primary interface</b>	Configure MRP primary interface settings
	<iftype> <ifnum>	Specify the interface type and number (Ethernet, 1/1)
	<b>secondary interface</b>	Configure MRP secondary interface settings
<iftype> <ifnum>	Specify the interface type and number (Ethernet, 1/1)	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp primary interface 1/1 secondary interface 1/2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Enable/Disable MRP Interconnection

### Commands

**mrp interconnection** { enable | disable }

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>interconnection</b>	MRP interconnection
	enable	Enable MRP interconnection
	disable	Disable MRP interconnection
<b>Defaults</b>	MRP interconnection is disabled by default.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp interconnection <b>enable</b>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Configure MRP Interconnection ID

### Commands

**mrp interconnection IID <integer(0-65535)>**

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>interconnection</b>	MRP interconnection
	<b>IID</b>	Interconnection ID
	<integer(0-65535)>	Interconnection ID
<b>Defaults</b>	The default MRP interconnection ID is 0.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp interconnection IID 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Configure MRP Interconnection Role

### Commands

**mrp interconnection role { manager | client }**

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>interconnection</b>	MRP interconnection
	<b>role</b>	Interconnection role
	manager	Configure Interconnection role as manager
	client	Configure Interconnection role as client
<b>Defaults</b>	The default MRP interconnection role is client.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp interconnection role manager	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Configure MRP Interconnection Mode

### Commands

**mrp interconnection mode {lc-mode | rc-mode}**

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>interconnection</b>	MRP interconnection
	<b>mode</b>	Interconnection mode
	<b>lc-mode</b>	Configure Interconnection mode as LC mode
	<b>rc-mode</b>	Configure Interconnection mode as RC mode
<b>Defaults</b>	The default MRP interconnection mode is RC mode.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp interconnection mode rc-mode	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show mrp	

## Configure MRP Interconnection Port

### Commands

**mrp interconnection interface** <iftype> <ifnum>

<b>Syntax Description</b>	<b>mrp</b>	Configure MRP settings
	<b>interconnection</b>	Configure MRP interconnection
	<b>interface</b>	Configure MRP interconnection port interface
	<iftype> <ifnum>	Specify the interface type and number (Ethernet, 1/1)
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# mrp interconnection interface ethernet 2/1	
<b>Error Messages</b>	% MRP: Invalid: Port Channel port couldn't be set as MRP interconnection port simultaneously !!! % MRP: Invalid: Dual Homing port couldn't be set as MRP interconnection port simultaneously !!! % MRP: Invalid: The MRP interconnection port couldn't be set as MRP ring ports simultaneously !!!	
<b>Related Commands</b>	show mrp	

## Multiple Dual Homing

### Display Dual Homing Information

#### Commands

**show dual-homing**

<b>Syntax Description</b>	<b>show</b>	Show running system information	
	<b>dual-homing</b>	Display dual homing configurations and status	
<b>Defaults</b>	N/A		
<b>Command Modes</b>	Privileged EXEC/User EXEC		
<b>Usage Guidelines</b>	N/A		
<b>Examples</b>	<pre>moxa# show dual-homing  Dual-homing: Disabled  Path mode: Primary path always first  Session 1:  Port Roles and States Path           Port-Index      Link-Status    Port-State ----- Primary        Eth2/4          Unknown        Disabled Secondary      Eth3/3          Unknown        Disabled  Session 2:  Port Roles and States Path           Port-Index      Link-Status    Port-State ----- Primary        N/A             --             -- Secondary      N/A             --             --</pre>		
<b>Error Messages</b>	N/A		
<b>Related Commands</b>	dual-homing		

## Enable/Disable Dual Homing Setting

### Commands

**dual-homing {enable | disable}**

<b>Syntax Description</b>	<b>dual-homing</b>	Dual Homing
	<b>enable</b>	Enable the feature
	<b>disable</b>	Disable the feature
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa (config)# dual-homing enable	
<b>Error Messages</b>	Invalid: Port channel member port can not be assigned to a redundant protocol.	
<b>Related Commands</b>	show dual-homing	

## Configure Dual Homing Path Mode

### Commands

**dual-homing path-mode {primary-first | maintain-current | sensing-recovery}**

<b>Syntax Description</b>	<b>dual-homing</b>	Configure dual-homing
	<b>path-mode</b>	Dual homing path switching mode setting
	<b>primary-first</b>	Primary path always first
	<b>maintain-current</b>	Maintain current path
	<b>sensing-recovery</b>	Primary path sensing recovery
<b>Defaults</b>	primary-first	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# dual-homing path-mode primary-first	
<b>Error Messages</b>	N/A	
<b>Command Modes</b>	show dual-homing	
<b>Related Commands</b>	primary-first	

## Configure the redundancy port on a certain session

### Commands

```
dual-homing primary interface {port-channel <integer (1-65535)> | <interface-type>
<interface-id>} secondary interface {port-channel <integer (1-65535)> | <interface-type>
<interface-id>} [{session <session number>} {enable | disable}]
```

<b>Syntax Description</b>	<b>dual-homing</b>	Configure dual homing
	<b>primary</b>	Dual homing primary port setting
	<b>interface</b>	Dual homing port interface setting
	<b>secondary</b>	Dual homing secondary port setting
	<b>port-channel</b>	Port Channel
	<b>integer (1-65535)</b>	Port Channel group ID
	<b>&lt;interface-type&gt;</b>	Interface type
	<b>&lt;interface-id&gt;</b>	Interface ID
	<b>session</b>	Session group setting
	<b>integer</b>	Session ID
	<b>enable</b>	Enable the feature
<b>disable</b>	Disable the feature	
<b>Defaults</b>	dual-homing primary interface ethernet 1/1 secondary interface ethernet 1/2 (when multi-session is supported, this commnad means the session 1 will be enabled.) dual-homing primary interface ethernet 1/1 secondary interface ethernet 1/2 session 1 enable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# dual-homing primary interface ethernet 1/1 secondary interface port-channel 1 session 1 enable	
<b>Error Messages</b>	Invalid: Port channel member port can not be assigned to a redundant protocol.	
<b>Related Commands</b>	show dual-homin	

## Multiple Network Coupling

### Enable/disable multiple network coupling

#### Commands

```
multiple-network-coupling {enable | disable}
```

<b>Syntax Description</b>	<b>multiple-network-coupling</b>	Configure Multiple Network Coupling parameters
	<b>enable</b>	Enable Multiple Network Coupling in the system
	<b>disable</b>	Disable Multiple Network Coupling in the system
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configuremoxa-product(config)# multiple-network-coupling enablemoxa-product# configuremoxa-product(config)# multiple-network-coupling disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display the coupling information that is present in the system

### Commands

**show multiple-network-coupling {config | status}**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information																																																							
	<b>multiple-network-coupling</b>	Display Multiple Network Coupling information																																																							
	<b>config</b>	Config information																																																							
	<b>status</b>	Status information																																																							
<b>Defaults</b>	N/A																																																								
<b>Command Modes</b>	Privileged EXEC Mode																																																								
<b>Usage Guidelines</b>	N/A																																																								
<b>Examples</b>	<pre>moxa-product# show multiple-network-coupling config</pre> <p>Multiple Network Coupling is globally Enabled. Main ring protocol : Turbo Ring V2. Coupling switch role : Backup. Coupling group ID : 1. Coupling polling interval : 40ms.</p> <p>Coupling Table :</p> <table border="1"> <thead> <tr> <th>Index</th> <th>Path ID</th> <th>Coupling port</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>Eth1/1</td> <td>Active</td> </tr> <tr> <td>2</td> <td>2</td> <td>Po1</td> <td>Active</td> </tr> <tr> <td>3</td> <td>3</td> <td>Eth2/3</td> <td>Inactive</td> </tr> <tr> <td>4</td> <td>4</td> <td>Eth2/4</td> <td>Inactive</td> </tr> </tbody> </table> <pre>moxa-product# show multiple-network-coupling status</pre> <p>Multiple Network Coupling is globally Enabled. Coupling switch role : Backup. Coupling group ID : 1.</p> <p>Coupling Table :</p> <table border="1"> <thead> <tr> <th>Index</th> <th>Path ID</th> <th>Coupling port</th> <th>Coupling port state</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> <td>Eth1/1</td> <td>Blocking</td> </tr> <tr> <td>2</td> <td>2</td> <td>Po1</td> <td>Forwarding</td> </tr> <tr> <td>3</td> <td>3</td> <td>Eth2/3</td> <td>Link down</td> </tr> <tr> <td>4</td> <td>4</td> <td>Eth2/4</td> <td>Link down</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Partner MAC</th> <th>Connection status</th> <th>Error status</th> </tr> </thead> <tbody> <tr> <td>00:90:e8:12:45:67</td> <td>Connected</td> <td>---</td> </tr> <tr> <td>00:90:e8:12:45:67</td> <td>Connected</td> <td>---</td> </tr> <tr> <td>---</td> <td>Disabled</td> <td>---</td> </tr> <tr> <td>---</td> <td>Disabled</td> <td>---</td> </tr> </tbody> </table>		Index	Path ID	Coupling port	Status	1	1	Eth1/1	Active	2	2	Po1	Active	3	3	Eth2/3	Inactive	4	4	Eth2/4	Inactive	Index	Path ID	Coupling port	Coupling port state	1	1	Eth1/1	Blocking	2	2	Po1	Forwarding	3	3	Eth2/3	Link down	4	4	Eth2/4	Link down	Partner MAC	Connection status	Error status	00:90:e8:12:45:67	Connected	---	00:90:e8:12:45:67	Connected	---	---	Disabled	---	---	Disabled	---
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<b>Error Messages</b>	N/A																																																								
<b>Related Commands</b>	N/A																																																								

## Configure the redundant protocol of the main ring

### Commands

**multiple-network-coupling main-ring-protocol {trv2 | mrp}**

<b>Syntax Description</b>	<b>multiple-network-coupling</b>	Configure Multiple Network Coupling parameters
	<b>main-ring-protocol</b>	Main ring protocol related configuration
	<b>trv2</b>	Turbo Ring V2 as main ring
	<b>mrp</b>	MRP as main ring
<b>Defaults</b>	trv2	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configure moxa-product(config)# multiple-network-coupling main-ring-protocol trv2  moxa-product# configure moxa-product(config)# multiple-network-coupling main-ring-protocol mrp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the coupling switch role

### Commands

**multiple-network-coupling switch-role {active | backup}**

<b>Syntax Description</b>	<b>multiple-network-coupling</b>	Configure Multiple Network Coupling parameters
	<b>switch-role</b>	Coupling switch role related configuration
	<b>active</b>	Active switch
	<b>backup</b>	Backup switch
<b>Defaults</b>	active	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configure moxa-product(config)# multiple-network-coupling switch-role active  moxa-product# configure moxa-product(config)# multiple-network-coupling switch-role backup	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the coupling group id

### Commands

**multiple-network-coupling group <group-id (1-16)>**

<b>Syntax Description</b>	<b>multiple-network-coupling</b>	Configure Multiple Network Coupling parameters
	<b>group</b>	Coupling group related configuration
	<b>group-id</b>	Coupling group ID
<b>Defaults</b>	1	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configure moxa-product(config)# multiple-network-coupling group 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the coupling polling interval

### Commands

**multiple-network-coupling polling-interval {80ms | 40ms}**

<b>Syntax Description</b>	<b>multiple-network-coupling</b>	Configure Multiple Network Coupling parameters
	<b>polling-interval</b>	Coupling polling interval related configuration
	<b>80ms</b>	80ms polling interval
	<b>40ms</b>	40ms polling interval
<b>Defaults</b>	80ms	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configure moxa-product(config)# multiple-network-coupling polling-interval 80ms	
	moxa-product# configure moxa-product(config)# multiple-network-coupling polling-interval 40ms	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Reset the coupling polling interval to the default value

### Commands

**no multiple-network-coupling polling-interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>multiple-network-coupling</b>	Multiple Network Coupling details configuration
	<b>polling-interval</b>	Coupling polling interval
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configure moxa-product(config)# no multiple-network-coupling polling-interval	
	moxa-product# configure moxa-product(config)# no multiple-network-coupling polling-interval	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/ disable the coupling table entry and configure the path id and coupling port of the entry in the coupling table

### Commands

**multiple-network-coupling** <index (1-4)> {**enable** | **disable**} [ **path-id** <path-id (1-16)> **port interface** { **port-channel** <port-channel-id> | <interface-type> <interface-id> } ]

<b>Syntax Description</b>	<b>multiple-network-coupling</b>	Configure Multiple Network Coupling parameters
	<b>index</b>	Index of coupling table
	<b>enable</b>	Enable coupling table entry
	<b>disable</b>	Disable coupling table entry
	<b>path-id</b>	Path ID related configuration
	<b>path-id</b>	Path ID
	<b>port</b>	Coupling port related configuration
	<b>interface</b>	Interface related configuration
	<b>port-channel</b>	Port channel interface
	<b>port-channel-id</b>	Port channel ID, the range is from 1 to (Totalport/2)
	<b>interface-type</b>	Interface type
	<b>interface-id</b>	Interface number
<b>Defaults</b>	See 2.7 Parameter Table	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa-product# configure moxa-product(config)# multiple-network-coupling 1 enable path-id 1 port interface port-channel 1  moxa-product# configure moxa-product(config)# multiple-network-coupling 1 enable path-id 1 port interface ethernet 1/1  moxa-product# configure moxa-product(config)# multiple-network-coupling 1 enable  moxa-product# configure moxa-product(config)# multiple-network-coupling 1 disable</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# IEC 62439-3

## PRP/HSR

### Show PRP/HSR Counter Information

#### Commands

**show prp-hsr** [counter]

<b>Syntax Description</b>	prp-hsr	Display PRP/HSR information
	counter	Counter information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show prp-hsr moxa# show prp-hsr counter	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Show Supervision-frame Information

#### Commands

**show supervision-frame** { config | nodes-table [<node-type (0-5)>] }

<b>Syntax Description</b>	supervision-frame	Display Supervision Frame information
	config	Supervision Frame config information
	nodes-table	IEC 62439-3 Nodes Table information
	(0-5)	Node type, i.e., DANP/RedboxP/VDANP/DANH/RedboxH/VDANH
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show supervision-frame config moxa# show supervision-frame nodes-table 0	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Enable/Disable PRP/HSR

#### Commands

**prp-hsr** {enable | disable}

<b>Syntax Description</b>	prp-hsr	Configure PRP/HSR parameters
	enable	Enable PRP/HSR in the system
	disable	Disable PRP/HSR in the system
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# prp-hsr enable	
<b>Error Messages</b>	1. Invalid settings detected. PHR module ports do not support 100M-Half, 10M-Full, 10M-Half. 2. Invalid settings detected. Invalid PHR module ports cannot modify port settings. 3. Invalid settings detected. PHR module ports do not support flow control. 4. Invalid settings detected. PHR module ports do not support port channel membership. 5. Invalid settings detected. PHR module ports do not support Multiple	

	<p>Network Coupling.</p> <p>6. Invalid settings detected. PHR module ports do not support Turbo Ring v2.</p> <p>7. Invalid settings detected. PHR module ports do not support Turbo Chain.</p> <p>8. Invalid settings detected. PHR module ports do not support RSTP.</p> <p>9. Invalid settings detected. PHR module ports do not support Dual Homing.</p> <p>10. Invalid settings detected. PHR module ports do not support MSTP.</p> <p>11. Invalid settings detected. PHR module ports do not support MRP.</p> <p>12. Invalid settings detected. PHR module ports do not support MRP interconnection.</p> <p>13. Invalid settings detected. PHR module ports do not support Ingress Rate Limit.</p> <p>14. Invalid settings detected. PHR module ports do not support GMRP.</p> <p>15. Invalid settings detected. PHR module ports cannot be set as port mirror destination ports.</p> <p>16. Invalid settings detected. PHR module ports cannot be set as RSPAN source port.</p> <p>17. Invalid settings detected. Invalid PHR module ports cannot be set as port mirror source port.</p> <p>18. Invalid settings detected. PHR module ports do not support IEEE 802.1X.</p> <p>19. Invalid settings detected. PHR module ports do not support MAB.</p> <p>20. Invalid settings detected. PHR module ports do not support Port Security.</p> <p>21. Invalid settings detected. PHR module ports do not support being set as IGMP static router ports.</p> <p>22. Invalid settings detected. PHR module ports do not support GVRP.</p> <p>23. Invalid settings detected. PHR module ports do not support MACsec.</p> <p>24. Invalid settings detected. PHR module ports do not support Traffic Storm Control.</p> <p>25. Invalid settings detected. PHR module ports do not support DHCP Snooping/IP Source Guard/Dynamic ARP Inspection.</p> <p>26. Invalid settings detected. PHR module ports do not support DHCP Snooping.</p> <p>27. Invalid settings detected. PHR module ports do not support Linkup Delay.</p> <p>28. Invalid settings detected. PHR module ports do not support Static Unicast.</p> <p>29. Invalid settings detected. PHR module ports do not support Static Multicast.</p> <p>30. Invalid settings detected. PHR module ports do not support DHCP Server Port-based IP Assignment.</p> <p>31. Invalid settings detected. Unable to configure VLAN because selected ports are invalid.</p> <p>32. Invalid settings detected. Unable to configure DHCP Relay Agent because selected ports are invalid.</p> <p>33. Invalid settings detected. Unable to configure QoS because selected ports are invalid.</p> <p>34. Invalid settings detected. Unable to configure ACL because selected ports are invalid.</p> <p>35. Invalid settings detected. PHR module ports do not support Egress Shaper.</p> <p>36. PHR module malfunction. The module may not be correctly inserted.</p> <p>37. Invalid settings detected. The main ring protocol cannot be set to HSR while TRv2/MRP is enabled.</p> <p>38. Supervision Frame can only be enabled when PRP/HSR is enabled.</p> <p>39. Invalid settings detected. The same PHR module port cannot be configured as a source port for multiple mirror sessions.</p>
<b>Warning Messages</b>	N/A
<b>Related Commands</b>	N/A

## Enable/Disable PRP/HSR/Coupling Protocol

### Commands

**prp-hsr protocol {prp | hsr | coupling}**

<b>Syntax Description</b>	prp-hsr	Configure PRP/HSR parameters
	protocol	Protocol related configuration
	prp	PRP
	hsr	HSR
	coupling	COUPLING
<b>Defaults</b>	prp	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# prp-hsr protocol prp	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Entry Forget Time

### Commands

**prp-hsr entryforgettime {10ms | 100ms}**

<b>Syntax Description</b>	prp-hsr	Configure PRP/HSR parameters
	entryforgettime	Entry forget time related configuration
	10ms	10ms
	100ms	100ms
<b>Defaults</b>	10ms	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# prp-hsr entryforgettime 10ms	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Net ID

### Commands

**prp-hsr netid <net-id (1-7)>**

**no prp-hsr netid**

<b>Syntax Description</b>	prp-hsr	Configure PRP/HSR parameters
	netid	Net ID related configuration
	(1-7)	Net ID
<b>Defaults</b>	1	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# prp-hsr netid 1 moxa(config)# no prp-hsr netid	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Lan ID

### Commands

**prp-hsr lanid <lan-id (0-1)>**

no prp-hsr lanid

<b>Syntax Description</b>	prp-hsr	Configure PRP/HSR parameters
	lanid	LAN ID related configuration
	(0-1)	LAN ID
<b>Defaults</b>	0 (LAN A)	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# prp-hsr lanid 0 moxa(config)# no prp-hsr lanid	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Supervision Frame

### Enable/Disable Supervision Frame

#### Commands

**supervision-frame {enable | disable}**

<b>Syntax Description</b>	supervision-frame	Configure Supervision Frame parameters
	enable	Enable Supervision Frame in the system
	disable	Disable Supervision Frame in the system
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# supervision-frame enable	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Configure Supervision Frame Interval

#### Commands

**supervision-frame interval <life-check-interval (1-60)>**

<b>Syntax Description</b>	supervision-frame	Configure Supervision Frame parameters
	interval	Life Check Interval related configuration
	(1-60)	Interval (sec) between two supervision frames sent
<b>Defaults</b>	2	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# supervision-frame interval 2	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Supervision Frame Destination Address

### Commands

**supervision-frame dest-addr** <last-hex-byte>

<b>Syntax Description</b>	supervision-frame	Configure Supervision Frame parameters
	dest-addr	Destination address related configuration
	<string(2)>	Last hex byte of destination address, i.e., 00~FF
<b>Defaults</b>	00	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# supervision-frame dest-addr 01	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/ Disable Supervision Frame Forward to Interlink

### Commands

**supervision-frame forward-to-interlink** {enable | disable}

<b>Syntax Description</b>	supervision-frame	Configure Supervision Frame parameters
	forward-to-interlink	Forwarding to interlink port related configuration
	enable	Enable Supervision Frame forwarding to interlink port
	disable	Disable Supervision Frame forwarding to interlink port
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# supervision-frame forward-to-interlink enable	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Supervision Frame Nodes Table Node Forget Time

### Commands

**supervision-frame nodes-table node-forget-time** <interval (60-120)>

<b>Syntax Description</b>	supervision-frame	Configure Supervision Frame parameters
	nodes-table	IEC 62439-3 Nodes Table related configuration
	node-forget-time	Node Forget Time related configuration
	(60-120)	Node Forget Time (sec)
<b>Defaults</b>	60	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# supervision-frame nodes-table node-forget-time 120	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Layer 3 Redundancy

## VRRP

### Enable/Disable VRRP Functions

#### Commands

**router vrrp** { enable | disable }

<b>Syntax Description</b>	<b>router</b>	Configures router related information
	<b>vrrp</b>	VRRP related configuration
	enable	Enables VRRP
	disable	Disables VRRP
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# router vrrp enable	
	moxa# configure	
	moxa(config)# router vrrp disable	
<b>Error messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Enter the VRRP Configuration Mode

#### Commands

**router vrrp**

<b>Syntax Description</b>	<b>router</b>	Configure router related information
	<b>vrrp</b>	VRRP related configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure	
	moxa(config)# router vrrp	
	moxa(config-vrrp)#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Configure the VRRP Version Settings

#### Commands

**vrrp version** { v2 | v3 }

<b>Syntax Description</b>	<b>vrrp</b>	Configure the VRRP related parameters
	<b>version</b>	Version related configuration
	v2	Enable VRRP Version 2
	v3	Enable VRRP Version 3
<b>Defaults</b>	v2	
<b>Command Modes</b>	VRRP Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# router vrrp	
	moxa(config-vrrp)# vrrp version v2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the Virtual Router IP Address

### Commands

**vrrp** <vrid(1-255)> **ip** <ip-addr>

<b>Syntax Description</b>	<b>vrrp</b>	Configures the VRRP related parameters
	vrid	virtual router ID
	<b>ip</b>	IP related configuration
	ip-addr	IP address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# vrrp 2 ip 192.168.2.1	
<b>Error Messages</b>	% VRRP: Invalid: If any of the existing virtual routers have advertisement intervals less than 1 second, then the maximum number of virtual routers is 16. % VRRP: Invalid: The associated IP conflicts with another associated IP. % VRRP: Invalid: The associated IP cannot be 0.0.0.0 or Class D, Class E, or vlan address. % VRRP: Invalid: The interface name is not an existing L3 VLAN interface or the L3 VLAN interface cannot be removed when VRRP is being used. % VRRP: Invalid: The associated IP and L3 VLAN interface IP must be in the same subnet. % VRRP: Invalid: The associated IP cannot be an L3 VLAN interface network address. % VRRP: Invalid: The associated IP cannot be an L3 VLAN interface broadcast address. % VRRP: Invalid: The associated IP cannot be active when the L3 VLAN interface IP or subnet mask is not set.	
<b>Related Commands</b>	N/A	

## Delete the Virtual Router in the Interface

### Commands

**no vrrp** <vrid(1-255)>

<b>Syntax Description</b>	<b>no</b>	Disables configuration/delete entry/reset to default value
	<b>vrrp</b>	VRRP related configuration
	vrid	virtual router ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# no vrrp 2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable the Virtual Router in the Interface

### Commands

**vrrp** <vrid(1-255)> **active**

<b>Syntax Description</b>	<b>vrrp</b>	Configures the VRRP related parameters
	vrid	virtual router ID
	<b>active</b>	Make the virtual router active
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# vrrp 2 active	
<b>Error Messages</b>	N/A	

<b>Related Commands</b>	N/A
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## Disable the Virtual Router in the Interface

### Commands

**no vrrp** <vrid(1-255)> **active**

<b>Syntax Description</b>	<b>no</b>	Disable configuration/delete entry/reset to default value
	<b>vrrp</b>	VRRP related configuration
	vrid	virtual router ID
	<b>active</b>	Make the virtual router active
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# no vrrp 2 active	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Set the Virtual Router Priority

### Commands

**vrrp** <vrid(1-255)> **priority** <priority(1-254)>

<b>Syntax Description</b>	<b>vrrp</b>	Configures the VRRP related parameters
	vrid	virtual router ID
	<b>priority</b>	priority related configuration
	prio-value	priority used for the virtual router master election process; larger number means higher priority
<b>Defaults</b>	100	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configure moxa-product(config)# interface vlan 2 moxa-product(config-if)# vrrp 2 priority 150	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Set the Virtual Router Priority to the Default Value

### Commands

**no vrrp** <vrid(1-255)> **priority**

<b>Syntax Description</b>	<b>no</b>	Disables configuration/delete entry/reset to default value
	<b>vrrp</b>	VRRP related configuration
	vrid	virtual router ID
	<b>priority</b>	priority related configuration
<b>Defaults</b>	100	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# no vrrp 2 priority	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable the Preempt Mode

### Commands

**vrpp** <vrid(1-255)> **preempt**

<b>Syntax Description</b>	<b>vrpp</b>	Configure the VRRP related parameters
	vrid	virtual router ID
	<b>preempt</b>	Preempt mode related configuration
<b>Defaults</b>	enable	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product(config)# interface vlan 2 moxa-product(config-if)# vrrp 2 preempt	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Disable the Preempt Mode

### Commands

**no vrrp** <vrid(1-255)> **preempt**

<b>Syntax Description</b>	<b>no</b>	Disables configuration/delete entry/reset to default value
	<b>vrrp</b>	VRRP related configuration
	vrid	virtual router ID
	<b>preempt</b>	preempt mode related configuration
<b>Defaults</b>	enable	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# no vrrp 2 preempt	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Set the Authentication Type for the Virtual Router to Simple Password

### Commands

**vrrp** <vrid(1-255)> **text-authentication** <password>

<b>Syntax Description</b>	<b>vrrp</b>	Configures the VRRP related parameters
	vrid	virtual router ID
	<b>text-authentication</b>	simple password authentication related configuration
	password	authentication password used to validate the incoming VRRP packets
<b>Defaults</b>	no authentication	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# vrrp 2 text-authentication aaaaaaa	
<b>Error Messages</b>	% VRRP: Invalid: The VRRP version must be V2 when configuring auth type or auth key. % VRRP: Invalid: The maximum length of VRRP authentication key is 8 characters.	
<b>Related Commands</b>	N/A	

## Set the Authentication Type for the Virtual Router to None

### Commands

**no vrrp** <vrid(1-255)> **text-authentication**

<b>Syntax Description</b>	<b>no</b>	Disables configuration/delete entry/reset to default value
	<b>vrrp</b>	VRRP related configuration
	vrid	virtual router ID
	<b>text-authentication</b>	simple password authentication related configuration
<b>Defaults</b>	no authentication	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# no vrrp 2 text-authentication	
<b>Error Messages</b>	% VRRP: Invalid: The VRRP version must be V2 when configuring auth type or auth key.	
<b>Related Commands</b>	N/A	

## Set the Advertisement Timer for the Virtual Router

### Commands

**vrrp** <vrid(1-255)> **timer [msec]** <interval(1-255)secs>

<b>Syntax Description</b>	<b>vrrp</b>	Configures the VRRP related parameters
	vrid	virtual router ID
	<b>timer</b>	timer related configuration
	<b>msec</b>	Unit is changed to milli-seconds
	interval	Acceptable range for version 2 and version 3 are (1-40secs)/(30-40000msecs)
<b>Defaults</b>	1sec/1000msecs	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# vrrp 2 timer 2  moxa(config)# interface vlan 2 moxa-(config-if)# vrrp 2 timer msec 100	
<b>Error Messages</b>	% VRRP: Invalid: If any of the existing virtual routers have advertisement intervals less than 1 second, then the maximum number of virtual routers is 16. % VRRP: Invalid: The advertisement interval must be set as a multiple of 10, e.g. 30 ms, 40 ms, 50 ms etc.	
<b>Related Commands</b>	N/A	

## Set the Advertisement Timer for the Virtual Router to the Default Value

### Commands

**no vrrp** <vrid(1-255)> **timer**

<b>Syntax Description</b>	<b>no</b>	Disables configuration/delete entry/reset to default value
	<b>vrrp</b>	VRRP related configuration
	vrid	virtual router ID
	<b>timer</b>	timer related configuration
<b>Defaults</b>	1sec (or 1000msecs)	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# no vrrp 2 timer	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable the Accept Mode

### Commands

**vrrp <vrid(1-255)> accept-mode**

<b>Syntax Description</b>	<b>vrrp</b>	Configures the VRRP related parameters
	vrid	virtual router ID
	<b>accept-mode</b>	accept mode related configuration
<b>Defaults</b>	enable	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# vrrp 2 accept-mode	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Disable the Accept Mode

### Commands

**no vrrp <vrid(1-255)> accept-mode**

<b>Syntax Description</b>	<b>no</b>	Disables configuration/delete entry/reset to default value
	<b>vrrp</b>	VRRP related configuration
	vrid	virtual router ID
	<b>accept-mode</b>	accept mode related configuration
<b>Defaults</b>	enable	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 2 moxa(config-if)# no vrrp 2 accept-mode	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show the VRRP Information

### Commands

**show vrrp [ interface { vlan <vlan-id> } <vrId(1-255)> ] [ { brief | detail | statistics } ]**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>vrrp</b>	Displays VRRP information
	<b>interface</b>	VRRP status for the interface
	<b>vlan</b>	VLAN interface
	vlan-id	The range (1-4094) is for VLAN ID
	vrId	Virtual router ID
	<b>brief</b>	Brief information
	<b>detail</b>	Detailed information
	<b>statistics</b>	Statistics related information
<b>Defaults</b>	brief	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show vrrp	
	moxa# show vrrp detail	
	moxa# show vrrp statistics	
	moxa# show vrrp interface vlan 2	
	moxa# show vrrp interface vlan 2 2	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show the VRRP Information for the Interface

### Commands

**show vrrp interface** [ { **vlan** <vlan-id> } ] [ { **brief** | **detail** | **statistics** } ]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>vrrp</b>	Displays VRRP information
	<b>interface</b>	VRRP status for the interface
	<b>vlan</b>	VLAN interface
	vlan-id	The range (1-4094) is for VLAN ID
	<b>brief</b>	brief information
	<b>detail</b>	detailed information
	<b>statistics</b>	statistics related information
<b>Defaults</b>	brief	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show vrrp interface	
	moxa# show vrrp interface detail	
	moxa# show vrrp interface statistics	
	moxa# show vrrp interface vlan 2	
<b>Error Messages</b>	N/A	
<b>Related commands</b>	N/A	

# Tracking

## Enable/Disable Tracking

### Commands

**tracking** {enable | disable}

<b>Syntax Description</b>	<b>tracking</b>	Configure tracking functions
	enable	Enable tracking function
	disable	Disable tracking function
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Enable or disable tracking function	
<b>Examples</b>	moxa(config)# tracking enable moxa(config)# tracking disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show tracking {all   interface   ping   logical}	

## Enable/Disable Tracking ID

### Commands

**tracking <short(1-16)>** {enable | disable}

<b>Syntax Description</b>	<b>tracking</b>	Configure tracking functions
	<b>1 - 16</b>	Tracking ID (1-16) of the created tracking entry
	enable	Enable the tracking entry
	disable	Disable the tracking entry
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Enable tracking entry	
<b>Examples</b>	moxa(config)# tracking 1 enable moxa(config)# tracking 1 disable	
<b>Error Messages</b>	% Tracking: Invalid: This TID does not exist.	
<b>Related Commands</b>	show tracking {all   interface   ping   logical}	

## Configure Tracking Entry of Interface

### Commands

**tracking <short(1-16)> interface { vlan <vlan-id> | port-channel <port-channel-id> | <interface-type> <interface-id> } [down\_to\_up {enable | disable}] [up\_delay <integer (0-99)>] [up\_to\_down {enable | disable}] [down\_delay <integer (0-99)>]**

<b>Syntax Description</b>	<b>tracking</b>	Configure tracking functions
	1 - 16	Tracking ID (1-16) of the created tracking
	<b>interface</b>	Interface related configuration
	<b>vlan</b>	Create an interface tracking entry to monitor a layer 3 interface
	vlan-id	The vlan id (1-4094) of the monitored layer 3 interface
	<b>port-channel</b>	Create an interface tracking entry to monitor a port-channel
	port-channel-id	Monitored port-channel id
	interface-type	Create an interface tracking entry to monitor a port
	interface-id	Monitored port number
	<b>down_to_up</b>	Status change from down to up
	enable	Enable the down to up status change
	disable	Disable the down to up status change
	<b>up_delay</b>	Set the up delay of interface tracking entry
	integer (0-99)	up delay (0 sec - 99 sec)
	<b>up_to_down</b>	Status change from up to down
	enable	Enable the up to down status change

	disable	Disable the up to down status change
	<b>down_delay</b>	Set the down delay of interface tracking entry
	integer (0-99)	down delay (0 sec - 99 sec)
<b>Defaults</b>	down_to_up: enable up_delay: 0 up_to_down: enable down_delay: 0	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Create an interface tracking entry	
<b>Examples</b>	moxa(config)# tracking 1 interface vlan 2 up_delay 5 up_to_down disable	
<b>Error Messages</b>	Error Messages % Tracking: Invalid: Duplicate tracking ID <tid>. % Tracking: Invalid: Invalid port. % Tracking: Invalid: The selected port cannot be used for tracking because it is a member of a port channel. % Tracking: Invalid: Invalid port channel. % Tracking: Invalid: This port channel does not exist. % Tracking: Invalid: Invalid VLAN interface.	
<b>Related Commands</b>	show tracking {all   interface   ping   logical}	

## Configure Tracking Entry of Ping

### Commands

**tracking** <short(1-16)> **ping** <ucast\_addr> [**interval** <integer (500-100000)>]  
**[timeout** <integer (500-100000)>] **[down\_to\_up** {enable | disable}] **[received** <integer (1-99)>]  
**[up\_to\_down** {enable | disable}] **[lost** <integer (1-99)>]

<b>Syntax Description</b>	<b>tracking</b>	Configure tracking functions
	1 - 16	Tracking ID (1-16) of the created tracking
	<b>ping</b>	Create a ping tracking entry to monitor an IP address
	ucast_addr	Monitored IP address
	<b>interval</b>	Set the interval of ping tracking entry
	integer (500-100000)	interval (500 ms - 100,000 ms) 500ms one unit
	<b>timeout</b>	Set the timeout of ping tracking entry
	integer (500-100000)	timeout (500 ms - 100,000 ms) 500ms one unit
	<b>down_to_up</b>	Status change from down to up
	enable	Enable the down to up status change
	disable	Disable the down to up status change
	<b>received</b>	Set the received threshold of ping tracking entry
	integer (1-99)	Received threshold (1 time - 99 times)
	<b>up_to_down</b>	Status change from up to down
	enable	Enable the up to down status change
	disable	Disable the up to down status change
	<b>lost</b>	Set the lost threshold of ping tracking entry
integer (1-99)	lost threshold (1 time - 99 times)	
<b>Defaults</b>	down_to_up: enable received: 3 up_to_down: enable lost: 3	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Create a ping tracking entry	
<b>Examples</b>	moxa(config)# tracking 2 interface ping 192.168.127.101 received 5 up_to_down disable	
<b>Error Messages</b>	% Tracking: Invalid: Duplicate tracking ID <tid>. % Tracking: Invalid: Invalid tracking interval value. Must be a multiple of 500 ms. % Tracking: Invalid: Invalid tracking timeout value. Must be a multiple of 500 ms.	
<b>Related Commands</b>	show tracking {all   interface   ping   logical}	

## Configure Tracking Entry of Logical

### Commands

**tracking** <short(1-16)> **logical** {and | or | nand | nor} **tid** <short(1-16)> **tid** <short(1-16)> [**tid** <short(1-16)> ] [**tid** <short(1-16)> ]

<b>Syntax Description</b>	<b>tracking</b>	Configure tracking functions
	short(1-16)	Tracking ID (1-16) of the created tracking
	<b>logical</b>	Create a logic tracking entry to monitor tracking entries
	and	Logic operator AND
	or	Logic operator OR
	nand	Logic operator NAND
	nor	Logic operator NOR
	<b>tid</b>	Set the monitored tracking entries
	short(1-16)	The first monitored tracking entry
	<b>tid</b>	Set the monitored tracking entries
	short(1-16)	The first monitored tracking entry
	<b>tid</b>	Set the monitored tracking entries
	short(1-16)	The first monitored tracking entry
<b>tid</b>	Set the monitored tracking entries	
short(1-16)	The first monitored tracking entry	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Create a logic tracking entry	
<b>Examples</b>	moxa(config)# tracking 3 logical and tid1 tid 2	
<b>Error Messages</b>	% Tracking: Invalid: Duplicate tracking ID <tid>. % Tracking: Invalid: (1) The TID <tid> does not exist. (2) The TID <tid> cannot be deleted because it belongs to a logical list. % Tracking: Invalid: The tracking ID <tid> must be higher than the highest logical list tracking ID.	
<b>Related Commands</b>	show tracking {all   interface   ping   logical}	

## Delete Tracking Entry

### Commands

**no tracking** <short(1-16)>

<b>Syntax Description</b>	<b>no</b>	Delete the entry
	<b>tracking</b>	Configure tracking functions
	short1 - 16	Tracking ID (1-16) of the delete tracking entry
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	To delete the tracking entry.	
<b>Examples</b>	moxa(config)# no tracking 5	
<b>Error Messages</b>	% Tracking: Invalid: (1) The TID <tid> does not exist. (2) The TID <tid> cannot be deleted because it belongs to a logical list.	
<b>Related Commands</b>	show tracking {all   interface   ping   logical}	

## Display Tracking Information

### Commands

**show tracking** { all | interface | ping | logical | <short(1-16)>}

<b>Syntax Description</b>	<b>show</b>	show running system information
	<b>tracking</b>	Display tracking information
	all	Display the status and configuration of all tracking entries
	interface	Display the status and configuration of interface tracking entries
	ping	Display the status and configuration of ping tracking entries
	logical	Display the status and configuration of logic tracking entries
	short(1-16)	Display the status and configuration of tracking ID (1-16) entry
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	Display tracking information.	
<b>Examples</b>	<pre> moxa# show tracking all  Tracking Function: enable            No. of   Time Since TID Enable Type   Target   Status Change Last Change ----- - 1 Enable Interface vlan2      Down 1    0d0h0m4s 2 Enable Ping    192.168.127.101 Up 0      0d1h6m12s 3 Enable Logical [AND]1,2    Down 1    0d0h0m4s  moxa# show tracking 1 ----- Tracking ID: 1 ----- Enable: Enable Type: Interface Tracking (Layer 3 Interface) VLAN ID: 2 Status Change Down to Up: Enable Up Delay (ms): 5 Status Change Up to Down: Enable Down Delay (ms): 5 Status: Down Number of Change: 1 Time Since Last Change: 0d0h0m4s -----  moxa# show tracking 3  Tracking ID: 3 ----- Enable: Enable Type: Logical Tracking Logical Operator: AND Tracking ID 1: 1 Tracking ID 2: 2 Tracking ID 3: ---- Tracking ID 4: ---- Status: Down Number of Change: 1 Time Since Last Change: 0d0h0m4s </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Tracking Force Sync Entry State

### Commands

**tracking force-sync-state tid** <tracking(1-16)>

<b>Syntax Description</b>	<b>tracking</b>	Command of tracking function
	<b>force-sync-state</b>	Force sync tracking entry state
	<b>tid</b>	The monitored tracking entries
	tracking(1-16)	Tracking ID (1-16) of the tracking entry
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	If Status Change (Down to Up / Up to Down) is disable, the user can use this command to force synchronization of tracking entry state.	
<b>Examples</b>	moxa# tracking force-sync-state tid 5	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Bind a Tracking Entry On the Port

### Commands

**tracking** <tracking(1-16)>

<b>Syntax Description</b>	<b>tracking</b>	Configure tracking parameters
	tracking(1-16)	tracking ID of the bound tracking entry
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration Mode	
<b>Usage Guidelines</b>	Each port could bind a tracking entry. The port is set disable when the status of the bound tracking entry is down forcefully. Otherwise, the port is set enable/disable by the configuration.	
<b>Examples</b>	moxa(config)# interface ethernet 1/1 moxa(config-if)# tracking 5	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Unbind the Tracking Entry On the Port

### Commands

**no tracking**

<b>Syntax Description</b>	<b>no</b>	Delete the configuration
	<b>tracking</b>	Configure tracking parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration Mode	
<b>Usage Guidelines</b>	Unbind the tracking entry on the port.	
<b>Examples</b>	moxa(config)# interface ethernet 1/1 moxa(config-if)# no tracking	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	tracking <short(1-16)>	

## Bind a Tracking Entry On the VRRP

### Commands

**vrrp** <vrid(1-255)> **tracking** <tracking(1-16)> **decrement** <decrement(0-255)>

<b>Syntax Description</b>	<b>vrrp</b>	Configures the VRRP related parameters
	<b>vrid</b>	virtual router ID
	<b>tracking</b>	Configure tracking parameters
	tracking(1-16)	tracking ID of the bound tracking entry
	<b>decrement</b>	decrement related configuration
	decrement (0-255)	decrement of the bound tracking entry
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration Mode	
<b>Usage Guidelines</b>	Each VRRP entry could bind a tracking entry. Each VRRP entry has a decrement, which is used to decrease the priority of VRRP entry, when the status of tracking entry is down.	
<b>Examples</b>	moxa(config)# interface vlan 20 moxa(config-if)# vrrp 20 tracking 1 decrement 5	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no vrrp <vrid(1-255)> tracking	

## Unbind the Tracking Entry On the VRRP

### Commands

**no vrrp** <vrid(1-255)> **tracking**

<b>Syntax Description</b>	<b>no</b>	Configures the VRRP related parameters
	<b>vrrp</b>	Configures the VRRP related parameters
	vrid(1-255)	virtual router ID
	<b>tracking</b>	Configure tracking parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration Mode	
<b>Usage Guidelines</b>	Set VRRP interface unbinding the tracking entry	
<b>Examples</b>	moxa(config)# interface vlan 20 moxa(config-if)# no vrrp 20 tracking	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	vrrp <vrid(1-255)> tracking <tracking(1-16)> decrement <decrement (0-255)>	

## Configure VRRP with static route

### Commands

**ip route** <prefix> <mask> {<next-hop> [<distance(1-255)>] [tracking <tracking(1-16)>]} | **vlan** <vlan-id> [<distance(1-255)>] [next-hop] [tracking <tracking(1-16)>] }

<b>Syntax Description</b>	<b>ip</b>	Global IPv4 configuration subcommands
	<b>route</b>	Static routing entry
	prefix	Address prefix
	mask	Subnet mask
	next-hop	Next hop address
	<b>vlan</b>	Specified VLAN ID
	distance(1-255)	Distance metric
	<b>tracking</b>	set static route binding a tracking entry
	tracking(1-16)	the tracking ID (1 - 16) of the bound tracking entry
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Each static route could bind a tracking entry. The static route is removed from routing table when the status of the bound tracking entry is down. Otherwise, the static route is writing into routing table.	
<b>Examples</b>	<pre>moxa(config)# ip route 30.0.0.2 255.255.255.255 20.0.0.1 tracking 5 moxa(config)# ip route 30.1.1.0 255.255.255.0 vlan 1 tracking 5  moxa(config)# no ip route 30.0.0.2 255.255.255.255 20.0.0.1 tracking moxa(config)# no ip route 30.1.1.0 255.255.255.0 vlan 1 tracking</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ip route	

## ERPS-v2

### Enable/Disable ERPS-v2

#### Commands

**erps-v2** { enable | disable }

<b>Syntax</b>	erps-v2	Configure ERPS V2 parameters
<b>Description</b>	enable	Enable ERPS V2
	disable	Disable ERPS V2
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# erps-v2 enable	
<b>Error Messages</b>	'Invalid: The ERPS V2 agent ID can not be empty if ERPS V2 Ring is enabled.'	
<b>Related Commands</b>	N/A	

## Configure ERPS-v2 Agent-id

### Commands

**erps-v2 agent-id** <integer(1-128)>

**no erps-v2 agent-id** <integer(1-128)>

<b>Syntax</b>	<b>erps-v2</b>	Configure ERPS V2 parameters
<b>Description</b>	<b>agent-id</b>	Configure ERPS V2 agent ID
	<integer(1-128)>	Agent ID value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# erps-v2 agent-id 12	
<b>Error Messages</b>	Invalid: ERPS V2 agent ID is out of range.	
	Invalid: The local ERPS V2 agent ID can not be the same with a neighbor ERPS V2 agent ID 1.	
	Invalid: The local ERPS V2 agent ID can not be the same with a neighbor ERPS V2 agent ID 2.	
<b>Related Commands</b>	N/A	

## Configure ERPS-v2 Connection-id

### Commands

**erps-v2 ring** <integer(1-4096)> [local-conn-id <integer(1-36)>]

**no erps-v2 ring** <integer(1-4096)>

<b>Syntax</b> <b>Description</b>	<b>erps-v2</b>	Configure ERPS V2 parameters
	<b>ring</b>	ERPS V2 ring related configuration
	<integer(1-4096)>	Ring ID value
	local-conn-id <integer(1-36)>	Configure local connection id connecting to ring port 1 Local Connection ID value starting from 1 in steps of 2
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# erps-v2 agent-id 12	
<b>Error Messages</b>	Invalid: ERPS V2 Ring ID is out of range.	
	Invalid: ERPS V2 Ring ID is duplicated.	
	Invalid: Local Connection ID should be set from 1 in steps of 2.	
	Invalid: Local Connection ID {index} is used by other rings.	
<b>Related Commands</b>	N/A	

## Enable/disable ERPS Ring

### Commands

**ring** { enable | disable }

<b>Syntax</b>	<b>ring</b>	ERPS V2 ring related configuration
<b>Description</b>	enable	Enable ERPS V2
	disable	Disable ERPS V2
<b>Defaults</b>	disable	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring enable	
<b>Error Messages</b>	Invalid: The ERPS V2 agent ID can not be empty if ERPS V2 Ring is enabled. Invalid: The control VLAN ID does not exist in the VLAN Table. Invalid: Ring port 1 is not configured yet. Invalid: Ring Port 1 and Ring Port 2 can not use the same port. Invalid: Port {index} is used by other rings. Invalid: ERPS V2 ring cannot be enabled on the member port of port-channel. Invalid: Neighbor ERPS V2 ring agent ID 1 should be configured a value from 1 to 128. Invalid: The neighbor ERPS V2 agent ID 2 can not be the same with a local ERPS V2 agent ID. Invalid: Neighbor connection ID 1 should be configured a value from 1 to 36. Invalid: Can't set more than 2 major rings. Invalid: Can't set more than 16 subrings. Invalid: Ring Port 1 cannot be empty to assign for RPL port. Invalid: Ring Port 2 cannot be empty to assign for switch port.	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring Control VLAN ID

### Commands

**ring ctrl-vlan-id** <short(1-4094)>

<b>Syntax</b>	<b>ring</b>	ERPS V2 ring related configuration
<b>Description</b>	<b>ctrl-vlan-id</b>	Configure control VLAN ID
	<short(1-4094)>	Control VLAN ID value
<b>Defaults</b>	1	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring ctrl-vlan-id 1024	
<b>Error Messages</b>	Invalid: The control VLAN ID does not exist in the VLAN Table.	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring Ports

### Commands

**ring port ring-port-1 interface** <Interface type> <interface-id> [{ ring-port-2 interface <Interface type> <interface-id> }]

**no ring port** {[ring-port-1] [ring-port-2]}

<b>Syntax Description</b>	<b>ring</b>	ERPS V2 ring related configuration
	<b>port</b>	Configure ERPS V2 ring port
	<b>ring-port-1</b>	Configure ring port 1
	<b>Interface</b>	Interface information
	<Interface type>	Interface type
	<interface-id>	Interface number
	ring-port-2	Configure ring port 2
	interface	Interface information
	<interface-id>	Interface number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring port ring-port-1 interface ethernet 1/4	
<b>Error Messages</b>	Invalid: Ring port 1 is not configured yet. Invalid: Ring Port 1 and Ring Port 2 can not use the same port. Invalid: Port {index} is used by other rings. Invalid: ERPS V2 ring cannot be enabled on the member port of port-channel.	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring Roles

### Commands

**ring role** { none | {{rpl-owner | rpl-neighbor} { ring-port-1 | ring-port-2}}}

<b>Syntax Description</b>	<b>ring</b>	ERPS V2 ring related configuration
	<b>role</b>	Configure ring role
	none	Configure ring role to normal device
	rpl-owner	Configure ring role to RPL owner device
	rpl-neighbor	Configure ring role to RPL neighbor device
	ring-port-1	Configure ring port 1 as the RPL port
	ring-port-2	Configure ring port 2 as the RPL port
<b>Defaults</b>	N/A	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring role rpl-owner ring-port-1	
<b>Error Messages</b>	Invalid: Ring Port 1 cannot be empty to assign for RPL port. Invalid: Ring Port 2 cannot be empty to assign for RPL port.	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring Revertive Mode

### Commands

**ring revertive-mode** { revertive | non-revertive }

<b>Syntax</b>	<b>ring</b>	ERPS V2 ring related configuration
<b>Description</b>	<b>revertive-mode</b>	Configure revertive mode
	revertive	Revertive mode of operation
	non-revertive	Non-revertive mode of operation
<b>Defaults</b>	revertive	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring revertive-mode non-revertive	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring Guard Timer

### Commands

**ring timer guard** <integer(10-2000)>

<b>Syntax</b>	<b>ring</b>	ERPS V2 ring related configuration
<b>Description</b>	<b>timer</b>	ERPS V2 timer related configuration
	<b>guard</b>	Configure guard timer
	<integer(10-2000)>	Guard timer values in steps of 10 milliseconds
<b>Defaults</b>	500	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring timer guard 1000	
<b>Error Messages</b>	Invalid: The guard timer must be a multiple of 10.	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring WTR Timer

### Commands

**ring timer wtr** <integer(1-12)>

<b>Syntax</b>	<b>ring</b>	ERPS V2 ring related configuration
<b>Description</b>	<b>timer</b>	ERPS V2 timer related configuration
	<b>wtr</b>	Configure WTR timer
	<integer(1-12)>	WTR timer value
<b>Defaults</b>	5	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring timer guard 1000	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring Connection Neighbor Agent ID

### Commands

**ring connection neighbor-agent-id-1** <integer(1-128)> **neighbor-conn-id-1** <integer(1-36)>

**neighbor-agent-id-2** <integer(1-128)> **neighbor-conn-id-2** <integer(1-36)>

**no ring connection**

<b>Syntax Description</b>	<b>ring</b>	ERPS V2 ring related configuration
	<b>connection</b>	Configure ring connections
	<b>neighbor-agent-id-1</b>	Configure neighbor agent id connecting to ring port 1
	<integer(1-128)>	Neighbor agent id value
	<b>neighbor-conn-id-1</b>	Configure neighbor connection id connecting to ring port 1
	<integer(1-36)>	Neighbor connection id value
	<b>neighbor-agent-id-2</b>	Configure neighbor agent id connecting to ring port 2
	<integer(1-128)>	Neighbor agent id value
<b>neighbor-conn-id-2</b>	Configure neighbor connection id connecting to ring port 2	
	<integer(1-36)>	Neighbor connection id value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring connection neighbor-agent-id-1 12 neighbor-conn-id-1 1 neighbor-agent-id-2 13 neighbor-conn-id-2 2	
<b>Error Messages</b>	Invalid: The neighbor ERPS V2 agent ID 1 can not be the same with a local ERPS V2 agent ID. Invalid: Neighbor ERPS V2 ring agent ID 2 should be configured a value from 1 to 128. Invalid: Neighbor connection ID 1 should be configured a value from 1 to 36.	
<b>Related Commands</b>	N/A	

## Configure ERPS Ring Switch Command

### Commands

**ring switch-command** { none | {{ forced | manual } { ring-port-1 | ring-port-2 } }

<b>Syntax Description</b>	<b>ring</b>	ERPS V2 ring related configuration
	<b>switch-command</b>	ERPS V2 timer related configuration
	none	Clear switch mode
	forced	Configure the forced switch mode
	manual	Configure the manual switch mode
	ring-port-1	Apply switch mode on ring port 1
	ring-port-2	Apply switch mode on ring port 2
<b>Defaults</b>	N/A	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ring switch-command none moxa(config)# ring switch-command forced ring-port-1	
<b>Error Messages</b>	Invalid: Ring Port 1 cannot be empty to assign for switch port. Invalid: Ring Port 2 cannot be empty to assign for switch port. Invalid: An ERPS V2 ring cannot be configured as manual switch mode when it stays in forced state.	
<b>Related Commands</b>	N/A	

## Show ERPS-v2 Setting and Status

### Commands

**show erps-v2** { config { detail | connection } } | status } [ ring <integer(1-4096)> ]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>erps-v2</b>	ERPS V2 related configuration and status
	config	ERPS V2 related configuration
	detail	Detail configuration
	connection	Connection configuration of ERPS V2 ring
	status	Status of ERPS V2
	ring	Ring ID configuration
	<integer(1-4096)>	Ring ID value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	ERPS V2 ring configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show erps-v2 config detail  Global Configuration ----- Global Enable      : Enabled ERPS V2 Agent ID   : 1  Ring ID 1 Configurations ----- Enable             : Enabled Domain             : Major Ring Control VLAN ID    : 1 Ring Port 1        : Eth1/1 Ring Port 2        : Eth1/2 Ring Role          : RPL Owner RPL Port           : Ring Port 1 Reverive Mode      : Revertive Guard Timer        : 500 ms. WTR Timer          : 5 min. Switch Command     : None Switch Port        : None  Ring ID 1 Connection Configurations:                  Neighbor      Neighbor Ring Port (Connection ID) ERPS V2 Agent ID Connection ID ----- Eth1/1 (1)           12           1 Eth1/2 (2)           12           2  moxa# show erps-v2 status  Global Status ----- Supported Max. Rings      : 1  Ring ID 1 Status ----- Ring State                : Protection Ring Role                 : RPL Owner Remaining Guard Timer     : 500 ms. Remaining WTR Timer       : 5 min.  Ring Port   Link Status  Port Status  VLAN ID </pre>	

	-----	-----	-----	-----
	Eth1/1	Link Down	Blocking	1
	Eth1/2	Link Down	Blocking	1
<b>Error Messages</b>	N/A			
<b>Related Commands</b>	N/A			

# Network Service

## DHCP and MAC-based IP Assignment

### Configure DHCP Server Pool

#### Commands

**network** <uicast\_addr> <uicast\_addr> <ip\_mask>

<b>Syntax Description</b>	<b>network</b>	Configure network parameters
	<uicast_addr>	The address pool starting IP address
	<uicast_addr>	The address pool ending IP address
	<ip_mask>	The subnet mask
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# network 192.168.127.10 192.168.127.20 255.255.255.0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure DHCP Server Host IP Address

### Commands

**host** <ucast\_addr> <ip\_mask>

<b>Syntax Description</b>	<b>host</b>	Configure host parameters
	<ucast_addr>	The unicast IP address
	<ip_mask>	The subnet mask
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# host 192.168.127.100	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure DHCP Server Host MAC Address

### Commands

**hardware-address** <ucast\_mac>

<b>Syntax Description</b>	<b>hardware-address</b>	Configure the MAC address
	<ucast_mac>	The MAC address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# hardware-address 00:90:e8:11:22:33	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Lease Time

### Commands

**lease** <integer (10-604800)>

<b>Syntax Description</b>	<b>lease</b>	Configure the IP lease duration
	<integer (10-604800)>	The IP lease duration in seconds
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# lease 3600	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Reset Lease time

### Commands

**no lease**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lease</b>	Configure the IP lease duration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# no lease	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Default Router IP Address

### Commands

**default-router** <ucast\_addr>

<b>Syntax Description</b>	<b>default-router</b>	Configure the default router
	<ucast_addr>	The unicast IP address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# default-router 192.168.127.254	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Remove Default Router IP Address

### Commands

**no default-router**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>default-router</b>	Configure the default router
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# no default-router	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure DNS Server IP Address

### Commands

**dns-server** <ucast\_addr> [ <ucast\_addr> ]

<b>Syntax Description</b>	<b>dns-server</b>	Configure the DNS server
	<ucast_addr>	The unicast IP address
	<ucast_addr>	The unicast IP address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# dns-server 192.168.127.254 moxa(dhcp-config)# dns-server 192.168.127.251 192.168.127.252	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Remove DNS Server IP Address

### Commands

**no dns-server**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>dns-server</b>	Configure the DNS server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# no dns-server	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure NTP Server IP Address

### Commands

**ntp-server** <ucast\_addr>

<b>Syntax Description</b>	<b>ntp-server</b>	Configure the NTP server
	<ucast_addr>	The unicast IP address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# ntp-server 192.168.127.254	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Remove NTP Server IP Address

### Commands

**no ntp-server**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ntp-server</b>	Configure the NTP server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC DHCP Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(dhcp-config)# no ntp-server	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Port-based IP Assignment

### Commands

**ip dhcp port-based-ip-assignment** <ucast\_addr> <ip\_mask>

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>dhcp</b>	Configure DHCP server parameters
	<b>port-based-ip-assignment</b>	Configure port-based IP assignment parameters
	<ucast_addr>	The unicast IP address
	<ip_mask>	The subnet mask
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface ethernet 1/2 moxa(config-if)# ip dhcp port-based-ip-assignment 192.168.127.100 255.255.255.0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Remove Port-based IP Assignment

### Commands

**no ip dhcp port-based-ip-assignment**

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>ip</b>	Configure IP parameters
	<b>dhcp</b>	Configure DHCP server parameters
	<b>port-based-ip-assignment</b>	Configure port-based IP assignment parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface ethernet 1/2 moxa(config-if)# no ip dhcp port-based-ip-assignment	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable Port-based IP Assignment

### Commands

**ip dhcp port-based-ip-assignment { enable | disable }**

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>dhcp</b>	Configure DHCP server parameters
	<b>port-based-ip-assignment</b>	Configure port-based IP assignment parameters
	enable	Enable port-based IP assignment
	disable	Disable port-based IP assignment
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface ethernet 1/2 moxa(config-if)# ip dhcp port-based-ip-assignment enable moxa(config-if)# ip dhcp port-based-ip-assignment disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Port-based IP Assignment Parameters

### Commands

```
ip dhcp port-based-ip-assignment { { lease <integer (10-604800)> } | { default-router <ucast_addr> } | { dns-server <ucast_addr> [ <ucast_addr> ] } | { ntp-server <ucast_addr> } }
```

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>dhcp</b>	Configure DHCP server parameters
	<b>port-based-ip-assignment</b>	Configure port-based IP assignment parameters
	lease	Configure duration of lease
	<integer (10-604800)>	The duration of the lease in seconds
	default-router	Configure the default router
	<ucast_addr>	The unicast IP address
	dns-server	Configure the DNS server
	<ucast_addr>	The primary DNS server IP address
	<ucast_addr>	The secondary DNS server IP address
ntp-server	Configure the NTP server	
<ucast_addr>	The unicast IP address	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config-if)# ip dhcp port-based-ip-assignment lease 3600 moxa(config-if)# ip dhcp port-based-ip-assignment default-router 192.168.127.254 moxa(config-if)# ip dhcp port-based-ip-assignment dns-server 192.168.127.254 moxa(config-if)# ip dhcp port-based-ip-assignment dns-server 192.168.127.251 192.168.127.252 moxa(config-if)# ip dhcp port-based-ip-assignment ntp-server 192.168.127.254</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Remove Port-based IP Assignment Parameters

### Commands

```
no ip dhcp port-based-ip-assignment { lease | default-router | dns-server | ntp-server }
```

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ip</b>	Configure IP parameters
	<b>dhcp</b>	Configure DHCP server parameters
	<b>port-based-ip-assignment</b>	Configure port-based IP assignment parameters
	lease	Configure the IP lease duration
	default-router	Configure the default router
	dns-server	Configure the DNS server
	ntp-server	Configure the NTP server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config-if)# no ip dhcp port-based-ip-assignment lease moxa(config-if)# no ip dhcp port-based-ip-assignment default-router moxa(config-if)# no ip dhcp port-based-ip-assignment dns-server moxa(config-if)# no ip dhcp port-based-ip-assignment ntp-server</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# DHCP Relay Agent

## Display IP DHCP Relay Configurations

### Commands

**show ip dhcp relay**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics information
	<b>ip</b>	Display the IP-related configuration
	<b>dhcp</b>	Display the DHCP-related configuration
	<b>relay</b>	Display the DHCP Relay configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	Use this command to show the DHCP relay configuration details.	
<b>Examples</b>	<pre>moxa# show ip dhcp relay  Dhcp Relay   : Enabled  DHCP server 1 : 192.168.127.100 DHCP server 2 : 192.168.127.200 DHCP server 3 : DHCP server 4 :  DHCP Relay Option 82 : Remote ID type   : IP Remote ID value  : 192.168.127.200 Remote ID display : C0A87FC8  The number of packets that Option 82 has been inserted in : 0 The number of packets that have been dropped : 0 The number of packets that Option 82 could not be inserted in : 0  Interface Relay   Trusted   Option 82 ----- Eth1/1  Disabled Untrusted Disabled Eth1/2  Disabled Untrusted Disabled Eth1/3  Disabled Untrusted Disabled Eth1/4  Enabled  Trusted   Enabled Eth1/5  Disabled Untrusted Disabled</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Clear IP DHCP Relay Statistics

### Commands

**clear ip dhcp relay statistics**

<b>Syntax Description</b>	<b>clear</b>	Clear statistics information
	<b>ip</b>	Clear IP-related information
	<b>dhcp</b>	Clear DHCP-related information
	<b>relay</b>	Clear DHCP relay-related information
	<b>statistic</b>	Clear the DHCP relay statistics
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	Use this command to clear the DHCP relay statistics counters	
<b>Examples</b>	<pre>moxa# clear ip dhcp relay statistics</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable DHCP Relay Global Status

### Commands

**ip dhcp relay** {enable | disable}

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>relay</b>	Configure DHCP relay parameters
	enable	Enable the global DHCP relay
	disable	Disable the global DHCP relay
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	Use this command to enable or disable the global DHCP relay	
<b>Examples</b>	moxa(config)# ip dhcp relay enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the DHCP Relay Server

### Commands

**ip dhcp relay server** <server-index> <uicast\_addr>

**no ip dhcp relay server** <server-index>

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>relay</b>	Configure DHCP relay parameters
	<b>server</b>	Configure DHCP relay server parameters
	<server-index>	Specify the DHCP server address index (1-4)
	<uicast_addr>	Specify the IP address of the DHCP server to which the packets are to be forwarded
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	Use this command to specify the IP address of the DHCP server to which the packets are to be forwarded. To remove the DHCP relay server address, use the no form of this command.	
<b>Examples</b>	moxa(config)# ip dhcp relay server 1 192.168.127.100	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the DHCP Relay Interface Status

### Commands

**ip dhcp relay**

**no ip dhcp relay**

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>relay</b>	Configure DHCP relay interface parameters
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	Use this command to enable the DHCP relay interface. To disable the DHCP relay interface, use the no form of this command.	
<b>Examples</b>	moxa(config-if)# ip dhcp relay	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the DHCP Relay Trust Mode

### Commands

**ip dhcp relay trust**

**no ip dhcp relay trust**

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>relay</b>	Configure DHCP relay parameters
	<b>trust</b>	Configure the DHCP relay trust mode
<b>Defaults</b>	Untrust	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	If the interface is in untrusted mode, it will drop any DHCP packets with Option 82 information or DHCP packets with a non-zero GIAddr received from untrust sources. In trusted mode, the interface will accept all DHCP packets.	
<b>Examples</b>	moxa(config-if)# ip dhcp relay trust	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## DHCP Relay Agent Option82

### Display IP DHCP Relay Configurations

#### Commands

**show ip dhcp relay**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics information
	<b>ip</b>	Display the IP-related configuration
	<b>dhcp</b>	Display the DHCP-related configuration
	<b>relay</b>	Display the DHCP Relay configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	Use this command to display the DHCP relay configuration details.	
<b>Examples</b>	<pre>moxa# show ip dhcp relay  Dhcp Relay   : Enabled  DHCP server 1 : 192.168.127.100 DHCP server 2 : 192.168.127.200 DHCP server 3 : DHCP server 4 :  DHCP Relay Option 82 : Remote ID type   : IP Remote ID value  : 192.168.127.200 Remote ID display : C0A87FC8  The number of packets that Option 82 has been inserted in : 0 The number of packets that have been dropped : 0 The number of packets that Option 82 could not be inserted in : 0  Interface Relay   Trusted   Option 82 ----- Eth1/1  Disabled Untrusted Disabled Eth1/2  Disabled Untrusted Disabled Eth1/3  Disabled Untrusted Disabled Eth1/4  Enabled  Trusted  Enabled Eth1/5  Disabled Untrusted Disabled</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the DHCP Relay Option 82 Remote ID

### Commands

**ip dhcp relay option82 remote-id** {ip | mac | client-id | other <string(15)>}

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>relay</b>	Configure DHCP relay parameters
	<b>option82</b>	Configure DHCP Option 82 parameters
	<b>remote-id</b>	Configure the Option 82 remote ID
	ip	Specify the IP address of the switch
	mac	Specify the MAC address of the switch
	client-id	Specify the hostname of the switch
other	Use a user-defined remote ID	
<string>	Specify the remote ID string (max 15 characters)	
<b>Defaults</b>	The IP address of switch	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	Use this command to specify the Option 82 remote ID of the switch.	
<b>Examples</b>	moxa(config)# ip dhcp relay option82 remote-id mac moxa(config)# ip dhcp relay option82 remote-id other abcdef	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable the DHCP Relay Option 82 Interface

### Commands

**ip dhcp relay option82**

**no ip dhcp relay option82**

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>relay</b>	Configure DHCP relay parameters
	<b>option82</b>	Configure the DHCP Option 82 interface status
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	Use this command to enable the DHCP relay to add Option 82 through the interface. To disable it, use the no form of this command.	
<b>Examples</b>	moxa(config-if)# ip dhcp relay option 82	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# DNS Settings

## Configure DNS settings

### Commands

**ip management name-server** server-index server-address

**no ip management name-server** server-index

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>ip</b>	Configure IP parameters
	<b>management</b>	Configure IPv4 management address parameters
	<b>name-server</b>	Configure the IPv4 DNS address of the device
	<i>server-index</i>	Index of DNS, range from 1 to 2
	<i>server-address</i>	IPv4 address of DNS
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip management name-server 1 1.1.1.1 moxa(config)# no ip management name-server 1	
<b>Error Messages</b>	Invalid: DNS Server server-address is not reachable.	
<b>Related Commands</b>	N/A	

# Routing

## Unicast Route

### Static Route

#### Create/Delete the Static Route Entry

##### Commands

**ip route** <prefix> <mask> {<next-hop> [<distance (1-255)>] | vlan <vlan-id> [<distance (1-255)>]  
[next-hop] }

**no ip route** <prefix> <mask> {<next-hop> | vlan <vlan-id> [next-hop] }

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ip</b>	Global IPv4 configuration subcommands
	<b>route</b>	Static routing entry
	prefix	Address prefix
	mask	Subnet mask
	next-hop	Next hop address
	vlan	Specified VLAN ID
	distance	Distance metric
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# ip route 30.0.0.2 255.255.255.255 20.0.0.1 moxa(config)# ip route 30.1.1.0 255.255.255.0 vlan 1	
<b>Error Messages</b>	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with another Interface IPv4 address. Invalid: [data.l3VlanIfTable] must contain no more than 256 items. Invalid: The interface name is duplicated. Invalid: The interface does not exist. Invalid: The subnet mask should be 32 bits for the following interface 10.10.10.10/255.255.255.0 Invalid: IP address mismatch. Invalid: Loopback index. Invalid: The maximum number of routing entries to the same destination is 8. Please delete another routing entry to accommodate the new one.	
<b>Related Commands</b>	show ip route show ip route static	

#### Display the Existing ARP Entry List

##### Commands

**show ip arp**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general/information
	<b>ip</b>	IP related information
	<b>arp</b>	ARP related information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip arp IP Address      MAC Address      Interface ----- 192.168.127.95   00:19:cb:d6:db:b4   vlan1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Flush the ARP Entries

### Commands

**clear ip arp**

<b>Syntax Description</b>	<b>clear</b>	Clear/flush the dynamically learnt arp entries
	<b>ip</b>	IP related information
	<b>arp</b>	ARP cache entries
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# clear ip arp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## OSPF

### Show OSPF Interface Information

#### Commands

**show ip ospf interface [vlan <vlan id>]**

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>interface</b>	Interface related information
	<b>vlan</b>	VLAN related information
	<vlan id>	Specified VLAN ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip ospf interface vlan 3 Interface name : vlan3 IP Address : 192.168.127.253 Mask : 255.255.255.0 Area : 0.0.0.0 Router ID : 10.5.5.4 Network Type : BROADCAST Cost : 1 Priority : 1  Timer intervals :   Hello : 10 secs            Hello due in 2 sec   Dead : 40 secs:   Retransmit : 5 secs   Transmit Delay : 1 sec  Authentication type : simple State : BDR   Designated Router   Id : 10.5.6.4   IP address : 10.4.0.4    Backup Designated Router   Id : 10.4.0.1   IP address : 10.4.0.1  Neighbor   Count : 1 Adjacent neighbor   count : 1 Adjacent with the neighbor :   10.5.6.4</pre>	

	Interface name : vlan1 IP Address : 192.168.127.253 is disable.
<b>Error Messages</b>	N/A
<b>Related Commands</b>	N/A

## Show OSPF Neighbor Information

### Commands

**show ip ospf neighbor [vlan <vlan id>]**

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>neighbor</b>	Neighbor router
	<b>vlan</b>	VLAN related information
	<vlan id>	Specified VLAN ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip ospf neighbor vlan 3 Neighbor-ID   Pri  State      DeadTime  Address      Interface ----- 10.5.6.4      1    FULL/DR    34        10.4.0.4     vlan3 10.10.1.8     1    FULL/DR    35        10.10.2.8    vlan10</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Request List

### Commands

**show ip ospf request-list**

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>request-list</b>	OSPF Link state request list information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip ospf request-list OSPF Router with ID (10.5.6.6)  Neighbor 10.5.6.4, interface - address 10.5.6.4  Type LS-ID      ADV-RTR      SeqNo      Age      Checksum ----- 1  10.5.6.6     10.5.6.6     0x8000000c 149     0x7e5c 2  10.5.6.6     10.5.6.6     0x80000001 740     0x943a</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Re-transmission List

### Commands

**show ip ospf retransmission-list**

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>retransmission-list</b>	OSPF Link state retransmission list information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip ospf retransmission-list OSPF Router with ID (10.5.6.6)  Neighbor 10.5.6.4, interface - address 10.5.6.4 Queue length 1  Type LS-ID          ADV-RTR          SeqNo          Age          Checksum ----- 1  10.5.6.6          10.5.6.6          0x80000015     0           0xe6ca</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Virtual Link Information

### Commands

**show ip ospf virtual-links**

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>virtual-links</b>	OSPF virtual link information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip ospf virtual-links Virtual Link to router 10.7.0.6, Interface State is DOWN Transit Area 0.0.0.3 Transmit Delay is 1 sec, Neighbor State DOWN Authentication type : simple Timer intervals : Hello : 10 secs Dead : 40 secs: Retransmit : 5 secs</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Border Router Information

### Commands

show ip ospf border-routers

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>border-routers</b>	OSPF border and boundary router information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip ospf border-routers	
	OSPF Process Border Router Information	
	Destination	TOS Type NextHop Cost Rt.Type Area
	-----	--- ---- -
	10.4.0.4	0 ASBR 10.10.2.1 2 interArea 0.0.0.6
	10.10.2.1	0 ABR 10.10.2.1 1 intraArea 0.0.0.6
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Area Range Information

### Commands

show ip ospf area-range

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>area-range</b>	Associated with the OSPF address range.
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip ospf area-range	
	Display of Summary addresses for Type3 and Translated Type5	
	Vrf default ,Summary Address	
	-----	
	Network Mask LSAType Area Effect Tag	
	-----	-----
	10.10.0.0 255.255.0.0 Summary 0.0.0.6 Advertise 0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Information

### Commands

show ip ospf

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip ospf OSPF Router with ID (10.4.0.1)   It is an Area Border Router   Autonomous System Boundary Router : Disabled    Redistributing External Routes is disabled   Rfc1583 compatibility is enabled   Administrative Distance is 110    Area is 0.0.0.6   Number of interfaces in this area is 1   SPF algorithm executed 2 times    Area is 0.0.0.0   Number of interfaces in this area is 1   SPF algorithm executed 2 times    Number of Areas in this router is 2</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Route Information

### Commands

show ip ospf route

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>route</b>	route Routes learnt by OSPF process
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip ospf route OSPF Routing Table Dest/Mask                TOS NextHop/Interface      Cost Rt.Type  Area -----                - - - - - / - - - - -    - - - - -  - - - 10.4.0.0/255.255.0.0      0  0.0.0.0/vlan3           1  IntraArea 0.0.0.0 10.10.2.0/255.255.255.0  0  0.0.0.0/vlan10          1  IntraArea 0.0.0.6</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show OSPF Database Information

### Commands

**show ip ospf database** [{database-summary | self-originate}]

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>database</b>	Displays how many of each type of LSA there are for each area in the database
	database-summary	Display how many of each type of LSA there are for each area in the database, and the total number of LSA types
	self-originate	Displays only self-originated LSAs (from the local router)
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ip ospf database database-summary Area 0.0.0.0 database summary ----- LSA Type          Count    Maxage ----- Router            2        0 Network           1        0 Summary Net       1        0 Summary ASBR      0        0 Type-7 Ext        0        0 Opaque Link       0        0 Opaque Area       0        0 Subtotal          4        0  Area 0.0.0.6 database summary ----- LSA Type          Count    Maxage ----- Router            2        0 Network           1        0 Summary Net       1        0 Summary ASBR      0        0 Type-7 Ext        0        0 Opaque Link       0        0 Opaque Area       0        0 Subtotal          4        0  OSPF Process database summary ----- LSA Type          Count    Maxage ----- Router            4        0 Network           2        0 Summary Net       2        0 Summary ASBR      0        0 Type-5 Ext        0        0 Type-7 Ext        0        0 Opaque Link       0        0 Opaque Area       0        0 Opaque AS         0        0 Total             8        0  MOXA# show ip ospf database self-originate OSPF Router with ID (10.4.0.1)       Router Link States (Area 0.0.0.0) ----- Link ID          ADV Router    Age      Seq#          Checksum Link count </pre>	

	<pre> ----- 10.4.0.1      10.4.0.1      1002      0x8000007d  0xf382  1 ----- Summary Link States (Area 0.0.0.0) ----- Link ID      ADV Router    Age      Seq#      Checksum ----- 10.10.2.0    10.4.0.1      717      0x80000094  0xdaa8 ----- Router Link States (Area 0.0.0.6) ----- Link ID      ADV Router    Age      Seq#      Checksum  Link count ----- 10.4.0.1     10.4.0.1      1098     0x80000095  0x90b9  1 ----- Summary Link States (Area 0.0.0.6) ----- Link ID      ADV Router    Age      Seq#      Checksum ----- 10.4.0.0     10.4.0.1      717      0x80000093  0x3b51 </pre>
<b>Error Messages</b>	N/A
<b>Related commands</b>	N/A

## Show OSPF Database by Specific LSA Type

### Commands

**show ip ospf database** { asbr-summary | external | network | nssa-external | router | summary }

<b>Syntax Description</b>	<b>ip</b>	IP related information
	<b>ospf</b>	OSPF related information
	<b>database</b>	Display all of the LSA entries
	asbr-summary	Display information only about the Autonomous System Boundary Router (ASBR) summary LSAs
	external	Display information only about the external LSAs
	network	Display information only about the network LSAs
	nssa-external	Display information about the NSSA external LSAs
	router	Display information only about the router LSAs
summary	Display information only about the summary LSAs	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ip ospf database  OSPF Router with ID (10.4.0.1)       Router Link States (Area 0.0.0.0) ----- Link ID        ADV Router    Age      Seq#          Checksum Link count ----- 10.4.0.1      10.4.0.1     1053    0x8000007d   0xf382  1 10.5.6.4      10.5.6.4     1056    0x80000124   0x1a9e  1        Network Link States (Area 0.0.0.0) ----- Link ID        ADV Router    Age      Seq#          Checksum ----- 10.4.0.4      10.5.6.4     1056    0x80000092   0x470d        Summary Link States (Area 0.0.0.0) ----- Link ID        ADV Router    Age      Seq#          Checksum ----- 10.10.2.0     10.4.0.1     768     0x80000094   0xdaa8        Router Link States (Area 0.0.0.6) ----- Link ID        ADV Router    Age      Seq#          Checksum Link count ----- 10.4.0.1      10.4.0.1     1150    0x80000095   0x90b9  1 10.10.1.8     10.10.1.8    1094    0x80000093   0xf831  1        Network Link States (Area 0.0.0.6) ----- Link ID        ADV Router    Age      Seq#          Checksum ----- 10.10.2.8     10.10.1.8    1094    0x80000092   0xc679        Summary Link States (Area 0.0.0.6) ----- Link ID        ADV Router    Age      Seq#          Checksum ----- 10.4.0.0      10.4.0.1     768     0x80000093   0x3b51 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable OSPF Settings

### Commands

**router ospf** {enable | disable}

<b>Syntax Description</b>	<b>router</b>	Configures router related information
	<b>ospf</b>	OSPF related configuration
	enable/disable	Enable/disable OSPF routing process
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# router ospf enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Router OSPF Settings

### Commands

**router ospf**

<b>Syntax Description</b>	<b>router</b>	Configure router related information
	<b>ospf</b>	OSPF related configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	Enter OSPF router configuration mode	
<b>Examples</b>	moxa(config)# router ospf	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Route ID

### Commands

**router-id** <ip\_addr>

**no router-id**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>router-id</b>	Set OSPF router ID
	ip_addr	IP address for the router
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	Set the router-id as 0.0.0.0 or use no router-id command, it will dynamically select the lowest IP address as router ID	
<b>Examples</b>	moxa(config-router)# router-id 10.4.0.1	
<b>Error messages</b>	N/A	
<b>Related commands</b>	N/A	

## Configure Network Area Settings

### Commands

**network** <ip\_addr> **area** <area-id>

**no network** <ip\_addr> **area** <area-id>

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>network</b>	Configures network related information
	<ip_addr>	IPv4 address of the network
	<b>area</b>	Area related configuration
	<area-id>	Area associated with the OSPF address range
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-router)# network 10.4.0.1 area 0.0.0.0	
<b>Error Messages</b>	% OSPF: Invalid: The IP address has not been configured. % OSPF: Invalid: Mismatched Area ID. % OSPF: Invalid: The area has not been configured. % OSPF: Invalid: The area has not been created. % OSPF: Invalid: There are configured neighbors on this interface so the network type cannot be changed. % OSPF: Invalid: Demand Circuit is not supported. % OSPF: Invalid: The advertisement of the indicated aggregate can not be disabled. OSPF: Invalid: The maximum number (75) of active OSPF interfaces has been exceeded. % OSPF: Invalid: The interface does not support this feature.	
<b>Related Commands</b>	N/A	

## Configure Redistribute Settings

### Commands

**redistribute** {static | connected | all} [**metric** <integer(1-16777214)>] [**metric-type** <integer(1-2)>]

**no redistribute** {static | connected | all}

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>redistribute</b>	Configures route redistribution related parameters
	static/connected/ rip/all	Redistribute protocol
	<b>metric</b>	Metric related configuration
	<b>metric-type</b>	OSPF exterior metric type for redistributed routes
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-router)# redistribute static	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Area Settings

### Commands

**area** <area-id> [{ nssa | stub }] [ no-summary]

**no area** <ip\_addr> [{ stub [no-summary] | nssa[no-summary]]}

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>area</b>	Configures area related information
	<area-id>	Area associated with the OSPF address range
	nssa/ stub	NSSA/Stub area related configuration
	no-summary	The router will neither originate nor propagate summary LSAs into the area
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	Create normal area : area <area-id> Create nssa area : area <area-id> nssa Create stub area : area <area-id> stub Reset to standard area : no area <area-id> nssa	
<b>Examples</b>	moxa(config-router)#area 0.0.0.6 nssa	
<b>Error Messages</b>	% OSPF: Invalid: The Area Type has not been configured. % OSPF: Invalid: The Backbone area cannot be set as a stub area or NSSA. % OSPF: Invalid: The area for which a virtual link has been configured cannot serve as stub or NSSA area. % OSPF: Invalid: The area has not been configured. % OSPF: Invalid: The area has not been created. % OSPF: Invalid: There are configured neighbors on this interface so the network type cannot be changed. % OSPF: Invalid: The Area ID is already associated with the aggregate area. (The existing function can still be used.) % OSPF: Invalid: The Area ID is already associated with the interface table. (The existing function can still be used.) % OSPF: Invalid: The Area ID is already associated with the virtual interface. (The existing function can still be used.) % OSPF: Invalid: This Area ID already exists. % OSPF: Invalid: The Backbone area can not be deleted.	
<b>Related Commands</b>	N/A	

## Configure Area Virtual Link Settings

### Commands

**area** < area-id > **virtual-link** < router-id > [**auth** { **simple** | **md5** | **sha-1** | **sha-224** | **sha-256** | **sha384** | **sha-512**}] [**hello-interval** <short (1-65535)>][**dead-interval** <integer (1-65535)>] [{**auth-key** <string(8)> | **key-id** <integer (0-255)> **auth-key** <string(16)>}]

**no area** <ip\_addr> **virtual-link** <ip\_addr> [**auth**] [**hello-interval**] [**dead-interval**]

<b>Syntax Description</b>	<b>area</b>	Configures area related information
	<area-id>	Area associated with the OSPF address rang
	<b>virtual-link</b>	Virtual link related configuration
	<router-id>	Router ID of the virtual neighbor
	<b>auth</b>	Authentication related configuration
	<b>hello-interval</b>	Interval between hello packets that the software sends on the OSPF virtual link interface
	<b>dead-interval</b>	Interval at which hello packets must not be seen before its neighbors declare the router down
	<b>auth-key</b>	Authentication key value
	<b>key-id</b>	Cryptographic authentication key ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-router)# area 0.0.0.3 virtual-link 10.7.0.6 auth sha-1 hello-interval 10 dead-interval 40 key-id 12 auth-key 456	
<b>Error Messages</b>	% OSPF: Invalid: The area has not been created. % OSPF: Invalid: The crypt authentication key has not been set yet. % OSPF: Invalid: The maximum length of the crypt authentication key is 16. % OSPF: Invalid: The simple authentication key has not been set yet. % OSPF: Invalid: The maximum length of the simple authentication key is 8. % OSPF: Invalid: The Virtual Interface already exists. % OSPF: Invalid: The virtual link cannot be configured on stub, NSSA, or the backbone area. % OSPF: Invalid: The virtual link cannot be configured since the area does not exist on any of the OSPF interfaces that are running. % OSPF: Invalid: The Dead Interval should be bigger than the Hello Interval. % OSPF: Invalid: The neighbor of another area of the virtual link's endpoint already exists.	
<b>Related Commands</b>	N/A	

## Configure Area Range Settings

### Commands

**area** <area-id> **range** <ip\_addr> <ip\_mask> {**summary** | **Type7**}

**no area** <area-id> **range** <ip\_addr> [**Type7**]

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>area</b>	Configures area related information
	<b>range</b>	Address range configuration
	<b>Summary/ Type7</b>	LSA type is set as summary LSA or Type-7 LSA
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-router)# area 0.0.0.6 range 10.10.2.0 255.255.255.0 summary	
<b>Error Messages</b>	% OSPF: Invalid: The area has not been created. % OSPF: Invalid: The advertisement of the indicated aggregate can not be disabled. % OSPF: Invalid: The number of addresses for this area has been exceeded. (The maximum is three.) % OSPF: Invalid: The address/mask combination is inconsistent. % OSPF: Invalid: The same Address Range has already been configured in this area and cannot be used. % OSPF: Invalid: The Aggregate area already exists. (The existing function can still be used.) % OSPF: Invalid: The Area ID is already associated with the aggregate area. (The existing function can still be used.)	
<b>Related Commands</b>	N/A	

## Configure the Neighbor Router Priority Settings

### Commands

**neighbor** <neighbor-ip-address> [**priority** <integer (0-255)>]

**no neighbor** <ip\_addr> [**priority**]

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>neighbor</b>	Specify a neighbor router
	<b>priority</b>	0 means no election; larger number means higher priority
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-router)# neighbor 10.10.2.8 priority 1	
<b>Error messages</b>	% OSPF: Invalid: There are configured neighbors on this interface so the network type cannot be changed. % OSPF: Invalid: The address/mask combination is inconsistent. % OSPF: Invalid: The IP address of a local interface cannot be configured as a neighbor IP address. % OSPF: Invalid: The Neighbor IP address does not fall into any of the interface networks. % OSPF: Invalid: The Neighbor IP address can only be configured on NBMA or point-to-multipoint networks. % OSPF: Invalid: The Neighbor IP address already exists.	
<b>Related commands</b>	N/A	

## Configure OSPF with Legacy OSPFv2 (RFC1583) Compatibility

### Commands

**compatible rfc1583**

**no compatible rfc1583**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>Compatible rfc1583</b>	Set OSPF compatibility list compatible with RFC 1583
<b>Defaults</b>	N/A	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-router)# compatible rfc1583	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure SPF (Shortest Path First) Holdtime Settings

### Commands

**spf holdtime < integer(0-65535)>**

<b>Syntax Description</b>	<b>spf holdtime</b>	Minimum time (in milliseconds) between two consecutive SPF calculations
	Integer(0-65535)	Set the spf holdtime in milliseconds
<b>Defaults</b>	5000	
<b>Command Modes</b>	OSPF Router Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-router)# spf holdtime 7000	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure OSPF Passive Interface Settings

### Commands

**ip ospf passive-interface**

**no ip ospf passive-interface**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>ip</b>	Configure IP related information
	<b>ospf</b>	OSPF related configuration
	<b>passive-interface</b>	Configure routing update details
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# ip ospf passive-interface	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure OSPF Priority Settings

### Commands

**ip ospf priority** <integer(0 - 255)>

**no ip ospf priority**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>ip</b>	Configures IP related information
	<b>ospf</b>	OSPF related configuration
	<b>priority</b>	Router priority configuration
	integer(0-255)	Set the priority parameter
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	1	
<b>Examples</b>	moxa(config-if)# ip ospf priority 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure OSPF Hello Interval Settings

### Commands

**ip ospf hello-interval** <integer(1 - 65535)>

**no ip ospf hello-interval**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>ip</b>	Configure IP related information
	<b>ospf</b>	OSPF related configuration
	<b>hello-interval</b>	Interval (in seconds) between hello packets sent on the interface
	integer(1 - 65535)>	Interval parameter
<b>Defaults</b>	10	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# ip ospf hello-interval 15	
<b>Error Messages</b>	% OSPF: Invalid: The Dead Interval should be bigger than the Hello Interval.	
<b>Related Commands</b>	N/A	

## Configure OSPF Dead Interval Settings

### Commands

**ip ospf dead-interval** <integer(1-65535)>

**no ip ospf dead-interval**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>ip</b>	Configures IP related information
	<b>ospf</b>	OSPF related configuration
	<b>dead-interval</b>	Interval (in seconds) at which hello packets must not be seen before neighbors declare the router down
	integer(1-65535)	Set the interval parameter
<b>Defaults</b>	40	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# ip ospf dead-interval 20	
<b>Error Messages</b>	% OSPF: Invalid: The Dead Interval should be bigger than the Hello Interval.	
<b>Related Commands</b>	N/A	

## Configure the OSPF Cost Settings

### Commands

**ip ospf cost** <integer (1-65535)>

**no ip ospf cost**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>ip</b>	Configures IP related information
	<b>ospf</b>	OSPF related configuration
	<b>cost</b>	Path cost configuration
	integer(10-65535)	Set the cost parameter
<b>Defaults</b>	1	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# ip ospf cost 30	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure OSPF Authentication Settings

### Commands

**ip ospf auth simple auth-key** <string (8)>

**ip ospf auth {md5 | sha-1 | sha-224 | sha-256 | sha-384 | sha-512} key-id** <integer (0-255)>  
**auth-key** <string (16)>

**no ip ospf auth**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>ip</b>	Configures IP related information
	<b>ospf</b>	OSPF related configuration
	<b>auth</b>	Authentication related configuration
	md5, sha-1, sha-224, sha-256, sha-384, sha-512	Set the authentication methods
	<b>key-id</b>	Cryptographic authentication key ID
	<b>auth-key</b>	Authentication key value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# ip ospf auth simple auth-key 123456	
<b>Error Messages</b>	% OSPF: Invalid: The crypt authentication key has not been set yet. % OSPF: Invalid: The maximum length of the crypt authentication key is 16. % OSPF: Invalid: The simple authentication key has not been set yet. % OSPF: Invalid: The maximum length of the simple authentication key is 8.	
<b>Related Commands</b>	N/A	

## Configure OSPF Network Settings

### Commands

**ip ospf network** {broadcast | non-broadcast | point-to-multipoint | point-to-point}

**no ip ospf network**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>ip</b>	Configures IP related information
	<b>ospf</b>	OSPF related configuration
	<b>network</b>	Network related configuration
<b>Defaults</b>	broadcast	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# ip ospf network point-to-multipoint	
<b>Error Messages</b>	% OSPF: Invalid: There are configured neighbors on this interface so the network type cannot be changed. % OSPF: Invalid: The Neighbor IP address only can be configured on NBMA or point-to-multipoint networks.	
<b>Related Commands</b>	N/A	

# Routing Table

## Display Static Routing Table

### Commands

**show ip route** [ { connected | ospf | static } ]

<b>Syntax Description</b>	<b>show</b>	Show running system information
	<b>ip</b>	Display IP information
	<b>route</b>	Display routing entries
	connected	Connected routing entries
	ospf	OSPF routing entries
	static	Static routing entries
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>Product# show ip route Codes: C - connected, S - static, O - ospf ----- S 192.111.111.0/24 [1] via 192.168.127.46 S 192.168.126.0/24 [1] via 192.168.127.45 C 192.168.127.0/24 is directly connected, vlan1  Product# show ip route static Codes: C - connected, S - static, O - ospf ----- S 192.111.111.0/24 [1] via 192.168.127.46 S 192.168.126.0/24 [1] via 192.168.127.45  Product# show ip route connected Codes: C - connected, S - static, O - ospf ----- C 192.168.127.0/24 is directly connected, vlan1  Product# show ip route ospf Codes: C - connected, S - static, O - ospf ----- O 15.0.0.0/8 [2] via 12.0.0.7 O 20.0.0.0/8 [10] via 12.0.0.7</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Multicast Route

## PIM-DM

### Enable/Disable PIM-DM

#### Commands

**ip multicast-routing pim-dm**

**no ip multicast-routing**

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>multi cast- routi ng</b>	Configure Multicast Routing related configuration
	<b>pim- dm</b>	Enable PIM-DM
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global configuration mode	
<b>Usage Guidelines</b>	The switch supports three IP multicast routing functions: "PIM-DM", "PIM-SM and "Multicast Local Route". Please note only one can be enabled at a time. CLI prompt error message if the user tries to enable more than one. Use no ip multicast-routing to disable all and then re-enable the desired function.	
<b>Examples</b>	moxa# configure moxa(config)# ip multicast-routing pim-dm moxa(config)# no ip multicast-routing	
<b>Error Messages</b>	Invalid: Only one multicast routing protocol can be running at the same time.	
<b>Related Commands</b>	N/A	

## Enter PIM Router Configuration Mode

### Commands

**router pim**

<b>Syntax Description</b>	<b>router</b>	Configures router related information
	<b>pim</b>	PIM related information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration mode	
<b>Usage Guidelines</b>	Enter PIM Router Configuration Mode	
<b>Examples</b>	moxa# configure moxa(config)# router pim moxa(config-pim)#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable PIM-DM State Refresh

### Commands

**pim-dm state-refresh**

**no pim-dm state-refresh**

<b>Syntax Description</b>	<b>no</b>	Disables configuration / delete entry / reset to default value
	<b>pim-dm</b>	PIM-DM related configuration
	<b>state-refresh</b>	Enable State-Refresh
<b>Defaults</b>	enable	
<b>Command Modes</b>	PIM Router Configuration Mode	
<b>Usage Guidelines</b>	If you want to use state-refresh, you need to ensure that state-refresh is enabled on all routers.	
<b>Examples</b>	moxa# configure moxa(config)# router pim moxa(config-pim)# pim-dm state-refresh	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PIM-DM State Refresh Interval

### Commands

**pim-dm state-refresh-interval <short (10-100)>**

**no pim-dm state-refresh-interval**

<b>Syntax Description</b>	<b>no</b>	Disables configuration / delete entry / reset to default value
	<b>pim-dm</b>	PIM-DM related configuration
	<b>state-refresh-interval</b>	State-Refresh-Interval related configuration
	(10-100)	State refresh interval value
<b>Defaults</b>	60sec	
<b>Command Modes</b>	PIM Router Configuration Mode	
<b>Usage Guidelines</b>	The interval for the state-refresh control message must be the same for all PIM routers.	
<b>Examples</b>	moxa# configure moxa(config)# router pim moxa(config-pim)# pim-dm state-refresh-interval 80	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/disable PIM-DM on the operating VLAN interface

### Commands

**ip pim-dm**

**no ip pim-dm**

<b>Syntax Description</b>	<b>no</b>	Disables configuration / delete entry / reset to default value
	<b>ip</b>	Configure IP related configuration
	<b>pim-dm</b>	Enable PIM-DM on specific VLAN
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 1 moxa(config-if)# ip pim-dm	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PIM-DM Hello Interval

### Commands

**ip pim-dm hello-interval** < integer (10-3600) >

**no ip pim-dm hello-interval**

<b>Syntax Description</b>	<b>no</b>	Disables configuration / delete entry / reset to default value
	<b>ip</b>	Configure IP related configuration
	<b>pim-dm</b>	PIM-DM related configuration
	<b>hello-interval</b> (10-3600)	Hello-Interval related configuration Hello interval value
<b>Defaults</b>	30sec	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 1 moxa(config-if)# ip pim-dm hello-interval 30	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display ip pim-dm interface status

### Commands

**show ip pim-dm interface** [vlan <vlan-id>] [detail]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>ip</b>	Display IP information
	<b>pim-dm</b>	PIM-DM related information
	<b>interface</b>	Interface related information
	vlan	VLAN related information
	vlan-id	Specified vlan id
	detail	Detail interface information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode/ User EXEC	
<b>Usage Guidelines</b>	<p>This command displays PIM-DM interface information.</p> <p><b>Checksum error:</b> Triggered when the PIM checksum of the packet is incorrect.</p> <p><b>Bad version packets:</b> Triggered when the PIM version of the packet is not 2.</p> <p><b>Packets from self:</b> Triggered when the source IP of the packet is the same as its own IP.</p> <p><b>Packets from Non-Neighbors:</b> When the PIM neighbor has not been established yet, packet types other than Hello are received</p>	
<b>Examples</b>	<pre>moxa# show ip pim-dm interface Globally disabled  moxa# show ip pim-dm interface  Interface  PIM-DM  Address      Nbr Count  Hello Interval -----  - Vlan2     Enabled  192.168.40.2  1          30 Vlan3     Enabled  192.168.50.2  2          30  moxa# show ip pim-dm interface detail vlan2 is up Internet Address is 192.168.40.2 PIM Version: 2 PIM Neighbor Count: 0 PIM Hello Interval: 30 PIM Join/Prune Interval: 60 PIM Graft Retry Interval: 3 PIM State Refresh: Uncapable PIM State Refresh Processing: enabled PIM Refresh Origination: Disabled PIM RPF Status: Disabled  PIM Interface Statistics General (Sent/Received):   Hellos: 0/0,  Join/Prune's: 0/0,  Assert's: 0/0,   Grafts's: 0/0,  GraftAck's: 0/0, Errors:   Checksum error: 0,  Bad version packets: 0   Packets from self: 0,  Packets from Non-Neighbors : 0</pre>	
<b>Error Messages</b>	Invalid: The maximum number (40) of active PIM-DM interfaces has been exceeded.	
<b>Related Commands</b>	N/A	

## Display PIM-DM PIM-DM neighbor information

### Commands

**show ip pim-dm neighbor** [vlan <vlan-id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>ip</b>	Display IP information
	<b>pim-dm</b>	PIM-DM related information
	<b>neighbor</b>	Neighbor related information
	<b>vlan</b>	VLAN related information
	<b>vlan-id</b>	Specified vlan id
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode/ User EXEC	
<b>Usage Guidelines</b>	This command displays PIM-DM neighbor information.	
<b>Examples</b>	moxa# show ip pim-dm neighbor	
	<pre>Neighbor      Interface      Uptime/Expiry ----- 192.168.40.3  vlan2          0d10h12m5s/0h0m15s 192.168.41.3  vlan3          0d11h12m3s/0h1m15s</pre>	
<b>Error Messages</b>	moxa# show ip pim-dm neighbor vlan 2	
	<pre>Neighbor      Interface      Uptime/Expiry ----- 192.168.40.3  vlan2          0d11h12m3s/0h1m25s</pre>	
<b>Related Commands</b>	N/A	

## Display PIM-DM Multicast Routing

### Commands

**show ip pim-dm mroute** [ **group-address** <mcast\_addr> | **source-address** <ucast\_addr> ]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general / information
	<b>ip</b>	Display IP information
	<b>pim-dm</b>	PIM-DM related information
	<b>mroute</b>	Display the multicast routing entries of PIM
	<b>group-address</b>	Group-address related information
	mcast_addr	Specifies the PIM-DM multicast group address
	<b>source-address</b>	Source-address related information
	ucast_addr	Specifies the Unicast address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode/ User EXEC	
<b>Usage Guidelines</b>	This command displays PIM-DM multicast routing entry information.	
<b>Examples</b>	<pre>moxa# show ip pim-dm mroute  PIM Multicast Routing Table ----- (S,G), Uptime/Expires   Incoming Interface: Interface, State   Upstream neighbor   Route Flags S: SPT Bit W: Wild Card Bit R: RPT Bit   OIF State Pruned(A): Assert Loser   Outgoing Interface list:     Interface, State/Mode, Uptime  Total number of Multicast Routes is 1  (192.168.20.100,239.1.1.1), 0d0h20m15s/0h3m22s   Incoming Interface: vlan29, Forwarding   Upstream nbr: 192.168.129.102   Route Flags: ---   State Refresh Message Generation: Disabled   Source Active Timer Value: 210   State Refresh Remaining Time: 0h0m0s   Prune Limit Remaining Time: 0h0m0s   Outgoing Interface list:     vlan30, Prune(A)/Dense ,0d0h20m15s</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Clear PIM-DM Statistics

### Commands

**clear ip pim-dm statistics** [vlan <vlan-id>]

<b>Syntax Description</b>	<b>clear</b>	Clear statistics information
	<b>ip</b>	IP related information
	<b>pim-dm</b>	PIM-DM related information
	<b>statistics</b>	Clear statistics information
	vlan	VLAN related information
	vlan-id	Specified vlan id
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode/ User EXEC	
<b>Usage Guidelines</b>	This command clear PIM-DM interface statistics.	
<b>Examples</b>	<pre>moxa# clear ip pim-dm statistics moxa# clear ip pim-dm statistics vlan 2</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## PIM-SM

### Enable/Disable PIM-SM

#### Commands

**ip multicast-routing pim-sm**

**no ip multicast-routing**

<b>Syntax Description</b>	<b>ip multicast-routing pim-sm</b> <b>no ip multicast-routing</b>	Enable PIM-SM on the switch Disable all IP multicast routing functions (PIM-DM, PIM-SM, Multicast Local Route) on the switch
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	The switch supports three IP multicast routing functions: "PIM-DM", "PIM-SM" and "Multicast Local Route". Please note only one can be enabled at a time.  CLI prompt error message if the user tries to enable more than one. Use no ip multicast-routing to disable all and then re-enable the desired function.	
<b>Examples</b>	moxa(config)# ip multicast-routing pim-sm	
<b>Error Messages</b>	Invalid: Only one multicast routing protocol can be active.	
<b>Related Commands</b>	ip multicast-routing pim-dm (Refer to FR-M-NL_PIM_DM Software Requirement Specification) ip multicast-routing local-route (Refer to FR-M-NL_MULTICAST_LOCAL_ROUTE Software Requirement Specification)	

### Enter PIM Router Configuration Mode

#### Commands

**router pim**

<b>Syntax Description</b>	<b>router pim</b>	Enter PIM Router Configuration Mode
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# router pim moxa(config-pim)#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PIM-SM Static RP

### Commands

**pim-sm rp-static rp-address** <group-addr> <group-mask> <ip-addr> [**override**]

**no pim-sm rp-static rp-address** <group-addr> <group-mask>

<b>Syntax Description</b>	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>rp-static</b>	Configure switch a statistically RP
	<b>rp-address</b>	Configure RP address for a particular group
	<group-addr>	Configure the group address
	<group-mask>	Configure the group mask
	<ip-addr>	Configure the unicast RP address
	<b>override</b>	Override dynamically learnt RP mappings
<b>Defaults</b>	N/A	
<b>Command Modes</b>	PIM Router Configuration Mode	
<b>Usage Guidelines</b>	The <b>override</b> keyword means that if there is a conflict between the RP configured by this command and one learned by BSR, the RP configured by this command is used instead of the one learned by BSR. Without the <b>override</b> keyword, the RP learned by BSR takes priority over the one configured by this command.	
<b>Examples</b>	moxa(config)# router pim moxa(config-pim)# pim-sm rp-static rp-address 224.1.1.0 255.255.255.0 4.4.4.4	
<b>Error Messages</b>	Invalid: Invalid group prefix. Invalid: A static RP already exists for this group prefix. Invalid: RP cannot be configured for a SSM group range.	
<b>Related Commands</b>	N/A	

## Configure PIM-SM Candidate RP

### Commands

**pim-sm rp-candidate rp-address** <group-addr> <group-mask> <ip-addr> [**priority** <value(0-255)>]

**no pim-sm rp-candidate rp-address** <group-addr> <group-mask> <ip-addr>

<b>Syntax Description</b>	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>rp-candidate</b>	Configure switch as RP candidate and advertise to BSR
	<b>rp-address</b>	Configure the address of RP for a particular group
	<group-addr>	Configure the group address
	<group-mask>	Configure the group mask
	<ip-addr>	Configure the unicast candidate RP address
	<b>priority</b>	Configure priority value for candidate RP. The default value is 192 if priority not set.
<b>Defaults</b>	N/A	
<b>Command Modes</b>	PIM Router Configuration Mode	
<b>Usage Guidelines</b>	The candidate RP with the smaller priority value is preferred. ----- Note: RP candidate can only be created when: Binding L3 IP interface is created Binding L3 IP address is valid PIM-SM interface is enabled ----- If RP is the same, the priority will override the previous one.	
<b>Examples</b>	moxa(config)# router pim moxa(config-pim)# pim-sm rp-candidate rp-address 224.1.1.0 255.255.255.0 3.3.3.3 priority 0	
<b>Error Messages</b>	Invalid: The PIM interface has not been created yet. Invalid: Invalid group prefix. Invalid: A candidate RP already exists for this group prefix. Invalid: RP cannot be configured for a SSM group range.	
<b>Related Commands</b>	N/A	

## Enable/disable PIM-SM SSM

### Commands

**pim-sm ssm {enable | disable}**

<b>Syntax Description</b>	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>ssm</b>	Configure SSM configuration
	<b>enable</b>	Enable SSM operation for groups within SSM range
	<b>disable</b>	Disable SSM operation
<b>Defaults</b>	Disable	
<b>Command Modes</b>	PIM Router Configuration Mode	
<b>Usage Guidelines</b>	This command is used to enable/disable SSM delivery model.  SSM delivery model can be used when local receiver knows the exact locations of multicast sources in advance, support IGMPv3 include mode to specify the sources they want to receive data.	
<b>Examples</b>	moxa(config)# pim-sm ssm enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure pim-sm ssm group address

### Commands

**pim-sm ssm group** <group-addr> <group-mask>

**no pim-sm ssm group** <group-addr> <group-mask>

<b>Syntax Description</b>	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>ssm</b>	Configure SSM configuration
	<b>group</b>	Add group range to be used for SSM
	<group-addr>	Configure the group address
	<group-mask>	Configure the group mask
<b>Defaults</b>	PIM Router Configuration Mode	
<b>Command Modes</b>	In addition to default SSM group range (232.0.0.0 to 232.255.255.255), SSM range can be expanded by this command. Switch allows SSM configuration for the IP multicast address range (224.0.0.0 to 239.255.255.255).  Note that the SSM group address range configured on each router should be the same.	
<b>Usage Guidelines</b>	moxa(config-pim)# pim-sm ssm group 224.1.1.0 255.255.255.0	
<b>Examples</b>	Invalid: The default SSM group cannot be deleted. Invalid: Invalid group prefix. Invalid: This SSM group already exists. Invalid: This SSM group range is already used by a static RP. Invalid: This SSM group range is already used by a candidate RP.	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/disable PIM-SM SPT Immediate

### Commands

**pim-sm spt-immediate**

**no pim-sm spt-immediate**

<b>Syntax Description</b>	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>spt-immediate</b>	Configure immediate switchover to Shortest-Path-Tree
<b>Defaults</b>	Disable	
<b>Command Modes</b>	PIM Router Configuration Mode	
<b>Usage Guidelines</b>	This command make the RPT switch over to the SPT as soon as the first data packet arrives at the last-hop router. By default, all groups use the RPT and will not switch to the SPT.	
<b>Examples</b>	moxa(config)# router pim moxa(config-pim)# pim-sm spt-immediate	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/disable PIM-SM on the interface

### Commands

**ip pim-sm**

**no ip pim-sm**

<b>Syntax Description</b>	<b>ip pim-sm</b>	Enable PIM-SM on the interface
	<b>no ip pim-sm</b>	Disable PIM-SM on the interface
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	Note: PIM-SM interface cannot be disabled if candidate RP is binding.	
<b>Examples</b>	moxa(config)# interface vlan 100 moxa(config-if)# ip pim-sm  moxa(config)# interface loopback 1 moxa(config-if)# ip pim-sm	
<b>Error Messages</b>	Invalid: The maximum number (40) of active PIM-SM interfaces has been exceeded. <b>Invalid: This interface is used by candidate RP.</b>	
<b>Related Commands</b>	N/A	

## Enable/disable IP PIM-SM BSR Candidate

### Commands

**ip pim-sm bsr-candidate {enable | disable}**

<b>Syntax Description</b>	<b>ip</b>	Configure IP related configuration
	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>bsr-candidate</b>	Configure BSR candidate configuration
	<b>enable</b>	Enable local interface as BSR candidate
	<b>disable</b>	Disable local interface as BSR candidate
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 100 moxa(config-if)# ip pim-sm bsr-candidate enable  moxa(config)# interface loopback 1 moxa(config-if)# ip pim-sm bsr-candidate enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the priority of PIM-SM BSR Candidate

### Commands

**ip pim-sm bsr-candidate priority** <value(0-255)>

**no ip pim-sm bsr-candidate priority**

<b>Syntax Description</b>	<b>ip</b>	Configure IP related configuration
	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>bsr-candidate</b>	Configure BSR candidate configuration
	<b>priority</b>	Configure priority value for BSR candidate
<b>Defaults</b>	64	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	The BSR with the larger priority value is preferred. If the priority values are the same, the device with the highest IP address is selected as the BSR.	
<b>Examples</b>	moxa(config)# interface vlan 100 moxa(config-if)# ip pim-sm bsr-candidate priority 0	
	moxa(config)# interface loopback 1 moxa(config-if)# ip pim-sm bsr-candidate priority 0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the Hash Mask Length of PIM-SM BSR Candidate

### Commands

**ip pim-sm bsr-candidate hash-mask-length** <hash-mask-length(4-32)>

**no ip pim-sm bsr-candidate hash-mask-length**

<b>Syntax Description</b>	<b>ip</b>	Configure IP related configuration
	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>bsr-candidate</b>	Configure BSR candidate configuration
	<b>hash-mask-length</b>	Configure hash-mask-length for BSR candidate
<b>Defaults</b>	30	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 100 moxa(config-if)# ip pim-sm bsr-candidate hash-mask-length 32	
	moxa(config)# interface loopback 1 moxa(config-if)# ip pim-sm bsr-candidate hash-mask-length 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure PIM-SM Hello Interval

### Commands

**ip pim-sm hello-interval** <seconds(10-3600)>

**no ip pim-sm hello-interval**

<b>Syntax Description</b>	<b>ip</b>	Configure IP related configuration
	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>hello-interval</b>	Configure the hello-messages interval
<b>Defaults</b>	30	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 100 moxa(config-if)# ip pim-sm hello-interval 60	
	Invalid: This configuration does not support a loopback interface.	
<b>Related Commands</b>	N/A	

## Configure PIM-SM Join/Prune Interval

### Commands

**ip pim-sm join-prune-interval** <seconds(10-3600)>

**no ip pim-sm join-prune-interval**

<b>Syntax Description</b>	<b>ip</b>	Configure IP related configuration
	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>join-prune-interval</b>	Configure the join/prune-messages interval
<b>Defaults</b>	60	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# interface vlan 100 moxa(config-if)# ip pim-sm join-prune-interval 30	
<b>Error Messages</b>	Invalid: This configuration does not support a loopback interface.	
<b>Related Commands</b>	N/A	

## Configure the PIM-SM DR priority

### Commands

**ip pim-sm dr-priority** <priority (1-4294967295)>

**no ip pim-sm dr-priority**

<b>Syntax Description</b>	<b>ip</b>	Configure IP related configuration
	<b>pim-sm</b>	Configure PIM-SM related configuration
	<b>dr-priority</b>	Configure the DR priority
<b>Defaults</b>	1	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	The DR with the larger priority value is preferred in DR election.	
<b>Examples</b>	moxa(config)# interface vlan 100 moxa(config-if)# ip pim-sm dr-priority 3	
<b>Error Messages</b>	Invalid: This configuration does not support a loopback interface.	
<b>Related Commands</b>	N/A	

## Display PIM-SM interface information

### Commands

**show ip pim-sm interface** [vlan <vlan-id(1-4094)> | **loopback** <interface-id(1-10)>] [**detail**]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>interface</b>	Display PIM-SM interface information
	<b>vlan</b>	Display for specific vlan
	<b>loopback</b>	Display for specific loopback
	<b>detail</b>	Display the detailed information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ip pim-sm interface  Shortest Path Tree Switchover Method: Never  IfName    PIM-SM  Address      Nbr  Hello DR          DR           Count Intvl Address      Priority ----- vlan200   Enabled  11.1.1.1     1    30   11.1.1.2     1 vlan300   Enabled  12.1.1.1     1    30   12.1.1.2     1 </pre> <pre> moxa# show ip pim-sm interface vlan 200 detail  vlan200 (Interface Index:130) is up Internet Address is 11.1.1.1   PIM version: 2   PIM DR: 11.1.1.2   PIM DR Priority: 1   PIM Neighbor Count: 1   PIM Hello Interval: 30   PIM Join/Prune Interval: 60   PIM Interface Statistics     General (Sent/Received):       Hellos: 103/103, Join/Prune's: 0/0, Assert's: 0/0, Errors:   Checksum error: 0, Bad version packets: 0, NULL-Register errors: 0   Packets from self: 0   Packets from Non-Neighbors: 1   Join/Prune packets received on RPF interface: 0   (*,G) Joins received with no/wrong RP: 0/0   (S,G) Join/Prune received for SSM groups: 0   Bad Join/Prune packets received for SSM groups: 0 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display PIM-SM neighbor information

### Commands

**show ip pim-sm neighbor** [vlan <vlan-id>]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>neighbor</b>	Display neighbor information
	<b>vlan &lt;vlan-id&gt;</b>	Display for specific VLAN
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip pim-sm neighbor  Neighbor      IfName      Uptime/Expiry      DR-Priority -----      - 11.1.1.2      vlan200      0d1h31m15s/0m15s      1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display PIM-SM statistic RP information

### Commands

**show ip pim-sm rp-static**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>rp-static</b>	Display statistically RP information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	iss# show ip pim-sm rp-static  Group Address      Group Mask      RP Address -----      - 224.1.1.0      255.255.255.0      3.3.3.3	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display PIM-SM RP candidate information

### Commands

**show ip pim-sm rp-candidate**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>rp-candidate</b>	Display RP candidate information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip pim-sm rp-candidate  Group Address      Group Mask      RP Address/Priority -----      - 225.1.1.0      255.255.255.0      100.1.1.1/1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display the PIM-SM RP information for the multicast group

### Commands

**show ip pim-sm rp** [<group-addr>]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>rp</b>	Display the RP information for the multicast group
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip pim-sm rp  PIM-SM BSR RP: ----- Group Address/Network Mask: 224.1.1.0/255.255.255.0 RP Address: 3.3.3.3 Priority: 192, Hold Time: 150s, Expiry Time: 0h2m25s  Group Address/Network Mask: 224.1.1.0/255.255.255.0 RP Address: 4.4.4.4 Priority: 192, Hold Time: 150s, Expiry Time: 0h2m25s  Group Address/Network Mask: 225.1.1.0/255.255.255.0 RP Address: 100.1.1.1 Priority: 1, Hold Time: 150s, Expiry Time: 0h2m25s  Group Address/Network Mask: 226.1.1.0/255.255.255.0 RP Address: 100.1.1.1 Priority: 1, Hold Time: 150s, Expiry Time: 0h2m25s  PIM-SM Static RP: ----- Group Address/Network Mask: 224.1.1.0/255.255.255.0 RP Address: 4.4.4.4, Override: Disabled  moxa# show ip pim-sm rp 224.1.1.1  RP Address: 3.3.3.3 (via BSR) Priority: 192, Hold Time: 150s, Expiry Time: 0h2m25s Hash Value   RP: 4.4.4.4, priority: 192, Hash Value: 546521210   RP: 3.3.3.3, priority: 192, Hash Value: 1597564979</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display PIM-SM BSR information

### Commands

**show ip pim-sm bsr**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>bsr</b>	Display BSR information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>iss# show ip pim-sm bsr  Elected BSR   BSR Address: 100.1.1.1   BSR Priority: 254, Hash Mask Length: 30   BSR UpTime: 0d0h3m41s</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display multicast routing table of PIM-SM

### Commands

**show ip pim-sm mroute** [<group-addr> | <source-addr>]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>mroute</b>	Display multicast routing table of PIM-SM
	<group-addr>	Specifies the PIM multicast group address
	<source-addr>	Specifies the Unicast network address that identifies the sources for which the entry contains multicast routing information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>iss# show ip pim-sm mroute  PIM Multicast Routing Table ----- (S,G), Uptime/Expires   Incoming Interface: Interface, State   Upstream neighbor   Route Flags S: SPT Bit W: Wild Card Bit R: RPT Bit   OIF State Pruned(A): Assert Loser   Outgoing InterfaceList:     Interface, State/Mode, Uptime  Total number of Multicast Routes is 1  (*, 224.1.1.1), 0d0h3m2s/, RP: 3.3.3.3   Incoming Interface: vlan200   Upstream nbr: 11.1.1.2   Route Flags: WR   Outgoing InterfaceList:     vlan300, Forwarding/Sparse, 0d0h3m2s</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display Multicast Routing table

### Commands

**show ip mroute** [<group-addr>| <source-addr>]

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>mroute</b>	Display multicast routing table
	<group-addr>	Specifies the PIM multicast group address
	<source-addr>	Specifies the Unicast network address that identifies the sources for which the entry contains multicast routing information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip mroute  IPv4 Multicast Routing Status : Enabled  Multicast Routing Table ----- (S,G), Uptime/Expires Multicast routing protocol, Upstream neighbor Incoming interface: Interface Outgoing interface list:   interface, State, Uptime/expires  (3.3.3.3, 224.1.1.1), 0d0h6m23s/0h3m27s Protocol: PIM-SM, Upstream nbr: 11.1.1.2 Incoming interface: vlan 200 Outgoing interface list:   vlan 300, Forwarding, 0d0h6m23s</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display the PIM-SSM group range

### Commands

**show ip pim-sm ssm**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics information
	<b>ip</b>	Display IP related information
	<b>pim-sm</b>	Display PIM-SM related information
	<b>ssm</b>	Display the PIM-SSM group range
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip pim-sm ssm  Group Address      Group Mask ----- 232.0.0.0          255.0.0.0</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Clear PIM-SM related statistics

### Commands

**clear ip pim-sm statistics** [vlan <vlan-id >]

<b>Syntax Description</b>	<b>clear</b>	Clear statistics information
	<b>ip</b>	Clear IP related configuration
	<b>pim-sm</b>	Clear PIM-SM related information
	<b>statistics</b>	Clear related statistics
	<b>vlan</b>	Clear for specified vlan
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# clear ip pim-sm statistics	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Multicast Local Route

### Enable/disable Multicast Local Route

#### Commands

**ip multicast-routing local-route**

**no ip multicast-routing**

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>multicast-routing</b>	Configure Multicast Routing related configuration
	<b>local-route</b>	Enable MLR global configuration
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	The switch supports multiple IP multicast routing protocols. Please note only one can be enabled at a time.  CLI prompt error message if the user tries to enable more than one. Use <b>no ip multicast-routing</b> to disable all and then re-enable the desired multicast protocol.	
<b>Examples</b>	moxa(config)# ip multicast-routing local-route	
<b>Error Messages</b>	% Multicast Routing: Invalid: Only one multicast routing protocol can be active.	
<b>Related Commands</b>	ip multicast-routing pim-dm ip multicast-routing pim-sm (Refer to FR-12-5L_Multicast_Routing_Table_SRS)	

### Enable Multicast Local Route VRRP-Master-Only

#### Commands

**ip mcast-local-route vrrp-master-only** {enable | disable}

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>mcast-local-route</b>	Configure Multicast Local Route related configuration
	<b>vrrp-master-only</b>	Configure VRRP master only configuration
	enable	Enable VRRP master only feature
	disable	Disable VRRP master only feature
<b>Defaults</b>	Enable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	When MLR and VRRP are enabled at the same time, only VRRP master can route multicast stream if <b>vrrp-master-only</b> is enabled. And both VRRP master and backup can route multicast stream if <b>vrrp-master-only</b> is disabled.	
<b>Examples</b>	moxa(config)# ip mcast-local-route vrrp-master-only enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Multicast Local Route

### Commands

**ip mcast-local-route route source-vlan** <vlan-id> **downstream-vlan** <vlan-range>

**no ip mcast-local-route route source-vlan** <vlan-id>

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>mcast-local-route</b>	Configure Multicast Local Route related configuration
	<b>route</b>	Configure Local Route
	<b>source-vlan</b>	Configure Source VLAN
	<vlan-id>	VLAN ID (1-4094)
	<b>downstream-vlan</b>	Configure Downstream VLAN
	<vlan-range>	Range (1-4094) of VLANs separated by a hyphen, or a series of VLANs separated by a comma
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	The source VLAN and downstream VLAN must be L3 VLAN interface. The source VLAN and downstream VLAN must not be duplicated in the same entry.	
<b>Examples</b>	moxa(config)# ip mcast-local-route route source-vlan 3 downstream-vlan 2,5-7	
<b>Error Messages</b>	% Multicast Local Route: Invalid: The Source VLAN must be mapped to a L3 VLAN interface. % Multicast Local Route: Invalid: The Downstream VLAN must be mapped to a L3 VLAN interface. % Multicast Local Route: Invalid VLAN ID. The valid range is from 1 to 4094. % Multicast Local Route: Invalid: The Downstream VLAN cannot be assigned to a VLAN that is already assigned to the Source VLAN. % Multicast Local Route: Invalid: The maximum number (16) of Local Route has been exceeded. % Multicast Local Route: Invalid: The maximum number (16) of downstream VLAN has been exceeded.	
<b>Related Commands</b>	N/A	

## Configure Multicast Local Route ACL

### Commands

**ip mcast-local-route acl** <macl-id (1-16)> **group** {<group-addr> <group-mask> | **any**} **source-ip** {<ucast\_addr> <ip\_mask> | **any**} **source-vlan** {<vlan-id> | **any**} **downstream-vlan** {<vlan-id> | **any**} {**permit** | **deny**}

**no ip mcast-local-route acl** <macl-id (1-16)>

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>mcast-local-route</b>	Configure Multicast Local Route related configuration
	<b>acl</b>	Configure Multicast ACL
	<macl-id>	Configure Multicast ACL Index
	<b>group</b>	Configure multicast group address and mask
	<group-addr>	Configure the group address
	<group-mask>	Configure the group mask
	<b>any</b>	Configure any group address and mask
	<b>source-ip</b>	Configure source IP and mask
	<ucast_addr>	Configure the source IP
	<ip_mask>	Configure the source mask
	<b>any</b>	Configure any source address and mask
	<b>source-vlan</b>	Configure source VLAN
	<vlan-id>	Configure source VLAN ID
	<b>any</b>	Configure any source VLAN ID
	<b>downstream-vlan</b>	Configure downstream VLAN
	<vlan-id>	Configure downstream VLAN ID
	<b>any</b>	Configure any downstream VLAN ID
	<b>permit</b>	Permit the multicast stream
	<b>deny</b>	Deny the multicast stream
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	Smaller MACL-ID numbers have higher priority for multicast routing filtering	
<b>Examples</b>	moxa(config)# ip mcast-local-route acl 1 group 239.0.1.2 255.255.255.255 source-ip any source-vlan 3 downstream-vlan 5 deny	
<b>Error Messages</b>	% Multicast Local Route: Invalid Multicast Group IP/Mask format. % Multicast Local Route: Invalid Multicast Group IP format. % Multicast Local Route: Invalid Multicast Group Mask format. % Multicast Local Route: Invalid Source IP/Mask format. % Multicast Local Route: Invalid Source Mask format. % Multicast Local Route: Invalid: The maximum number (16) of Multicast ACL has been exceeded.	
<b>Related Commands</b>	N/A	

## Display Active Multicast Local Route status

### Commands

**show ip mcast-local-route route**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>ip</b>	Display IP information
	<b>mcast-local-route</b>	Display Multicast Local Route related information
	<b>route</b>	Display Active Multicast Local Route status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip mcast-local-route route	
	Multicast Local Route is globally enabled VRRP Master Only is globally enabled  Index Source VLAN Downstream VLAN ----- 1 3 2,5	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display Active Multicast ACL status

### Commands

**show ip mcast-local-route acl**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>ip</b>	Display IP information
	<b>mcast-local-route</b>	Display Multicast Local Route related information
	<b>acl</b>	Display Active Multicast ACL status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip mcast-local-route acl	
	Note. Action(A) : Deny(D) Permit(P)  ID Group Mask Source Mask Svid Dvid A ----- 1 239.0.1.2 255.255.255.255 Any Any 3 5 D	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Display Multicast Routing table

### Commands

**show ip mroute**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>ip</b>	Display IP information
	<b>mroute</b>	Multicast routing related information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip mroute  IPv4 Multicast Routing Status : Enabled  Multicast Routing Table ----- (S,G), Uptime/Expires   Muticast routing protocol, Upstream neighbor   Incoming interface : Interface   Outgoing interface list :     Interface, State, Uptime  (192.168.3.102, 239.0.1.2), 0d0h3m29s/0h0m9s   Protocol: Multicast Local Route, Upstream nbr: -   Incoming interface: vlan 3   Outgoing interface list:     vlan 2, Forwarding, 0d0h3m29s     vlan 5, Forwarding, 0d0h3m29s  (192.168.3.30, 239.255.255.250), 0d0h2m12s/0h3m27s   Protocol: Multicast Local Route, Upstream nbr: -   Incoming interface: vlan 3   Outgoing interface list:     vlan 2, Forwarding, 0d0h2m12s     vlan 5, Forwarding, 0d0h2m12s</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Multicast Routing Table

### Configure Multicast Routing Protocol

#### Commands

**ip multicast-routing {pim-dm | pim-sm | local-route}**

**no ip multicast-routing**

<b>Syntax Description</b>	<b>ip</b>	Configure IP parameters
	<b>multicast-routing</b>	Configure Multicast Routing related configuration
	<b>pim-dm</b>	Enable PIM-DM
	<b>pim-sm</b>	Enable PIM-SM
	<b>local-route</b>	Enable Multicast-Local-Route
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global configuration mode	
<b>Usage Guidelines</b>	The switch supports three IP multicast routing functions: "PIM-DM", "PIM-SM" and "Multicast Local Route". Please note only one can be enabled at a time. CLI prompt error message if the user tries to enable more than one. Use no ip multicast-routing to disable all and then re-enable the desired function.	
<b>Examples</b>	moxa# configure moxa(config)# ip multicast-routing pim-dm moxa(config)# no ip multicast-routing	
<b>Error Messages</b>	Invalid: Only one multicast routing protocol can be running at the same time.	
<b>Related Commands</b>	N/A	

## Display Multicast Routing Table

### Commands

**show ip mroute [ group-address <mcast\_addr> | source-address <ucast\_addr> ]**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>ip</b>	Display IP information
	<b>mroute</b>	Multicast routing related information
	<b>group-address</b>	Group-address related information
	mcast_addr	Specifies the multicast group address
	<b>source-address</b>	Source-address related information
	ucast_addr	Specifies the Unicast address
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode/ User EXEC	
<b>Usage Guidelines</b>	This command displays multicast routing entry information.	
<b>Examples</b>	<pre>moxa# show ip mroute  IPv4 Multicast Routing Status : Enabled  Multicast Routing Table ----- (S,G), Uptime/Expires Multicast routing protocol, Upstream neighbor Incoming interface: Interface Outgoing interface list :   Interface, State, Uptime  (192.168.20.100,239.1.1.1), 0d0h20m18s/0h3m28s Protocol: PIM-DM, Upstream nbr: 192.168.129.102 Incoming interface: vlan 29 Outgoing interface list:   vlan 30, Forwarding, 0d0h20m18s (192.168.20.100,239.1.1.2), 0d0h20m18s/0h3m28s Protocol: PIM-DM, Upstream nbr: - Incoming interface: vlan 29 Outgoing interface list:   vlan 30, Forwarding, 0d0h20m18s</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Security

## Device Security

### Login Policy

#### Configure Login Lockout Settings

##### Commands

**login lockout** <enable|disable>

**login lockout** <minute(1-10)> **attempts** <tries(1-10)>

<b>Syntax Description</b>	<b>login</b>	Configure login parameters
	<b>lockout</b>	Configure the maximum number of failed login attempts and the lockout time to block the user from logging in
	enable	Enable login lockout
	disable	Disable login lockout
	minute	Configure the lockout time ranging from 1 to 10 minutes
	<b>attempts</b>	Configure the maximum number of login attempts
	tries	The number of tries ranging from 1 to 10
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# login lockout 10 attempts 5 (config)# login lockout enable (config)# login lockout disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

#### Configure Login Banner

##### Commands

**login banner** <string (500)>

**no login banner**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>login</b>	Configure login parameters
	<b>banner</b>	Configure a login banner
	string	The login banner content up to 500 characters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# login banner "this is a banner" (config)# no login banner	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Login Failure Message

### Commands

**login fail-message** <string (500)>

**no login fail-message**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>login</b>	Configure login parameters
	<b>fail-message</b>	Configure a login failure message
	string	The login failure message up to 500 characters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# login fail-message "this is a failure message" (config)# no login fail-message	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Timeout Value for a Session End

### Commands

**session timeout** <integer (1-1440)>

<b>Syntax Description</b>	<b>session</b>	Configure session parameters
	<b>timeout</b>	Configure the session timeout value
	integer	The timeout value ranging from 1 to 1440 seconds
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# session timeout 100	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Session Timeout Information

### Commands

**show session timeout**

<b>Syntax Description</b>	<b>show</b>	Display running information
	<b>session</b>	Display session information
	<b>timeout</b>	Display session timeout information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show session timeout Session TimeOut: 5 (Min)	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Login Failure Message

### Commands

show login fail-message

<b>Syntax Description</b>	<b>show</b>	Display running information
	<b>login</b>	Display login information
	<b>fail-message</b>	Display the login failure message
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show log fail-message Login Fail Message: This is a failed message!	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Login Banner

### Commands

show login banner

<b>Syntax Description</b>	<b>show</b>	Display running information
	<b>login</b>	Display login information
	<b>banner</b>	Display the login banner
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show log banner Login Banner Message: this is a banner	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Login Authentication

### Commands

show login authentication

<b>Syntax Description</b>	<b>show</b>	Display running information
	<b>login</b>	Display login information
	<b>authentication</b>	Display authentication information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show login authentication Login Authentication Method: Local	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Trusted Access

### Configure Trusted Access Settings

#### Commands

**trusted-access ip-source** <uicast\_addr> [ { <ip\_mask> | "/" <short(0-32)> } ]

**no trusted-access** <uicast\_addr> [ { <ip\_mask> | "/" <short(0-32)> } ]

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>trusted-access</b>	Configure IP trusted access parameters
	<b>ip-source</b>	Configure the IP source
	uicast_addr	Configure the network or host IP address
	ip_mask	Configure the subnet mask of the IP address
	"/"	Configure the CIDR notation
	short (0-32)	Configure the prefix length
<b>Defaults</b>	Trusted access is disabled by default	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Trusted access will take effect when the "trusted-access enable" command is executed.	
<b>Examples</b>	(config)# trusted-access ip-source 10.10.10.10 255.255.255.0 (config)# trusted-access ip-source 20.10.10.10 / 24 (config)# trusted-access ip-source 30.10.10.10 (config)# no trusted-access ip-source 10.10.10.10 255.255.255.0 (config)# no trusted-access ip-source 20.10.10.10 / 24 (config)# no trusted-access ip-source 30.10.10.10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show trusted-access trusted-access enable	

### Enable/Disable IP Trusted Access List

#### Commands

**trusted-access** <enable>

**trusted-access** <disable>

<b>Syntax Description</b>	<b>trusted-access</b>	Configure IP trusted access parameters
	enable	Enable the IP trusted access list
	disable	Disable the IP trusted access list
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# trusted-access enable (config)# trusted-access disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	trusted-access disable	

## Show Trusted Access IP List

### Commands

**show trusted-access**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>trusted-access</b>	Display IP trusted access information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show trusted-access Trusted Access Table : Disabled ----- IP Address : 210.222.222.225 Subnet Mask : 255.255.255.0 moxa#	
<b>Error Messages</b>	% No such manager found % Manager is not configured	
<b>Related Commands</b>	trusted-access	

## SSH & SSL

### Re-generate New Web SSL Certificate

#### Commands

**web certificate generate**

<b>Syntax Description</b>	<b>web</b>	Configure web parameters
	<b>certificate</b>	Configure the web server certificate
	<b>generate</b>	Generate a self-signed certificate
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# web certificate generate	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Import New Web SSL Certificate via TFTP or SFTP

#### Commands

**web certificate import** {<tftp\_url> | <sftp\_url>}

<b>Syntax Description</b>	<b>web</b>	Configure web parameters
	<b>certificate</b>	Configure the web server certificate
	<b>import</b>	Import the certificate from a remote server
	tftp_url	The file on the remote TFTP server to be copied
	sftp_url	The file on the remote SFTP server to be copied
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# web certificate import tftp://192.168.1.1/server.crt	
<b>Error Messages</b>	Format or Password Error Server not Connected	
<b>Related Commands</b>	N/A	

## Export Web SSL Certificate Signing Request via TFTP/SFTP

### Commands

**web signing-request export** {<tftp\_url> | <sftp\_url>}

<b>Syntax Description</b>	<b>web</b>	Configure Web related parameters
	<b>signing-request</b>	Configure the web server certificate signing request
	<b>export</b>	Export the certificate
	tftp_url	The file on the remote TFTP server to be copied
	sftp_url	The file on the remote SFTP server to be copied
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# web signing-request export tftp://192.168.1.1/server.csr	
<b>Error Messages</b>	Server not Connected	
<b>Related Commands</b>	N/A	

## Re-generate New SSH Key

### Commands

**ssh key generate**

<b>Syntax Description</b>	<b>ssh</b>	Configure SSH parameters
	<b>key</b>	Configure the SSH server key
	<b>generate</b>	Generate the SSH key
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# ssh key generate	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Liquid Crystal Display Module (LCM)

### Enable/Disable LCM

#### Commands

**hardware-interface lcm** { enable | disable }

<b>Syntax Description</b>	<b>hardware-interface</b>	Hardware interface config change
	<b>lcm</b>	LCM
	enable	Enable LCM
	disable	Disable LCM
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# hardware-interface lcm enable moxa# configure terminal moxa(config)# hardware-interface lcm disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable energy-saving mode for LCM

### Commands

**lcm es** { enable | disable }

<b>Syntax</b>	<b>lcm</b>	LCM
<b>Description</b>	<b>es</b>	Energy saving mode
	Enable	Enable energy saving mode
	Disable	Disable energy saving mode
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	Starting the energy-saving mode initiates a 60-second timer, after which LCM will enter energy-saving mode if no buttons are pressed. LCM will be automatically turned off to conserve energy.	
<b>Examples</b>	moxa# configure terminal moxa(config)# lcm es enable moxa# configure terminal moxa(config)# lcm es disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Change LCM display mode

### Commands

**lcm mode** { menu | info }

<b>Syntax</b>	<b>lcm</b>	LCM
<b>Description</b>	<b>mode</b>	LCM display mode
	menu	Menu mode
	info	Information mode
<b>Defaults</b>	menu	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# lcm mode info moxa# configure terminal moxa(config)# lcm mode menu	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show LCM Status

### Commands

#### show lcm-settings

<b>Syntax</b>	<b>show</b>	Display configuration/status information
<b>Description</b>	<b>lcm-settings</b>	Display configurations of LCM
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show lcm-settings LCM ES Service: Enabled LCM display mode: Menu LCM info line 1: product model LCM info line 2: IPv4 address LCM info line 3: MAC address LCM info line 4: number of critical event	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Network Security

## IEEE 802.1X

### Configure Local Authentication Mode

#### Commands

**dot1x aaa auth** { radius | local }

<b>Syntax Description</b>	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	<b>aaa</b>	Configure authentication, authorization, and accounting
	<b>auth</b>	Configure authentication
	radius	Configure a RADIUS authentication server
	local	Configure a local authentication database
<b>Defaults</b>	The default authentication mode is set to local	
<b>Command Modes</b>	Global configuration mode	
<b>Usage Guidelines</b>	This command enables dot1x local authentication or RADIUS server-based remote authentication method for all ports. The actual authentication of the supplicant happens at the authentication server.	
<b>Examples</b>	moxa(config)# dot1x aaa auth radius	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Enable/Disable IEEE 802.1X Function

#### Commands

**dot1x** { enable | disable }

<b>Syntax Description</b>	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	enable	Enable dot1x authentication
	disable	Disable dot1x authentication
<b>Defaults</b>	Dot1x authentication is disabled by default	
<b>Command Modes</b>	Global configuration mode	
<b>Usage Guidelines</b>	This command enables dot1x on the switch. Dot1x is an authentication mechanism that acts as mediator between the authentication server and the supplicant (client). If the client accesses the protected resources, it contacts the authenticator with EAPOL frames.	
<b>Examples</b>	moxa (config)# dot1x enable	
<b>Error Messages</b>	{{!s}} and 802.1x/MAB cannot be enabled at the same port. Invalid: If 802.1x port is enabled, the port security port cannot be enabled. Invalid: If the port is in port-channel, it cannot enable dot1x.	
<b>Related Commands</b>	N/A	

### Configure IEEE 802.1X on the Port

#### Commands

**dot1x**

**no dot1x**

<b>Syntax Description</b>	<b>dot1x</b>	Enable dot1x on the port.
	<b>no dot1x</b>	Disable dot1x on the port.
<b>Defaults</b>	Dot1x is disabled by default	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	This command enables dot1x on the specified port.	
<b>Examples</b>	moxa (config-if)# dot1x moxa (config-if-range)# dot1x	
<b>Error Messages</b>	{{!s}} and 802.1x/MAB cannot be enabled at the same port. Invalid: If 802.1x port is enabled, the port security port cannot be enabled.	

	Invalid: If the port is in port-channel, it cannot enable dot1x.
<b>Related Commands</b>	N/A

## Authorize IEEE 802.1X

### Commands

**dot1x port-control** { auto | force-authorized | force-unauthorized }

**no dot1x port-control**

<b>Syntax Description</b>	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	<b>port-control</b>	Configure authenticator port control parameters
	auto	Enable 802.1X authentication on the interface
	force-authorized	Allow all traffic without any restrictions
	force-unauthorized	Block all traffic over the interface
	<b>no</b>	Set the authenticator port control state to force-authorized.
<b>Defaults</b>	The default port-control mode is set to force-authorized	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	This command configures the authenticator port control parameter. The dot1x standard exercises port-based authentication to increase the security of the network. The different modes employed on the ports offer varied access levels.	
<b>Examples</b>	moxa (config-if)# dot1x port-control auto moxa (config-if-range)# dot1x port-control auto	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Maximum Number of EAP

### Commands

**dot1x max-req** < count (1-10) >

**no dot1x max-req**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>dot1x max-req</b>	Configure the dot1X maximum request count
	count	The count value ranging from 1 to 10.
<b>Defaults</b>	The default request count is set to 2	
<b>Command Modes</b>	Interface Configuration Mode	
<b>Usage Guidelines</b>	This command sets the maximum number of EAP (Extensible Authentication Protocol) retries to the client by the authenticator before restarting the authentication process.	
<b>Examples</b>	moxa (config-if)# dot1x max-req 2 moxa (config-if-range)# dot1x max-req 2	
<b>Error Messages</b>	Invalid input detected at '^' marker	
<b>Related Commands</b>	N/A	

## Configure IEEE 802.1X Reauthentication

### Commands

**dot1x reauthentication**

**no dot1x reauthentication**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	<b>reauthentication</b>	Perform periodic reauthentication
<b>Defaults</b>	Dot1x reauthentication is disabled by default	
<b>Command Modes</b>	Interface Configuration Mode.	
<b>Usage Guidelines</b>	This command enables periodic re-authentication from authenticator to client. The periodic re-authentication is requested to ensure that the same supplicant is accessing the protected resources.	
<b>Examples</b>	moxa (config-if)# dot1x reauthentication	

	moxa (config-if-range)# dot1x reauthentication
<b>Error Messages</b>	Invalid: If port Control mode is not Auto, Reauthentication cannot be enabled.
<b>Related Commands</b>	dot1x timeout – Sets the dot1x timers dot1x port-control – Configures the authenticator port control parameter

## Reauthenticate IEEE 802.1X on the Port

### Commands

#### **dot1x re-authenticate**

<b>Syntax Description</b>	<b>dotx1</b>	Configure IEEE 802.1X port-based network access control
	<b>re-authenticate</b>	Perform re-authentication of the specified dot1x-enabled port
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	Re-authentication is requested by the authentication server to the supplicant to furnish the identity without waiting for the configured number of seconds. (re-authperiod).	
<b>Examples</b>	moxa (config-if) # dot1x re-authenticate moxa (config-if-range) # dot1x re-authenticate	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure IEEE 802.1X Settings

### Commands

**dot1x timeout** { quiet-period < value (0-65535) > | { reauth-period | server-timeout | supp-timeout | tx-period } < value (1-65535) > }

**no dot1x timeout** { quiet-period | reauth-period | server-timeout | supp-timeout | tx-period }

<b>Syntax Description</b>	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	<b>timeout</b>	Configure the dot1x timeout parameter
	quiet-period	The number of seconds that the switch remains in the quiet state following a failed authentication exchange with the client
	reauth-period	The number of seconds between re-authentication attempts
	server-timeout	The number of seconds that the switch waits for the retransmission of packets by the switch to the authentication server
	supp-timeout	The number of seconds that the switch waits for the retransmission of packets by the switch to the client
	tx-period	The number of seconds that the switch waits for a response to an EAP-request/identity frame from the client before retransmitting the request
	<b>no</b>	Set the dot1x timers to their default values
<b>Defaults</b>	quiet-period: 60 seconds reauth-period: 3600 seconds server-timeout: 30 seconds supp-timeout: 30 seconds tx-period: 30 seconds	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	This command sets the dot1x timers.	
<b>Examples</b>	moxa (config-if)# dot1x timeout quiet-period 30 moxa (config-if-range)# dot1x timeout quiet-period 30	
<b>Error Messages</b>	Invalid input detected at '^' marker	
<b>Related Commands</b>	dot1x max-req – Sets the maximum number of EAP retries to the client before restarting authentication process. dot1x reauthentication – Enables periodic re-authentication of the client.	

## Show IEEE 802.1X Information

### Commands

**show dot1x** [ { interface < interface-type > < interface-id > | local-database | all } ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	interface-type	The interface type
	interface-id	The slot number/port number
	local-database	Display the dot1x authentication server database with user names
	all	Display the dot1x status for all interfaces
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command displays dot1x information.	
<b>Examples</b>	<pre> moxa # show dot1x iss# show dot1x Sysauthcontrol           = Enabled Dot1x Authentication Method = Local moxa # show dot1x interface gigabitethernet 1/2 Dot1x Info for Eth1/2 ----- AuthPaeStatus           = ENABLED PortStatus              = UNAUTHORIZED MaxReq                  = 2 Port Control            = Auto QuietPeriod             = 60 Seconds Re-authentication       = Disabled ReAuthPeriod            = 3600 Seconds ServerTimeout           = 30 Seconds SuppTimeout             = 30 Seconds Tx Period               = 30 Seconds moxa # show dot1x local-database Pnac Authentication Users Database ----- User name      : user1 Ports         : Eth1/1, Eth1/2, Eth1/3, Eth1/4, Eth2/1, Eth2/2                Eth2/3, Eth2/4, Eth3/1, Eth3/2, Eth3/3, Eth3/4                Eth4/1, Eth4/2, Eth4/3, Eth4/4, Eth5/1, Eth5/2                Eth5/3, Eth5/4, Eth6/1, Eth6/2, Eth6/3, Eth6/4                Eth7/1, Eth7/2, Eth7/3, Eth7/4 ----- User name      : user2 Ports         : Eth1/1, Eth1/2, Eth1/3, Eth1/4, Eth2/1, Eth2/2                Eth2/3, Eth2/4, Eth3/1, Eth3/2, Eth3/3, Eth3/4                Eth4/1, Eth4/2, Eth4/3, Eth4/4, Eth5/1, Eth5/2                Eth5/3, Eth5/4, Eth6/1, Eth6/2, Eth6/3, Eth6/4                Eth7/1, Eth7/2, Eth7/3, Eth7/4 ----- </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	dot1x local-database - Configures dot1x local database with values dot1x system-auth-control - Enables dot1x in the switch dot1x max-req - Configures the maximum number of EAP retries to the client dot1x reauthentication - Configures the periodic reauthentication for the client dot1x timeout - Sets the dot1x timers	

## Configure IEEE 802.1X Server Host

### Commands

**dot1x auth radius-server host** { ipv4-address } [ auth-port < integer(1-65535) > ] [ timeout < 1-120 > ] [ retransmit < 1-254 > ] [ key < secret-key-string > ] [ primary ]

**no dot1x auth radius-server host** { < ipv4-address > } [ primary ]

<b>Syntax Description</b>	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	<b>auth radius-server host</b>	Configure the RADIUS server host
	ipv4-address	Configure the IPv4 address.
	auth-port	Configure a specific UDP destination port on this RADIUS server to be used exclusively for authentication requests.
	timeout	Configure the time period in seconds for which a client waits for a response from the server before re-transmitting the request.
	retransmit	Configure the maximum number of attempts to be tried by a client to get a response from the server for a request.
	key	Configure the per-server encryption key.
	primary	Set the RADIUS server as the primary server.
	<b>no</b>	Delete the RADIUS server configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration mode	
<b>Usage Guidelines</b>	This command configures the RADIUS client with the host, timeout, key, retransmit parameters.	
<b>Examples</b>	moxa (config)# dot1x auth radius-server host 6.7.8.9 auth-port 1812 timeout 3 retransmit 1 key 123456 primary	
<b>Error Messages</b>	Invalid: All of the retry times {{!s}} cannot exceeds Dot1x server timeout values {{!s}}. Note: All of the retry times = Timeout * (Retransmit + 1). Invalid: Primary IP Address should be the same as the Server IP Address. Invalid: Server IP Address cannot be a reserved IP Address.	
<b>Related Commands</b>	N/A	

## Configure IEEE 802.1X Username and Password

### Commands

**dot1x local-database** < username > password < password >

**no dot1x local-database** < username >

<b>Syntax Description</b>	<b>dot1x</b>	Configure IEEE 802.1X port-based network access control
	<b>local-database</b>	Configure the local database table
	username	Configure the username for the new entry
	password	Configure the password for the new entry
	<b>no</b>	Delete the entry from the dot1x authentication server database
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration mode	
<b>Usage Guidelines</b>	This command configures dot1x authentication server local database username and password entries.	
<b>Examples</b>	moxa (config)# dot1x local-database user password 123456	
<b>Error Messages</b>	Invalid: This 'Username' is already in the 'Local Database'.	
<b>Related Commands</b>	N/A	

## Show IEEE 802.1X Authentication RADIUS Server

### Commands

**show dot1x auth radius server**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>dot1x</b>	Display dot1x configuration information
	<b>auth</b>	Display authentication type information.
	<b>radius</b>	Display RADIUS server information.
	<b>server</b>	Display server information.
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command displays radius server information.	
<b>Examples</b>	<pre>moxa# show dot1x auth radius server Primary Server      : 6.7.8.9  Radius Server Host Information ----- Index              : 1 Server address     : 6.7.8.9 Shared secret      : Radius Server Status : Enabled Response Time      : 5 Maximum Retransmission : 1 Authentication Port : 1812 -----</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## MAC Authentication Bypass

### Enable/Disable MAC Authentication Bypass

#### Commands

**mab** {enable | disable}

<b>Syntax Description</b>	<b>mab</b>	Configure MAB parameters
	enable	Enable MAB on the switch
	disable	Disable MAB on the switch
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config)# mab enable moxa(config)# mab disable</pre>	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show mab	

## Configure MAB Authentication Settings

### Commands

**mab aaa auth** {radius | local}

<b>Syntax Description</b>	<b>mab</b>	Configure MAB parameters
	<b>aaa</b>	Configure AAA services related parameters
	<b>auth</b>	Authentication related configuration
	radius	Configure RADIUS as the authentication mode
	local	Configure local database as the authentication mode
<b>Defaults</b>	Local-database	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# mab aaa auth radius moxa(config)# mab aaa auth local	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show mab	

## Enable/Disable MAB on a Port

### Commands

**mab**

**no mab**

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>mab</b>	Enable/Disable MAB on an interface
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface Configuration	
<b>Usage Guidelines</b>	'no mab' will invalid HW operation but keep the configuration on a port.	
<b>Examples</b>	moxa(config-if)# mab moxa(config-if)# no mab	
<b>Error Messages</b>	moxa(config-if)# mab	
	Cannot enable MAB while < Link Aggregation, RSTP, MSTP, Dual-Homing, Turbo Ring v2, Turbo Chain, 802.1X, Port Security> be enabled.  moxa(config)# mac-address-table static unicast 00:00:00:00:00:03 vlan 1 set interface ethernet 1/1 moxa(config)# interface ethernet 1/1 moxa(config-if)# mab	
<b>Warning Messages</b>	Cannot enable MAB on an interface while it's configured as forwarding port in static unicast table.	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show mab	



## Configure MAB Local Database MAC Address

### Commands

**mab local-database mac-address** <ucast\_mac>

**no mab local-database** {mac-address <ucast\_mac> | all }

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>mab</b>	Configure MAB parameters
	<b>local-database</b>	Configure local database authentication
	mac-address	Unicast MAC address
	all	Delete for all entries
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa(config)# mab local-database mac-address 02:03:04:01:01:01 moxa(config)# no mab local-database mac-address 02:03:04:01:01:01 moxa(config)# no mab local-database all</pre>	
<b>Error Messages</b>	<pre>moxa(config)# mab local-database mac-address 00:00:00:00:00:01 The MAC address has exceeded the maximum limit.  moxa(config)# mab local-database mac-address 00:00:00:00:00:02  MAC address is already in the local database.  moxa(config)# mac-address-table static unicast 00:00:00:00:00:03 vlan 1 set interface ethernet 1/1 moxa(config)# mab local-database mac-address 00:00:00:00:00:03  Cannot add a MAC address into MAB local database while it's in static unicast table.  [Web Only] MAB only support unicast MAC address.</pre>	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	show mab auth local-database	

## Show MAB Information

### Commands

#### show mab

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information			
	<b>mab</b>	Display MAB information			
<b>Defaults</b>	N/A				
<b>Command Modes</b>	User EXEC Privileged EXEC				
<b>Usage Guidelines</b>	N/A				
<b>Examples</b>	moxa# show mab MAB Status: Enabled MAB Authentication Method: Local				
	<pre> Port      Enable  Quiet Period  Reauthentication  Reauth Period ----- Eth1/1    Disabled  60            Enabled           3600 Eth1/2    Disabled  60            Disabled          3600 Eth1/3    Disabled  60            Disabled          3600 Eth1/4    Disabled  60            Disabled          3600 Eth2/1    Disabled  60            Disabled          3600 Eth2/2    Disabled  60            Disabled          3600 Eth2/3    Disabled  60            Disabled          3600 Eth2/4    Disabled  60            Disabled          3600 Eth3/1    Disabled  60            Disabled          3600 Eth3/2    Disabled  60            Disabled          3600 Eth3/3    Disabled  60            Disabled          3600 Eth3/4    Disabled  60            Disabled          3600 Eth4/1    Disabled  60            Disabled          3600 Eth4/2    Disabled  60            Disabled          3600 Eth4/3    Disabled  60            Disabled          3600 Eth4/4    Disabled  60            Disabled          3600 </pre>				
<b>Error Messages</b>	moxa# N/A				
<b>Warning Messages</b>	N/A				
<b>Related Commands</b>	N/A				

## Show MAB Authentication Local Database MAC Address

### Commands

**show mab auth local-database**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>mab</b>	Display MAB configuration
	<b>auth</b>	Auth type information
	<b>local-database</b>	Display local-database information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show mab auth local-database MAB Authentication Users Database ----- MAC Address ----- 02:03:04:01:01:01 02:03:04:01:01:02  Total MAC entries      : 2 System Max. Addresses  : 1024</pre>	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## MACsec

### Globally enable/disable Multicast Local Route

#### Commands

**macsec { enable | disable }**

<b>Syntax Description</b>	<b>macsec enable</b>	Globally enable MACsec
	<b>macsec disable</b>	Globally disable MACsec
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# macsec enable	
<b>Error Messages</b>	Invalid: Dot1x must be enabled before activating the MACsec feature.	
<b>Related Commands</b>	N/A	

### Configures MKA participants to enable/disable

#### Commands

**macsec**

**no macsec**

<b>Syntax Description</b>	<b>macsec</b>	Configure mka participant to enable.
	<b>no macsec</b>	Configure mka participant to disable.
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	This command configures MKA participants.	
<b>Examples</b>	Product(config-if)# macsec	
<b>Error Messages</b>	Invalid: MACsec cannot be enabled on the member port of port-channel.	
<b>Related Commands</b>	N/A	

## Delete the connectivity association key name (CKN)

### Commands

**no mka participant ckn** <string (16)>

<b>Syntax Description</b>	<b>no mka participant ckn</b>	Delete the connectivity association key name (CKN).
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	This command deletes the connectivity association key name (CKN).	
<b>Examples</b>	Product(config-if)# no mka participant ckn	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Create the pre-shared key

### Commands

**mka participant ckn** <string (16)> **cak** <string (66)> key-server {enable | disable}

<b>Syntax Description</b>	<b>mka participant ckn</b> <string (1-16)> <b>cak</b> <string (1-16)> <b>key-server enable</b> <b>key-server disable</b>	Create the pre-shared key by configuring the connectivity association key name (CKN) and connectivity association key (CAK). Configure key-server enable. Configure key-server disable.
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	This command creates the pre-shared key by configuring the connectivity association key name (CKN) and connectivity association key (CAK).	
<b>Examples</b>	Product(config-if)# mka participant ckn moxackn cak moxacak key-server enable	
<b>Error Messages</b>	Invalid: Both the CKN and CAK values must be entered. Invalid: The CKN and CAK values cannot be empty on a MACsec-enabled port. Invalid: CKN entries cannot be the same.	
<b>Related Commands</b>	N/A	

## Display MACsec information

### Commands

**show macsec** [{interface <iftype> <ifnum> | mka {participant | peer ckn <string (16)>} interface <iftype> <ifnum>}]

<b>Syntax Description</b>	<b>show macsec</b>	To Display MACsec status and configuration in the system level.
	<b>interface</b>	To view Kay Mka port related information.
	<b>participant</b>	To view Kay Mka participant related information.
	<b>peer</b>	To display Mka peer List information.
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command displays macsec information.	
<b>Examples</b>	<pre> Product# show macsec MACsec                : Enabled Periodic Hello-Time   : 2  Product# show macsec interface ethernet 1/2  Mka Pae Kay Info for Eth1/2 -----  MACsec Port           = Enabled  Product# show macsec mka participant interface eth 4/8  Mka Participant Info Eth4/8 -----  Participant CKN       = moxackn KeyServer             = Disabled  Product# show macsec mka peer ckn moxackn interface ethernet 4/8  Mka Peer List Info Eth4/8 -----  MkaParticipant CKN   : moxackn MkaPeerList MI       : d7034342ddb9221c41f725da MkaPeerList MN       : 2099 MkaPeerList Type     : LivePeerList MkaPeerList SCI      : 00010203040a0021 </pre>	
<b>Error Messages</b>	<p>If CKN not exists and interface is valid:  Product# show macsec mka peer ckn moxackn interface ethernet 4/6  No corresponding CKN exists.</p> <p>If CKN exists, interface is valid, and no peer exists:  Product# show macsec mka peer ckn moxackn interface ethernet 4/6  No corresponding peer exists in the Peer List.</p>	
<b>Related Commands</b>	N/A	

# Port Security

## Configure Port Security Mode

### Commands

**port-security mode** { static-port-lock | mac-sticky }

<b>Syntax Description</b>	<b>port-security mode</b>	Configure port security parameters
		Configure the security mode (port security port/address table will be reset when the mode changes)
	static-port-lock	Use Static Port Lock mode
	mac-sticky	Use MAC Sticky mode
<b>Defaults</b>	The default port security mode is set to static-port-lock	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Changing modes resets all port configurations.	
<b>Examples</b>	moxa(config)# port-security mode mac-sticky moxa(config)# port-security mode static-port-lock	
<b>Error Messages</b>	"error:If 'portLimit' is changed, 'mode' must be Mac Sticky" "error:If 'portSecurityAction' is changed," + " 'mode' must be Mac sticky" 'Invalid: Address Table cannot have duplicated addresses (VLAN ID, MAC Address).' 'Invalid: The mac address has exceeded the setting port limit.' 'Sum of port limit value on all ports ' + 'MUST under ' + str(_MAX_SUN_OF_PORT_LIMIT) + ' in Mac-Sticky mode' 'Invalid: Port Security MAC only support unicast address.' 'Invalid: Port Security address table VLAN ID must exist in the VLAN configuration.' 'Invalid: Port Security address table port should be added in the VLAN member.' 'Invalid: Port Security address table conflicts with VLAN configuration.' 'Invalid: If this port enables Port Security, this port cannot be a member port of Static Unicast Port Table.' 'Invalid: If this port enables Port Security, this port cannot be a member port of port-channel.' 'Invalid: If Port Security is enabled on this port, it cannot be a destination port of port mirror.' 'Invalid: If Port Security action is changed, this port could not in violation state.' 'Invalid: Port Security and redundant protocol cannot be enabled on the same port.'	
<b>Related Commands</b>	N/A	

## Enable/Disable Port Security

### Commands

**port-security** { enable | disable }

<b>Syntax Description</b>	<b>port-security</b>	Configure port security parameters
	enable	Enable port security
	disable	Disable port security
<b>Defaults</b>	Port security is enabled by default	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# port-security enable moxa(config)# port-security disable	
<b>Error Messages</b>	"error:If 'portLimit' is changed, 'mode' must be Mac Sticky" "error:If 'portSecurityAction' is changed," + " 'mode' must be Mac sticky" 'Invalid: Address Table cannot have duplicated addresses (VLAN ID, MAC Address).' 'Invalid: The mac address has exceeded the setting port limit.' 'Sum of port limit value on all ports ' + 'MUST under ' + str(_MAX_SUM_OF_PORT_LIMIT) + ' in Mac-Sticky mode' 'Invalid: Port Security MAC only support unicast address.' 'Invalid: Port Security address table VLAN ID must exist in the VLAN configuration.' 'Invalid: Port Security address table port should be added in the VLAN member.' 'Invalid: Port Security address table conflicts with VLAN configuration.' 'Invalid: If this port enables Port Security, this port cannot be a member port of Static Unicast Port Table.' 'Invalid: If this port enables Port Security, this port cannot be a member port of port-channel.' 'Invalid: If Port Security is enabled on this port, it cannot be a destination port of port mirror.' 'Invalid: If Port Security action is changed, this port could not in violation state.' 'Invalid: Port Security and redundant protocol cannot be enabled on the same port.'	
<b>Related Commands</b>	N/A	

## Configure Port Security Setting

### Commands

**port-security** [ { limit <integer(1-1024)> | violation { packet-drop | port-shutdown } | mac-address <ucast\_mac> vlan <vlan\_vfi\_id> } ]

<b>Syntax Description</b>	<b>port-security</b>	Configure port security parameters
	limit	The maximum number of addresses on the port
	integer(1-1024)	The limit value (MAC address will be removed on the configured port when the limit value changes)
	violation	Configure the violation action on the port
	packet-drop	Drop the packet when a violation occurs
	port-shutdown	Shut down the port when a violation occurs
	mac-address	The new MAC address
	ucast_mac	The unicast MAC address
	vlan	The new VLAN ID
	vlan_vfi_id	The VLAN ID ranging from 1 to 4094
<b>Defaults</b>	no port-security: disable on ports limit: 1 violation: secure action is packet-drop	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	If the limit value changes on a port, all entries on the port are deleted.	
<b>Examples</b>	<pre>moxa(config-if)# port-security moxa(config-if)# port-security limit 10 moxa(config-if)# port-security violation port-shutdown moxa(config-if)# port-security mac-address 02:03:04:01:01:01 vlan 1</pre>	
<b>Error Messages</b>	<pre>"error:If 'portLimit' is changed, 'mode' must be Mac Sticky" "error:If 'portSecurityAction' is changed," + " 'mode' must be Mac sticky" 'Invalid: Address Table cannot have duplicated addresses (VLAN ID, MAC Address).' 'Invalid: The mac address has exceeded the setting port limit.' 'Sum of port limit value on all ports ' + 'MUST under ' + str(_MAX_SUN_OF_PORT_LIMIT) + ' in Mac-Sticky mode' 'Invalid: Port Security MAC only support unicast address.' 'Invalid: Port Security address table VLAN ID must exist in the VLAN configuration.' 'Invalid: Port Security address table port should be added in the VLAN member.' 'Invalid: Port Security address table conflicts with VLAN configuration.' 'Invalid: If this port enables Port Security, this port cannot be a member port of Static Unicast Port Table.' 'Invalid: If this port enables Port Security, this port cannot be a member port of port-channel.' 'Invalid: If Port Security is enabled on this port, it cannot be a destination port of port mirror.' 'Invalid: If Port Security action is changed, this port could not in violation state.' 'Invalid: Port Security and {} '.format(red_protocol_def[red_protocol]) + 'cannot be enabled on the same port.'</pre>	
<b>Related Commands</b>	N/A	

## Remove Port Security Setting

### Commands

**no port-security** [ { limit | mac-address { <mac\_addr> vlan <integer(1-4094)> | all } } ]

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>port-security</b>	Configure port security parameters
	limit	The maximum number of addresses on the port
	mac-address	The new MAC address
	mac_addr	The MAC address
	vlan	The new VLAN ID
	integer(1-4094)	The VLAN ID ranging from 1 to 4094
	all	All entries in the address table
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	If the limit value changes on a port, all entries on the port are deleted.	
<b>Examples</b>	moxa(config-if)# no port-security moxa(config-if)# no port-security limit moxa(config-if)# no port-security mac-address 02:03:04:01:01:01 vlan 1	
<b>Error Messages</b>	"error:If 'portLimit' is changed, 'mode' must be Mac Sticky" "error:If 'portSecurityAction' is changed," + " 'mode' must be Mac sticky" 'Invalid: Address Table cannot have duplicated addresses (VLAN ID, MAC Address).' 'Invalid: The mac address has exceeded the setting port limit.' 'Sum of port limit value on all ports ' + 'MUST under ' + str(_MAX_SUN_OF_PORT_LIMIT) + ' in Mac-Sticky mode' 'Invalid: Port Security MAC only support unicast address.' 'Invalid: Port Security address table VLAN ID must exist in the VLAN configuration.' 'Invalid: Port Security address table port should be added in the VLAN member.' 'Invalid: Port Security address table conflicts with VLAN configuration.' 'Invalid: If this port enables Port Security, this port cannot be a member port of Static Unicast Port Table.' 'Invalid: If this port enables Port Security, this port cannot be a member port of port-channel.' 'Invalid: If Port Security is enabled on this port, it cannot be a destination port of port mirror.' 'Invalid: If Port Security action is changed, this port could not in violation state.' 'Invalid: Port Security and redundant protocol cannot be enabled on the same port.'	
<b>Related Commands</b>	set port-security mode [static-port-lock   mac-sticky]	

## Show Port Security Setting

### Commands

**show port-security** [ address ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>port-security</b>	Display port security information
	address	Display port security address information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show port-security moxa# show port-security address	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Traffic Storm Control

## Enable/Disable Storm Control

### Commands

**storm-control** { bc | mc | dlf | bc\_mc | bc\_dlf | mc\_dlf | bc\_mc\_dlf } level <rate-value(1-1488100)>

**no storm-control** {bc | mc | dlf | bc\_mc | bc\_dlf | mc\_dlf | bc\_mc\_dlf}

<b>Syntax Description</b>	<b>no</b>	Remove configuration delete entry/reset to default value
	<b>storm-control</b>	Configure storm control parameters
	bc	Configure broadcast packet storm control parameters
	mc	Configure multicast packet storm control parameters
	dlf	Configure unicast packet storm control parameters
	bc_mc	Configure broadcast and multicast packet storm control parameters
	bc_dlf	Configure broadcast and unicast packet storm control parameters
	mc_dlf	Configure multicast and unicast packet storm control parameters
	bc_mc_dlf	Configure broadcast multicast and unicast packet storm control parameters
	level	Configure the control suppression level
rate-value (625-1488100)	The storm control rate value	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# storm-control bc level 635  moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# storm-control bc_mc level 1270  moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# storm-control bc_mc_dlf level 1905  moxa# configure moxa(config)# interface ethernet 1/1 moxa(config-if)# no storm-control bc</pre>	
<b>Error Messages</b>	<p>'Invalid: The value of traffic storm control should be less than ingress rate limit threshold.'</p> <p>'Invalid: Your configure value {}.format(cfg_val) + ' exists too large bias because of limitation of hardware.' + ' We suggest configure the value {} again.'.format(suggest_cfg_val)</p>	
<b>Related Commands</b>	<pre>moxa(config-if)# no storm-control {bc   mc   dlf   bc_mc   bc_dlf   mc_dlf   bc_mc_dlf} moxa# show [&lt;ifXtype&gt; &lt;ifnum&gt;] storm-control</pre>	

## Show Storm Control Status

### Commands

**show interface** [<ifXtype> <ifnum>] storm-control

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>interface</b>	Display interface information
	ifXtype	The interface type
	ifnum	The interface number
	storm-control	Display the broadcast, multicast, and unicast storm control suppression levels of the interface
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show interface ethernet 1/1 storm-control  Eth1/1 DLF Storm Control      : Disabled Broadcast Storm Control : Disabled Multicast Storm Control : Disabled  moxa# show interface ethernet 1/1 storm-control  Eth1/1 DLF Storm Control      : Disabled Broadcast Storm Control : Enabled Broadcast Storm Control Level : 635  Multicast Storm Control : Disabled</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>moxa (config-if)# storm-control {bc   mc   dlf   bc_mc   bc_dlf   mc_dlf   bc_mc_dlf} level &lt;rate-value(625-1488100)&gt; moxa (config-if)# no storm-control {bc   mc   dlf   bc_mc   bc_dlf   mc_dlf   bc_mc_dlf}</pre>	

## Access Control List

### Define IPv4 Access-list and Enter IPv4 Access-list Configuration Mode

#### Commands

**ip access-list** <short(1-16)>

<b>Syntax Description</b>	<b>ip</b>	Configure IP related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	An access list is created when the access list's name or rule is configured	
<b>Examples</b>	moxa# configure terminal moxa(config)# ip access-list 1 moxa(config-ip-acl)#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

### Configure IPv4 Access-list Name

#### Commands

**name** <string(32)>

<b>Syntax Description</b>	<b>name</b>	Configure IPv4 access-list name
	<string(32)>	IPv4 access-list name
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# name IP-ACL1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ip access-list <short(1-16)>	

## Configure Permitted IPv4 ACL Rules

### Commands

#### Permit

{**any** | **src** <ip-address> | <ip-address> <ip-mask>}

[{ **any** | **dst** <ip-address> | <ip-address> <ip-mask> }]

[**dscp** <short(0-63)>]

[**redirect interface** <interface-type> <interface-id>]

[**dscp-remark** <short(0-63)>]

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>dscp</b>	Configure the DSCP related ACL parameters
	short(0-63)	DSCP value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
<b>interface</b>	Configure the interface related ACL parameters	
(interface-type /interface-id)	Interface to redirect packets that hits ACL rules	
<b>dscp-remark</b>	Configure the dscp-remark related ACL parameters	
short(0-63)	DSCP value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support DSCP remarking in outbound traffic	
<b>Examples</b>	<pre>moxa(config-ip-acl)# permit src 192.168.127.253 dst 192.168.127.100 moxa(config-ip-acl)# deny 192.168.127.0 255.255.255.0 192.168.127.0 255.255.255.0  moxa(config-ip-acl)# permit any any dscp 32  moxa(config-ip-acl)# permit any any redirect interface ethernet 1/1  moxa(config-ip-acl)# permit any any dscp-remark 10</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Permitted TCP ACL Rules

### Commands

#### permit tcp

{**any** | **src** <ip-address> | <ip-address> <ip-mask>}

[{ **any** | **dst** <ip-address> | <ip-address> <ip-mask> }]

[**src-port** <short(0-65535)>]

[**dst-port** <short(0-65535)>] [**dscp** <short(0-63)>]

[**redirect interface** <interface-type> <interface-id> ]

[**dscp-remark** <short(0-63)>]

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>tcp</b>	Configure the tcp related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>src-port</b>	Configure the source-port related ACL parameters
	short(0-65535)	Source port value to filter
	<b>dst-port</b>	Configure the destination-port related ACL parameters
	short(0-65535)	Destination port value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
<b>redirect</b>	Configure the redirect related ACL parameters	
<b>interface</b>	Configure the interface related ACL parameters	
(interface-type /interface-id)	Interface to redirect packets that hits ACL rules	
<b>dscp-remark</b>	Configure the dscp-remark related ACL parameters	
short(0-63)	DSCP value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support DSCP remarking in outbound traffic	
<b>Examples</b>	moxa(config-ip-acl)# permit tcp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0 src-port 23 dst-port 22	
	moxa(config-ip-acl)# permit tcp any any dscp 32	
	moxa(config-ip-acl)# permit tcp any any redirect interface ethernet 1/1	
	moxa(config-ip-acl)# permit tcp any any dscp-remark 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Permitted UDP ACL Rules

### Commands

#### permit udp

{**any** | **src** <ip-address> | <ip-address> <ip-mask>}

[{ **any** | **dst** <ip-address> | <ip-address> <ip-mask> }]

[**src-port** <short(0-65535)>]

[**dst-port** <short(0-65535)>]

[**dscp** <short(0-63)>]

[**redirect interface** <interface-type> <interface-id> ]

[**dscp-remark** <short(0-63)>]

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>udp</b>	Configure the udp related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>src-port</b>	Configure the source-port related ACL parameters
	short(0-65535)	Source port value to filter
	<b>dst-port</b>	Configure the destination-port related ACL parameters
	short(0-65535)	Destination port value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
	<b>interface</b>	Configure the interface related ACL parameters
	(interface-type /interface-id)	Interface to redirect packets that hits ACL rules
	<b>dscp-remark</b>	Configure the dscp-remark related ACL parameters
	(0-63)	DSCP value to remark
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic	
	Only support DSCP remarking in outbound traffic	
<b>Examples</b>	moxa(config-ip-acl)# permit udp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0 src-port 23 dst-port 22	
	moxa(config-ip-acl)# permit udp any any dscp 32	
	moxa(config-ip-acl)# permit udp any any redirect interface ethernet 1/1	
	moxa(config-ip-acl)# permit udp any any dscp-remark 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)>	
	no ip access-list <short(1-16)>	
	show ip access-list <short(1-16)>	

## Configure Permitted ICMP ACL Rules

### Commands

#### permit icmp

{**any** | **src** <ip-address> | <ip-address> <ip-mask>}

[{ **any** | **dst** <ip-address> | <ip-address> <ip-mask> }]

[**type** <short(0-255)>]

[**code** <short(0-15)>]

[**dscp** <short(0-63)>]

[**redirect interface** <interface-type> <interface-id> ]

[**dscp-remark** <short(0-63)>]

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>icmp</b>	Configure the ICMP related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>src-port</b>	Configure the source-port related ACL parameters
	short(0-65535)	Source port value to filter
	<b>type</b>	Configure the ICMP type related ACL parameters
	short(0-255)	ICMP type value to filter
	<b>code</b>	Configure the ICMP code related ACL parameters
	short(0-15)	ICMP code value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
<b>interface</b>	Configure the interface related ACL parameters	
(interface-type /interface-id)	Interface to redirect packets that hits ACL rules	
<b>dscp-remark</b>	Configure the dscp-remark related ACL parameters	
short(0-63)	DSCP value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support DSCP remarking in outbound traffic	
<b>Examples</b>	<pre>moxa(config-ip-acl)# permit icmp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0 type 3 code 10  moxa(config-ip-acl)# permit icmp any any dscp 32  moxa(config-ip-acl)# permit icmp any any redirect interface ethernet 1/1  moxa(config-ip-acl)# permit icmp any any dscp-remark 10</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>no rule &lt;short(1-10)&gt; no ip access-list &lt;short(1-16)&gt; show ip access-list &lt;short(1-16)&gt;</pre>	

## Configure Permitted IGMP ACL Rules

### Commands

#### permit igmp

{**any** | **src** <ip-address> | <ip-address> <ip-mask> }

[{ **any** | **dst** <ip-address> | <ip-address> <ip-mask> }]

[**type** <short(0-255)>]

[**dscp** <short(0-63)>]

[**redirect interface** <interface-type> <interface-id> ]

[**dscp-remark** <short(0-63)>]

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>igmp</b>	Configure the IGMP related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>src-port</b>	Configure the source-port related ACL parameters
	short(0-65535)	Source port value to filter
	<b>type</b>	Configure the IGMP type related ACL parameters
	short(0-15)	IGMP type value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
<b>redirect</b>	Configure the redirect related ACL parameters	
<b>interface</b>	Configure the interface related ACL parameters	
(interface-type /interface-id)	Interface to redirect packets that hits ACL rules	
<b>dscp-remark</b>	Configure the dscp-remark related ACL parameters	
short(0-63)	DSCP value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support DSCP remarking in outbound traffic	
<b>Examples</b>	moxa(config-ip-acl)# permit icmp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0 type 5  moxa(config-ip-acl)# permit igmp any any dscp 32  moxa(config-ip-acl)# permit igmp any any redirect interface ethernet 1/1  moxa(config-ip-acl)# permit igmp any any dscp-remark 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Permitted OSPF ACL Rules

### Commands

#### permit ospf

{**any** | **src** <ip-address> | <ip-address> <ip-mask>}

[{ **any** | **dst** <ip-address> | <ip-address> <ip-mask> }]

[**dscp** <short(0-63)>]

[**redirect interface** <interface-type> <interface-id> ]

[**dscp-remark** <short(0-63)>]

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>ospf</b>	Configure the OSPF related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
	<b>interface</b>	Configure the interface related ACL parameters
(interface-type /interface-id)	Interface to redirect packets that hits ACL rules	
<b>dscp-remark</b>	Configure the dscp-remark related ACL parameters	
short(0-63)	DSCP value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support DSCP remarking in outbound traffic	
<b>Examples</b>	moxa(config-ip-acl)# permit ospf 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0  moxa(config-ip-acl)# permit ospf any any dscp 32  moxa(config-ip-acl)# permit ospf any any redirect interface ethernet 1/1  moxa(config-ip-acl)# permit ospf any any dscp-remark 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Permitted Protocol ACL Rules

### Commands

```

permit protocol <short(0-255)>
{any | src <ip-address> | <ip-address> <ip-mask>}
[{ any | dst <ip-address> | <ip-address> <ip-mask> }]
[dscp <short(0-63)>]
[redirect interface <interface-type> <interface-id> ]
[dscp-remark <short(0-63)>]
  
```

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>protocol</b>	Configure the protocol related ACL parameters
	short(0-255)	Protocol value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
	<b>interface</b>	Configure the interface related ACL parameters
(interface-type /interface-id)	Interface to redirect packets that hits ACL rules	
<b>dscp-remark</b>	Configure the dscp-remark related ACL parameters	
short(0-63)	DSCP value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support DSCP remarking in outbound traffic	
<b>Examples</b>	<pre> moxa(config-ip-acl)# permit protocol 136 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0  moxa(config-ip-acl)# permit protocol 136 any any dscp 32  moxa(config-ip-acl)# permit protocol 136 any any redirect interface ethernet 1/1  moxa(config-ip-acl)# permit protocol 136 any any dscp-remark 10           </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre> no rule &lt;short(1-10)&gt; no ip access-list &lt;short(1-16)&gt; show ip access-list &lt;short(1-16)&gt;           </pre>	

## Configure Unacceptable ACL Rules

### Commands

#### deny

{**any** | src <ip-address> | <ip-address> <ip-mask>}

[{ **any** | dst <ip-address> | <ip-address> <ip-mask> }]

[**dscp** <short(0-63)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# deny 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0	
	moxa(config-ip-acl)# deny any any dscp 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)>	
	no ip access-list <short(1-16)>	
	show ip access-list <short(1-16)>	

## Configure Unacceptable TCP ACL Rules

### Commands

#### deny tcp

{**any** | src <ip-address> | <ip-address> <ip-mask>}

[{ **any** | dst <ip-address> | <ip-address> <ip-mask> }]

[**src-port** <short(0-65535)>]

[**dst-port** <short(0-65535)>]

[**dscp** <short(0-63)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>tcp</b>	Configure the tcp related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>dst-port</b>	Configure the destination-port related ACL parameters
	short(0-65535)	Destination port value to filter
	<b>any</b>	Configure the filtering of a rule to any address
<b>dscp</b>	Configure the dscp related ACL parameters	
short(0-63)	DSCP value to filter	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# deny tcp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0	
	moxa(config-ip-acl)# deny tcp any any dscp 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)>	
	no ip access-list <short(1-16)>	
	show ip access-list <short(1-16)>	

## Configure Unacceptable UDP ACL Rules

### Commands

#### deny udp

{**any** | src <ip-address> | <ip-address> <ip-mask>}

[{ **any** | dst <ip-address> | <ip-address> <ip-mask> }]

[**src-port** <short(0-65535)>]

[**dst-port** <short(0-65535)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>udp</b>	Configure the udp related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>dst-port</b>	Configure the destination-port related ACL parameters
	short(0-65535)	Destination port value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# deny udp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0	
	moxa(config-ip-acl)# deny udp any any dscp 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)>	
	no ip access-list <short(1-16)>	
	show ip access-list <short(1-16)>	

## Configure Unacceptable ICMP ACL Rules

### Commands

#### deny icmp

{**any** | src <ip-address> | <ip-address> <ip-mask>}

[{ **any** | dst <ip-address> | <ip-address> <ip-mask> }]

[**type** <short(0-255)>]

[**code** <short(0-15)>]

[**dscp** <short(0-63)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>icmp</b>	Configure the icmp related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>type</b>	Configure the ICMP type related ACL parameters
	short(0-255)	ICMP type value to filter
	<b>code</b>	Configure the ICMP code related ACL parameters
	short(0-15)	ICMP code value to filter
	<b>any</b>	Configure the filtering of a rule to any address
<b>dscp</b>	Configure the dscp related ACL parameters	
short(0-63)	DSCP value to filter	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# deny icmp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0 type 3 code 10  moxa(config-ip-acl)# deny icmp any any dscp 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Unacceptable IGMP ACL Rules

### Commands

#### deny igmp

{**any** | src <ip-address> | <ip-address> <ip-mask>}

[{ **any** | dst <ip-address> | <ip-address> <ip-mask> }]

[**type** <short(0-255)>]

[**dscp** <short(0-63)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>igmp</b>	Configure the igmp related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>type</b>	Configure the IGMP type related ACL parameters
	short(0-255)	IGMP type value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dscp</b>	Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# deny igmp 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0 type 5	
	moxa(config-ip-acl)# deny igmp any any dscp 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)>	
	no ip access-list <short(1-16)>	
	show ip access-list <short(1-16)>	

## Configure Unacceptable OSPF ACL Rules

### Commands

#### deny ospf

{**any** | src <ip-address> | <ip-address> <ip-mask>}

[{ **any** | dst <ip-address> | <ip-address> <ip-mask> }]

[**dscp** <short(0-63)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>ospf</b>	Configure the ospf related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dscp</b>	Configure the dscp related ACL parameters
short(0-63)	DSCP value to filter	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# deny ospf 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0	
	moxa(config-ip-acl)# deny ospf any any dscp 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)>	
	no ip access-list <short(1-16)>	
	show ip access-list <short(1-16)>	

## Configure Unacceptable Protocol ACL Rules

### Commands

**deny protocol** <short(0-255)>

{**any** | src <ip-address> | <ip-address> <ip-mask>}

[{ **any** | dst <ip-address> | <ip-address> <ip-mask> }]

[**dscp** <short(0-63)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>protocol</b>	Configure the protocol related ACL parameters
	short(0-255)	Protocol value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(ip-address/ip-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
<b>dscp</b>		Configure the dscp related ACL parameters
	short(0-63)	DSCP value to filter
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# deny protocol 136 192.168.127.253 255.255.255.0 192.168.127.100 255.255.255.0	
	moxa(config-ip-acl)# deny protocol 136 any any dscp 32	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)>	
	no ip access-list <short(1-16)>	
	show ip access-list <short(1-16)>	

## Enable/Disable an IP ACL rule

### Commands

**rule** <short(1-10)> {**enable** | **disable**}

<b>Syntax Description</b>	<b>rule</b>	Configure the rule related ACL parameters
	short(1-10)	Rule index
	<b>enable</b>	Enable the rule
	<b>disable</b>	Disable the rule
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# rule 9 enable	
	moxa(config-ip-acl)# rule 9 disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ip access-list <short(1-16)>	

## Remove an IPv4 Access-list

### Commands

**no ip access-list** <short(1-16)>

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>ip</b>	Configure IP related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	IP Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# no ip accessl-list 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ip access-list <short(1-16)>	

## Configure a MAC Access-list and Enter MAC Access-list Configuration Mode

### Commands

**mac access-list** <short(1-16)>

<b>Syntax Description</b>	<b>mac</b>	Configure MAC related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure terminal moxa(config)# mac access-list 1 moxa(config-mac-acl)#	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no mac access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Permitted MAC ACL Rules

### Commands

#### permit

```
{any | src < mac-address> | < mac-address> < mac-mask>}
[ { any | dst < mac-address> | < mac-address> < mac-mask> } ]
[vlan <short(1-4094)>]
[cos <short(0-7)>]
[redirect interface <interface-type> <interface-id> ]
[cos-remark <short(0-7)>]
```

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
	short(1-4094)	VLAN index value to filter
	<b>cos</b>	Configure the cos related ACL parameters
	short(0-7)	Cos value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
	<b>interface</b>	Configure the interface related ACL parameters
	(interface-type /interface-id)	Interface to redirect packets that hits ACL rules
<b>cos-remark</b>	Configure the cos-remark related ACL parameters	
short(0-7)	Cos value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	<pre>moxa(config-mac-acl)# permit 00:90:e8:00:00:12 ff:ff:ff:ff:ff:00 00:90:e8:00:00:33 ff:ff:ff:ff:ff:00  moxa(config-mac-acl)# permit any any vlan 2 cos 1  moxa(config-mac-acl)# permit any any redirect interface ethernet 1/1  moxa(config-mac-acl)# permit any any cos-remark 7</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>no rule &lt;short(1-10)&gt; no ip access-list &lt;short(1-16)&gt; show ip access-list &lt;short(1-16)&gt;</pre>	

## Configure Permitted Goose ACL Rules

### Commands

#### permit goose

```
{any | src < mac-address> | < mac-address> < mac-mask>}
[ { any | dst < mac-address> | < mac-address> < mac-mask> } ]
[vlan <short(1-4094)>]
[cos <short(0-7)>]
[redirect interface <interface-type> <interface-id> ]
[cos-remark <short(0-7)>]
```

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>goose</b>	Configure the goose related parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
	short(1-4094)	VLAN index value to filter
	<b>cos</b>	Configure the cos related ACL parameters
	short(0-7)	Cos value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
	<b>interface</b>	Configure the interface related ACL parameters
	(interface-type /interface-id)	Interface to redirect packets that hits ACL rules
<b>cos-remark</b>	Configure the cos-remark related ACL parameters	
short(0-7)	Cos value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	<pre>moxa(config-mac-acl)# permit goose 00:90:e8:00:00:12 ff:ff:ff:ff:00 00:90:e8:00:00:33 ff:ff:ff:ff:00  moxa(config-mac-acl)# permit goose any any vlan 2 cos 1  moxa(config-mac-acl)# permit goose any any redirect interface ethernet 1/1  moxa(config-mac-acl)# permit goose any any cos-remark 7</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>no rule &lt;short(1-10)&gt; no ip access-list &lt;short(1-16)&gt; show ip access-list &lt;short(1-16)&gt;</pre>	

## Configure Permitted SMV ACL Rules

### Commands

#### permit smv

```
{any | src < mac-address> | < mac-address> < mac-mask>}
[ { any | dst < mac-address> | < mac-address> < mac-mask> } ]
[vlan <short(1-4094)>]
[cos <short(0-7)>]
[redirect interface <interface-type> <interface-id> ]
[cos-remark <short(0-7)>]
```

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>smv</b>	Configure the smv related parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
	short(1-4094)	VLAN index value to filter
	<b>cos</b>	Configure the cos related ACL parameters
	short(0-7)	Cos value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
	<b>interface</b>	Configure the interface related ACL parameters
(interface-type /interface-id)	Interface to redirect packets that hits ACL rules	
<b>cos-remark</b>	Configure the cos-remark related ACL parameters	
short(0-7)	Cos value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	<pre>moxa(config-mac-acl)# permit smv 00:90:e8:00:00:12 ff:ff:ff:ff:00:00:90:e8:00:00:33 ff:ff:ff:ff:00</pre> <pre>moxa(config-mac-acl)# permit smv any any vlan 2 cos 1</pre> <pre>moxa(config-mac-acl)# permit smv any any redirect interface ethernet 1/1</pre> <pre>moxa(config-mac-acl)# permit smv any any cos-remark 7</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>no rule &lt;short(1-10)&gt;</pre> <pre>no ip access-list &lt;short(1-16)&gt;</pre> <pre>show ip access-list &lt;short(1-16)&gt;</pre>	

## Configure Permitted Ethertype ACL Rules

### Commands

**permit ethertype** <short(0-65535)>

{**any** | src < mac-address> | < mac-address> < mac-mask>}

[{ **any** | dst < mac-address> | < mac-address> < mac-mask> }]

[**vlan** <short(1-4094)>]

[**cos** <short(0-7)>]

[**redirect interface** <interface-type> <interface-id> ]

[**cos-remark** <short(0-7)>]

<b>Syntax Description</b>	<b>permit</b>	Configure the permitted ACL rule
	<b>ethertype</b>	Configure the ethertype related parameters
	short(0-65535)	Ethertype value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	src	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
	short(1-4094)	VLAN index value to filter
	<b>cos</b>	Configure the cos related ACL parameters
	short(0-7)	Cos value to filter
	<b>redirect</b>	Configure the redirect related ACL parameters
	<b>interface</b>	Configure the interface related ACL parameters
	(interface-type /interface-id)	Interface to redirect packets that hits ACL rules
<b>cos-remark</b>	Configure the cos-remark related ACL parameters	
short(0-7)	Cos value to remark	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	<pre>moxa(config-mac-acl)# permit ethertype 10 00:90:e8:00:00:12 ff:ff:ff:ff:00 00:90:e8:00:00:33 ff:ff:ff:ff:00  moxa(config-mac-acl)# permit ethertype 10 any any vlan 2 cos 1  moxa(config-mac-acl)# permit ethertype 10 any any redirect interface ethernet 1/1  moxa(config-mac-acl)# permit ethertype 10 any any cos-remark 7</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>no rule &lt;short(1-10)&gt; no ip access-list &lt;short(1-16)&gt; show ip access-list &lt;short(1-16)&gt;</pre>	

## Configure Unacceptable MAC ACL Rules

### Commands

#### deny

{**any** | src < mac-address> | < mac-address> < mac-mask>}

[{ **any** | dst < mac-address> | < mac-address> < mac-mask> }]

[**vlan** <short(1-4094)>]

[**cos** <short(0-7)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
	short(1-4094)	VLAN index value to filter
<b>cos</b>	Configure the cos related ACL parameters	
short(0-7)	Cos value to filter	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	moxa(config-mac-acl)# deny 00:90:e8:00:00:12 ff:ff:ff:ff:00 00:90:e8:00:00:33 ff:ff:ff:ff:00  moxa(config-mac-acl)# deny any any vlan 2 cos 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Unacceptable Goose ACL Rules

### Commands

#### deny goose

{**any** | src < mac-address> | < mac-address> < mac-mask>}

[{ **any** | dst < mac-address> | < mac-address> < mac-mask> }]

[**vlan** <short(1-4094)>]

[**cos** <short(0-7)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>goose</b>	Configure the goose related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
	short(1-4094)	VLAN index value to filter
<b>cos</b>	Configure the cos related ACL parameters	
short(0-7)	Cos value to filter	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	moxa(config-mac-acl)# deny goose 00:90:e8:00:00:12 ff:ff:ff:ff:00 00:90:e8:00:00:33 ff:ff:ff:ff:00  moxa(config-mac-acl)# deny goose any any vlan 2 cos 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Unacceptable SMV ACL Rules

### Commands

#### deny smv

{**any** | src < mac-address> | < mac-address> < mac-mask>}

[{ **any** | dst < mac-address> | < mac-address> < mac-mask> }]

[**vlan** <short(1-4094)>]

[**cos** <short(0-7)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>smv</b>	Configure the smv related ACL parameters
	<b>any</b>	Configure the filtering of a rule to any address
	<b>src</b>	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
	short(1-4094)	VLAN index value to filter
<b>cos</b>	Configure the cos related ACL parameters	
short(0-7)	Cos value to filter	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	moxa(config-mac-acl)# deny smv 00:90:e8:00:00:12 ff:ff:ff:ff:00 00:90:e8:00:00:33 ff:ff:ff:ff:00  moxa(config-mac-acl)# deny smv any any vlan 2 cos 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Configure Unacceptable Ethertype ACL Rules

### Commands

**deny ethertype** <short(0-65535)>

{**any** | src < mac-address> | < mac-address> < mac-mask>}

[{ **any** | dst < mac-address> | < mac-address> < mac-mask> }]

[**vlan** <short(1-4094)>]

[**cos** <short(0-7)>]

<b>Syntax Description</b>	<b>deny</b>	Configure the unacceptable ACL rule
	<b>ethertype</b>	Configure the Ethertype related ACL parameters
	short(0-65535)	Ethertype value to filter
	<b>any</b>	Configure the filtering of a rule to any address
	src	Configure the source related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>any</b>	Configure the filtering of a rule to any address
	<b>dst</b>	Configure the destination related ACL parameters
	(mac-address/ mac-mask)	Configure the filtering of a rule to a specific address/mask
	<b>vlan</b>	Configure the vlan related ACL parameters
short(1-4094)	VLAN index value to filter	
<b>cos</b>	Configure the cos related ACL parameters	
short(0-7)	Cos value to filter	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	Only support redirect in inbound traffic Only support CoS remarking in outbound traffic	
<b>Examples</b>	moxa(config-mac-acl)# deny ethertype 00:90:e8:00:00:12 ff:ff:ff:ff:00 00:90:e8:00:00:33 ff:ff:ff:ff:00  moxa(config-mac-acl)# deny ethertype 10 any any vlan 2 cos 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	no rule <short(1-10)> no ip access-list <short(1-16)> show ip access-list <short(1-16)>	

## Enable/Disable a MAC ACL Rule

### Commands

**rule** <short(1-10)> {**enable** | **disable**}

<b>Syntax Description</b>	<b>rule</b>	Configure the rule related ACL parameters
	short(1-10)	Rule index
	<b>enable</b>	Enable the rule
	<b>disable</b>	Disable the rule
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-mac-acl)# rule 9 enable moxa(config-mac-acl)# rule 9 disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ip access-list <short(1-16)>	

## Remove MAC ACL Rules

### Commands

**no rule** <short(1-10)>

<b>Syntax Description</b>	<b>no</b>	Remove configure/delete entry/reset to default value
	<b>rule</b>	Configure the rule related ACL parameters
	short(1-10)	Rule index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	MAC Access-list Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-ip-acl)# no rule 9	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show ip access-list <short(1-16)>	

## Remove a MAC Access-list

### Commands

**no mac access-list** <short(1-16)>

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>mac</b>	Configure MAC related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no mac access-list 10	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac access-list <short(1-16)>	

## Apply an IPv4 Access-list to a Port Interface

### Commands

**ip access-list** <short(1-16)> { **in** | **out** }

<b>Syntax Description</b>	<b>ip</b>	Configure IP related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply IP access-list to inbound traffic
	<b>out</b>	Apply IP access-list to outbound traffic
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-if)# ip access-list 10 in	
	moxa(config-if)# ip access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	ip access-list <short(1-16)> no ip access-list <short(1-16)> { in   out }	

## Apply an IPv4 Access-list to a VLAN Interface

### Commands

**ip access-list** <short(1-16)> { **in** | **out** }

<b>Syntax Description</b>	<b>ip</b>	Configure IP related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply IP access-list to inbound traffic
	<b>out</b>	Apply IP access-list to outbound traffic
<b>Defaults</b>	N/A	
<b>Command Modes</b>	VLAN interface Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-vlan)# ip access-list 10 in	
	moxa(config-vlan)# ip access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	ip access-list <short(1-16)>	
	no ip access-list <short(1-16)> { in   out }	

## Remove an IPv4 Access-list to a Port Interface

### Commands

**no mac access-list** <short(1-16)> { **in** | **out** }

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>mac</b>	Configure MAC related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply IP access-list to inbound traffic
<b>out</b>	Apply IP access-list to outbound traffic	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Port Interface Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-if)# no ip access-list 10 in	
	moxa(config-if)# no ip access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	ip access-list <short(1-16)>	
	no ip access-list <short(1-16)> { in   out }	

## Remove an IPv4 Access-list to a VLAN Interface

### Commands

**no ip access-list** <short(1-16)> { **in** | **out** }

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>ip</b>	Configure IP related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply IP access-list to inbound traffic
<b>out</b>	Apply IP access-list to outbound traffic	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	VLAN Interface Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-vlan)# no ip access-list 10 in	
	moxa(config-vlan)# no ip access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	ip access-list <short(1-16)>	
	no ip access-list <short(1-16)> { in   out }	

## Apply a MAC Access-list to a Port Interface

### Commands

**mac access-list** <short(1-16)> { **in** | **out** }

<b>Syntax Description</b>	<b>mac</b>	Configure MAC related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply MAC access-list to inbound traffic
	<b>out</b>	Apply MAC access-list to outbound traffic
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Port Interface Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-if)# mac access-list 10 in	
	moxa(config-if)# mac access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac access-list <short(1-16)>	
	no mac access-list <short(1-16)> { in   out }	

## Apply a MAC Access-list to a VLAN Interface

### Commands

**mac access-list** <short(1-16)> { **in** | **out** }

<b>Syntax Description</b>	<b>mac</b>	Configure MAC related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply MAC access-list to inbound traffic
	<b>out</b>	Apply MAC access-list to outbound traffic
<b>Defaults</b>	N/A	
<b>Command Modes</b>	VLAN Interface Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-vlan)# mac access-list 10 in	
	moxa(config-vlan)# mac access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac access-list <short(1-16)>	
	no mac access-list <short(1-16)> { in   out }	

## Remove a MAC Access-list to a Port Interface

### Commands

**no mac access-list** <short(1-16)> { **in** | **out** }

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>mac</b>	Configure MAC related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply MAC access-list to inbound traffic
	<b>out</b>	Apply MAC access-list to outbound traffic
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Port Interface Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-if)# no mac access-list 10 in	
	moxa(config-if)# no mac access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac access-list <short(1-16)>	
	no mac access-list <short(1-16)> { in   out }	

## Remove a MAC Access-list to a VLAN Interface

### Commands

**no mac access-list** <short(1-16)> { in | out }

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>mac</b>	Configure MAC related parameters
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	Access control list index
	<b>in</b>	Apply MAC access-list to inbound traffic
	<b>out</b>	Apply MAC access-list to outbound traffic
<b>Defaults</b>	N/A	
<b>Command Modes</b>	VLAN Interface Configuration Mode	
<b>Usage Guidelines</b>	The maximum activated ACL groups are 16 (IP-based + MAC-based combined)	
<b>Examples</b>	moxa(config-vlan)# no mac access-list 10 in	
	moxa(config-vlan)# no mac access-list 10 out	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac access-list <short(1-16)> no mac access-list <short(1-16)> { in   out }	

## Show All Access-lists

### Commands

**show access-list**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>access-list</b>	Configure ACL related parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command shows both IP and MAC address lists	
<b>Examples</b>	moxa# show access-list	
	Mac Access List 1	
	Name : MyACL1	
	Out VLAN List : 1	
	-----	
	Rule Index : 1	
	Rule Status : enabled	
	Rule Type : permit	
	Ethertype : any	
	Source MAC Address : 00:00:01:00:02:03/FF:FF:FF:FF:FF:00	
Destination MAC Address : 00:00:01:00:02:04/FF:FF:FF:FF:FF:00		
Cos : 7		
Action : Remark cos to 3		
-----		
Mac Access List 10		
Name :		
In VLAN List :		
Out VLAN List : 3		
-----		
Rule Index : 1		
Rule Status : enabled		
Rule Type : permit		
Ethertype : any		
Source MAC Address : any		
Destination MAC Address : any		

	<pre> Cos                : any Action             : None ----- Ip Access List 1  Name              : IP-ACL-1 In Port List     : Eth1/1, Eth1/2, Eth1/3, Eth3/4, Eth4/1                   Eth6/2, Eth6/3, Eth7/2, Eth7/3 Out Port List    : Eth1/1, Eth1/2, Eth3/3, Eth3/4, Eth6/1                   Eth6/2, Eth7/1, Eth7/2, Eth7/4 ----- Rule Index        : 1 Rule Status      : enabled Rule Type        : permit Protocol         : any Source IP Address : any Destination IP Address : any Dscp            : any Action          : Redirect to Eth 6/2 ----- Source Port       : 333 Destination Port  : 22 Dscp            : any Action          : None </pre>
<b>Error Messages</b>	N/A
<b>Related Commands</b>	<pre> ip access-list &lt;short(1-16)&gt; mac access-list &lt;short(1-16)&gt; </pre>

## Show All IPv4 Access-lists

### Commands

#### show ip access-list

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ip</b>	Display IP related information
	<b>access-list</b>	Configure ACL related parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show ip access-lists  Ip Access List 1  Name          : IP-ACL-1 In Port List  : Eth1/1, Eth1/2, Eth1/3, Eth3/4, Eth4/1                Eth6/2, Eth6/3, Eth7/2, Eth7/3 Out Port List : Eth1/1, Eth1/2, Eth3/3, Eth3/4, Eth6/1                Eth6/2, Eth7/1, Eth7/2, Eth7/4  ----- Rule Index          : 1 Rule Status         : enabled Rule Type           : permit Protocol            : any Source IP Address   : any Destination IP Address : any Dscp                : any Action              : Redirect to Eth 6/2  ----- Destination IP Address : any ICMP Type           : 3 ICMP Code           : 15 Dscp                : any Action              : None  -----  Ip Access List 2  Name          : 123 In VLAN List  : 1, 300, 2536, 4094 Out VLAN List : 2, 40, 336, 594 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	ip access-list <short(1-16)>	

## Show Specific IPv4 Access-list

### Commands

**show ip access-list** <short(1-16)>

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ip</b>	Display IP related information
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	ACL index to display
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show ip access-list 3  Ip Access List 3  Name: ----- Rule Index           : 1 Rule Status          : enabled Rule Type            : permit Protocol             : UDP Source IP Address    : any Destination IP Address : any Source Port          : 333 Destination Port     : 22 Dscp                 : any Action               : Remark dscp to 12 ----- Rule Index           : 2 Rule Status          : enabled Rule Type            : permit Protocol             : any Source IP Address    : any Destination IP Address : any Dscp                 : any Action               : Redirect to Eth 2/2                     Remark dscp to 36 ----- Rule Index           : 3 Rule Status          : enabled Rule Type            : permit Protocol             : any Source IP Address    : any Destination IP Address : any Dscp                 : any Action               : Mirror to Session 5                     Remark dscp to 36 ----- Rule Index           : 4 Rule Status          : enabled Rule Type            : permit Protocol             : any Source IP Address    : any Destination IP Address : any Dscp                 : any Action               : Mirror to Session 5 ----- Rule Index           : 5 Rule Status          : enabled Rule Type            : permit Protocol             : any</pre>	

	Source IP Address : any
	Destination IP Address : any
	Dscp : any
	Action : Redirect to Eth 2/2
<b>Error Messages</b>	N/A
<b>Related Commands</b>	ip access-list <short(1-16)>

## Show All MAC Access-lists

### Commands

**show mac access-list**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>mac</b>	Display MAC related information
	<b>access-list</b>	Configure ACL related parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show mac access-list  Mac Access List 1  Name          : MyACL1 Out VLAN List : 1  ----- Rule Index      : 1 Rule Status     : enabled Rule Type       : permit EtherType       : any Source MAC Address : 00:00:01:00:02:03/FF:FF:FF:FF:FF:00 Destination MAC Address : 00:00:01:00:02:04/FF:FF:FF:FF:FF:00 Cos             : 7 Action          : Remark cos to 3  ----- Rule Index      : 2 Rule Status     : enabled Rule Type       : permit EtherType       : any Source MAC Address : 00:00:01:00:02:03/FF:FF:FF:FF:FF:00 Destination MAC Address : 00:00:01:00:02:04/FF:FF:FF:FF:00:00 Cos             : 7 Action          : Remark cos to 3  ----- Mac Access List 10  Name          : In VLAN List  : Out VLAN List : 3  ----- Rule Index      : 1 Rule Status     : enabled Rule Type       : permit EtherType       : any Source MAC Address : any Destination MAC Address : any Cos             : any Action          : None  ----- </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac access-list <short(1-16)>	

## Show Specific MAC Access-list

### Commands

**show mac access-list** <short(1-16)>

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>mac</b>	Display MAC related information
	<b>access-list</b>	Configure ACL related parameters
	short(1-16)	ACL index to display
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show mac access-lists 1  Mac Access List 1  Name          : MyACL1 Out VLAN List : 1  -----  Rule Index      : 1 Rule Status     : enabled Rule Type       : permit Ethertype       : any Source MAC Address : 00:00:01:00:02:03/FF:FF:FF:FF:FF:00 Destination MAC Address : 00:00:01:00:02:04/FF:FF:FF:FF:FF:00 Cos             : 7 Action          : Remark cos to 3  -----  Rule Index      : 2 Rule Status     : enabled Rule Type       : permit Ethertype       : any Source MAC Address : 00:00:01:00:02:03/FF:FF:FF:FF:FF:00 Destination MAC Address : 00:00:01:00:02:04/FF:FF:FF:FF:00:00 Cos             : 7 Action          : Remark cos to 3  -----</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	mac access-list <short(1-16)>	

## Show Port Access-list Configuration

### Commands

**show interface** <interface-type> <interface-id> **access-list**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>interface</b>	Display interface related information
	<interface-type/interface id>	Port index to display
	<b>access-list</b>	Configure ACL related parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show interface ethernet 1/1 access-list	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	ip access-list <short(1-16)> { in   out } mac access-list <short(1-16)> { in   out }	

## Show VLAN Access-list Configuration

### Commands

**show vlan id** <short(1-4094)> **access-list**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>vlan</b>	Display VLAN related information
	<b>id</b>	Display VLAN index related information
	short(1-4094)	VLAN index to display
	<b>access-list</b>	Configure ACL related parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show vlan id 1 access-list	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	ip access-list <short(1-16)> { in   out } mac access-list <short(1-16)> { in   out }	

## Network Loop Protection

### Enable/Disable Network Loop Protection

#### Commands

**loop-protect** { enable | disable }

<b>Syntax Description</b>	<b>loop-protect</b>	Configure Loop Protection parameters
	enable	Enable Loop Protection
	disable	Disable Loop Protection
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# loop-protect enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show loop-protect	

### Configure the Network Loop Protection Detection Interval

#### Commands

**loop protect detect-interval** <integer(1-30)>

<b>Syntax Description</b>	<b>loop-protect</b>	Configure Loop Protection parameters
	<b>detect-interval</b>	Configures loop detection frame interval
	<integer(1-30)>	Specify the interval (in seconds) at which the system will send loop detection frames
<b>Defaults</b>	10	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# loop-protect detect-interval 5	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show loop-protect	

## Show Network Loop Protection Information

### Commands

#### show loop-protect

<b>Syntax Description</b>	<b>Show</b>	Display configuration/status information
	<b>loop-protect</b>	Display Loop Protection information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show loop-protect   Loop Protection Status : Enabled   Detection interval:    : 1 sec  Ports   Loop Status  Port Status  Peer Port -----  - Eth1/1   Normal       -- Eth1/2   Normal       -- Eth1/3   Normal       -- Eth1/4   Normal       -- Eth1/5   Normal       -- Eth1/6   Normal       -- Eth1/7   Normal       -- Eth1/8   Normal       -- Eth1/9   Normal       -- Eth1/10  Normal       -- Eth1/11  Looping      Disabled    Eth1/12 Eth1/12  Looping      Disabled    Eth1/11</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Binding Database

## Configure Binding Database

### Commands

**ip dhcp snooping binding** <mac-address> **vlan** <vlan-id (1-4094)> <ip-address> **interface** { port-channel <port-channel-id > | <interface-type> <interface-id> }

**no ip dhcp snooping binding** <mac-address> **vlan** <vlan-id (1-4094)>

<b>Syntax Description</b>	<b>ip dhcp snooping binding</b> <b>no ip dhcp snooping binding</b>	Add a binding to DHCP snooping database Delete a binding from DHCP snooping database
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	This command adds/deletes a binding entry.	
<b>Examples</b>	Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.253 interface ethernet 1/1	
<b>Error Messages</b>	<p>If user sets two entry with same VLAN and MAC address: Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface ethernet 1/2 Invalid: There should not be two entries with the same VLAN ID and Mac Address.</p> <p>If user sets a port channel that does not exist : Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface port-channel 2 Invalid: The Port-Channel does not exist.</p> <p>If user sets a member port: Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface ethernet 1/3 Invalid: The port is a member of Port-Channel.</p> <p>If user sets a port that is enabled IP source guard or dynamic ARP inspection and this situation reach maximum number of shared resources: Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface ethernet 1/3 Invalid: Entry limit reached. To add more entries, delete unnecessary ACL entries, binding database entries used by Dynamic ARP Inspection or IP Source Guard, or GOOSE Check entries.</p> <p>If the user configures more than the maximum number of binding database entries: Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface ethernet 1/3 Invalid: Reached the maximum number of binding database entries (refer to the Product Diff. section).</p>	
<b>Related Commands</b>	N/A	

## Display Binding Database Status

### Commands

**show ip dhcp snooping** [{ interface | vlan <vlan-id> | binding}]

<b>Syntax Description</b>	<b>interface</b>	Display all interface status of DHCP snooping
	<b>vlan</b>	Display the configuration and statistics of DHCP snooping on specific VLAN
	<b>binding</b>	Display DHCP snooping binding database
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command displays DHCP snooping information.	
<b>Examples</b>	<pre> moxa# show ip dhcp snooping Layer 2 DHCP Snooping is globally disabled  moxa# show ip dhcp snooping Layer 2 DHCP Snooping is globally enabled MAC Address verification is enabled  moxa# show ip dhcp snooping interface Interface  DHCP Snooping Port Status -----  ----- Eth1/1    Untrusted Eth1/2    Untrusted Eth1/3    Untrusted Eth1/4    Untrusted  moxa# show ip dhcp snooping vlan 1 DHCP Snooping Vlan information ----- VLAN : 1 Snooping status : Enabled Number of Incoming Discovers : 0 Number of Incoming Requests : 0 Number of Incoming Releases : 0 Number of Incoming Declines : 0 Number of Incoming Informs : 0 Number of Transmitted Offers : 0 Number of Transmitted Acks : 0 Number of Transmitted Naks : 0 Total Number Of Discards : 0 Number of MAC Discards : 0 Number of Server Discards : 0  moxa# show ip dhcp snooping vlan 2 DHCP Snooping Vlan information ----- VLAN : 2 Snooping status : Disabled  moxa# show ip dhcp snopping binding DHCP Snooping Binding Information ----- VLAN  MacAddress      IpAddress   Interface  Type   Lease   Active ----- 1      00:10:12:13:13:15  12.0.0.1   Eth1/1    static infinite none 1      68:05:ca:2e:37:39  12.0.0.2   Eth2/4    dhcp    113    IPSPG 2      00:10:12:13:17:18  12.0.0.3   Eth1/4    static  infinite DAI, IPSPG </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# DHCP Snooping

## Enable/Disable DHCP Snooping

### Commands

**ip dhcp snooping** { enable | disable }

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>snooping</b>	Configure DHCP Snooping parameters
	enable	Globally enable DHCP snooping
	disable	Globally disable DHCP snooping
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# ip dhcp snooping enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable DHCP Snooping on a Specific VLAN

### Commands

**ip dhcp snooping vlan** <vlan-id>

**no ip dhcp snooping vlan** <vlan-id>

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>snooping</b>	Configure DHCP Snooping parameters
	<b>vlan</b>	Configure VLAN parameters
	<vlan-id>	Specify the VLAN ID
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Product(config)# ip dhcp snooping vlan 2	
<b>Error Messages</b>	If user enables DHCP Snooping on same VLAN: Product(config)# ip dhcp snooping vlan 2 Not valid: There should not be two entries with the same VLAN ID.	
<b>Related Commands</b>	N/A	

## Set the DHCP Snooping Port Status to Trusted/Untrusted

### Commands

**ip dhcp snooping** { trust | untrust }

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>snooping</b>	Configure DHCP Snooping parameters
	trust	Set the DHCP snooping port status to trusted
	untrust	Set the DHCP snooping port status to untrusted
<b>Defaults</b>	Untrusted	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	This command configures the DHCP snooping port status	
<b>Examples</b>	Product(config-if)# ip dhcp snooping trust	
<b>Error Messages</b>	If port is enabled IP source guard, and user change port status to trusted: Product(config-if)# ip dhcp snooping trust This port is enabled for IP Source Guard. IP Source Guard can only be enabled on an untrusted port.	
	If port is enabled Dynamic ARP Inspection, and user change port status to trusted: Product(config-if)# ip dhcp snooping trust This port is enabled for Dynamic ARP Inspection. Dynamic ARP Inspection can only be enabled on an untrusted port.	
	Change port status on member port: Product(config-if)# ip dhcp snooping trust This port is a member of Port-Channel. DHCP Snooping cannot be enabled on a member port.	
<b>Related Commands</b>	N/A	

## Add/Delete a DHCP Snooping Binding Entry

### Commands

**ip dhcp snooping binding** <src\_mac> **vlan** <vlan-id> <src\_ip> **interface** <interface-type> < slot number>/<port number>

**no ip dhcp snooping binding** <src\_mac> vlan <vlan-id>

<b>Syntax Description</b>	<b>ip</b>	Configure IP-related parameters
	<b>dhcp</b>	Configure DHCP-related parameters
	<b>snooping</b>	Configure DHCP Snooping parameters
	<b>binding</b>	Configure DHCP snooping binding entries
	<src mac>	Specify the source MAC address
	<b>vlan</b>	Configure VLAN parameters
	<vlan id>	Specify the VLAN ID
	<src ip>	Specify the source IP address
	<b>interface</b>	Configure interface parameters
	<interface-type>	Specify the interface type
	<slot number>	Specify the slot number
<port number>	Specify the port number	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	This command adds a DHCP snooping binding entry. Use the no version of this command to delete an entry.	
<b>Examples</b>	Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.253 interface ethernet 1/1	
<b>Error Messages</b>	If user sets two entry with same VLAN and MAC address: Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface ethernet 1/2 Not valid: There should not be two entries with the same VLAN ID and Mac Address.	
	If user sets a port channel that does not exist : Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface port-channel 2 Not valid: The Port-Channel does not exist.	
	If user sets a member port: Product(config)# ip dhcp snooping binding 01:23:45:56:78:86 vlan 1 192.168.127.252 interface ethernet 1/3 Not valid: The port is a member of Port-Channel.	
<b>Related Commands</b>	N/A	

## Show DHCP Snooping Information.

### Commands

**show ip dhcp snooping** [{ interface | vlan <vlan-id> | binding}]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ip</b>	Show IP-related configuration information
	<b>dhcp</b>	Show DHCP-related configuration information
	<b>snooping</b>	Show DHCP Snooping information
	<b>interface</b>	Display DHCP snooping interface information
	<b>vlan</b>	Display the configuration and statistics of DHCP snooping on a specific VLAN
	<b>&lt;vlan id&gt;</b>	Specify the VLAN ID
	<b>binding</b>	Display the DHCP snooping binding database
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command displays DHCP snooping information.	
<b>Examples</b>	<pre>moxa# show ip dhcp snooping Layer 2 DHCP Snooping is globally disabled</pre>	
	<pre>moxa# show ip dhcp snooping Layer 2 DHCP Snooping is globally enabled MAC Address verification is enabled</pre>	
	<pre>moxa# show ip dhcp snooping interface Interface  DHCP Snooping Port Status -----  ----- Eth1/1    Untrusted Eth1/2    Untrusted Eth1/3    Untrusted Eth1/4    Untrusted</pre>	
	<pre>moxa# show ip dhcp snooping vlan 1 DHCP Snooping Vlan information ----- VLAN : 1 Snooping status : Enabled Number of Incoming Discovers : 0 Number of Incoming Requests : 0 Number of Incoming Releases : 0 Number of Incoming Declines : 0 Number of Incoming Informs : 0 Number of Transmitted Offers : 0 Number of Transmitted Acks : 0 Number of Transmitted Naks : 0 Total Number Of Discards : 0 Number of MAC Discards : 0 Number of Server Discards : 0</pre>	
	<pre>moxa# show ip dhcp snooping vlan 2 DHCP Snooping Vlan information ----- VLAN : 2 Snooping status : Disabled</pre>	
	<pre>moxa# show ip dhcp snopping binding DHCP Snooping Binding Information ----- VLAN  MacAddress      IpAddress Interface Type  Lease -----  ----- 1      00:10:12:13:13:15  12.0.0.1  Eth1/1  static infinite 1      68:05:ca:2e:37:39  12.0.0.2  Eth2/4  dhcp    113</pre>	

<b>Error Messages</b>	N/A
<b>Related Commands</b>	N/A

## IP Source Guard

### Enable/Disable IP Source Guard

#### Commands

**ip source guard**

**no ip source guard**

<b>Syntax Description</b>	<b>ip source guard</b>	Enable IP source guard.
	<b>no ip source guard</b>	Disable IP source guard.
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Enable on untrusted interface: Product(config-if)# ip source guard	
<b>Error Messages</b>	Enable on DHCP Snooping trusted interface: Product(config-if)# ip source guard IP Source Guard must be enabled on a DHCP Snooping untrusted interface.	
	Enable on member port: Product(config-if)# ip source guard This port is a member of Port-Channel. IP Source Guard cannot be enabled on a member port.	

### Show IP Source Guard Interface Status

#### Commands

**show ip source guard**

<b>Syntax Description</b>	<b>show ip source guard</b>	Display the IP source guard interface status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command displays IP source guard information.	
<b>Examples</b>	moxa# show ip source guard	
	<pre> Interface      IP Source Guard Status ----- Eth1/1         Disabled Eth1/2         Disabled Eth1/3         Disabled Eth1/4         Disabled Eth2/1         Disabled </pre>	
<b>Error Messages</b>	N/A	

## Dynamic ARP Inspection

### Enable/Disable Dynamic ARP Inspection

#### Commands

**ip arp inspection**

**no ip arp inspection**

<b>Syntax Description</b>	<b>ip arp inspection</b> <b>no ip arp inspection</b>	Enable dynamic ARP inspection Disable dynamic ARP inspection
<b>Defaults</b>	disable	
<b>Command Modes</b>	interface configuration mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Enable on DHCP Snooping untrusted interface: Product(config-if)# ip arp inspection	
<b>Error Messages</b>	Enable on DHCP Snooping trusted interface: Product(config-if)# ip arp inspection Dynamic ARP Inspection must be enabled on a DHCP Snooping untrusted interface.  Enable on member port: Product(config-if)# ip arp inspection This port is a member of Port-Channel. Dynamic ARP Inspection cannot be enabled on a member port.	
<b>Related Commands</b>	N/A	

### Show Dynamic ARP Inspection

#### Commands

**show ip arp inspection**

<b>Syntax Description</b>	<b>show ip arp inspection</b>	Display dynamic ARP inspection interface status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command displays Dynamic ARP Inspection information.	
<b>Examples</b>	Product# show ip arp inspection interfaces Interface      Dynamic ARP Inspection Status ----- Eth1/1          Disabled Eth1/2          Enabled Eth1/3          Disabled Eth1/4          Disabled Eth2/1          Disabled	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Authentication

## Login Authentication

### Configure Login Authentication Settings

#### Commands

**login authentication** [{ radius | tacacs }] [local]

<b>Syntax Description</b>	<b>login</b>	Configure login parameters
	<b>authentication</b>	Configure authentication parameters
	radius	Configure RADIUS authentication servers
	tacacs	Configure a TACACS authentication system
	local	Configure a local authentication database
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# login authentication radius (config)# login authentication tacacs (config)# login authentication local (config)# login authentication radius local (config)# login authentication tacacs local	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## RADIUS

### Configure RADIUS Server Host Settings

#### Commands

**radius-server host** { <ucast\_addr> } [auth-port { <integer(1-65535)>}] [timeout { <short(5-180)>}] [retransmit { <short(0-5)>}] key { <string(60)>} authtype { pap | chap | mschap } { primary | secondary }

**no radius-server** { primary | secondary }

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>radius-server</b>	Configure RADIUS server parameters
	<b>host</b>	Configure the RADIUS host
	auth-port	Configures the UDP destination port for authentication requests
	timeout	Configure time period (in seconds) until which a client waits for a response from the server before re-transmitting the request
	retransmit	Configure the maximum number of attempts the client undertakes to contact the server
	key	Configure the RADIUS server encryption key
	authtype	Configure the authentication type of the RADIUS server
	primary	Set as the primary server
	secondary	Set as the secondary server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# radius-server host 1.1.1.1 auth-port 2222 timeout 5 retransmit 5 key test authtype pap primary (config)# no radius-server primary	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show RADIUS Server Information

### Commands

**show radius-server**

<b>Syntax Description</b>	<b>show</b>	Display running information
	<b>radius-server</b>	Display the RADIUS server parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show radius-server	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## TACACS+

### Configure TACACS+ Server Host Settings

#### Commands

**tacacs-server host** { <ucast\_addr> } [auth-port {<integer(1-65535)>}] [timeout {<short(5-180)>} ] [retransmit {<short(0-5)>}] key {<string(60)>} authtype { pap | chap | mschap } { primary | secondary }

**no tacacs-server** { primary | secondary }

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>tacacs-server</b>	Configure TACACS server parameters
	host	Configure TACACS host parameters
	auth-port	Configure authentication port parameters
	timeout	Configure timeout parameters
	retransmit	Configure the maximum number of attempts the client undertakes to contact the server
	key	Configure the per-server encryption key
	authtype	Configure the authentication type of the TACACS server
	primary	Set as the primary server
	secondary	Set as the secondary server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# tacacs-server host 1.1.1.1 auth-port 2222 timeout 5 retransmit 5 key test authtype pap primary (config)# no tacacs-server primary	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show TACACS+ Server Information

### Commands

**show tacacs server**

<b>Syntax Description</b>	<b>show</b>	Displays running information
	<b>tacacs-server</b>	Displays the TACACS server parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show tacacs-server	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Customer Key Management

## Show Customer Key Information

### Commands

#### show customer-key info

<b>Syntax Description</b>	<b>show</b>	Display the related information
	<b>customer-key</b>	Display customer key information
	<b>info</b>	Information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show customer-key info  Customer key info ----- Private/Certificate Enable:  Yes Label:   111 Algorithm: RSA Length:  2048  Moxa# show customer-key info  Customer key info -----	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	copy customer-key {<tftp_url>   <sftp_url>} private {<tftp_url>   <sftp_url>} certificate label name clear customer-key signed-config {enable   disable}	

## Clear Customer Key

### Commands

#### clear customer-key

<b>Syntax Description</b>	<b>clear</b>	Clear the key pair
	<b>customer-key</b>	Key pair generated and imported from customer
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# clear customer-key	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show customer-key info copy customer-key {<tftp_url>   <sftp_url>} private {<tftp_url>   <sftp_url>} certificate label name	

## Enable/Disable Digital Signature

### Commands

**signed-config** {enable | disable}

<b>Syntax Description</b>	<b>signed-config</b>	Digital signature when administrator back up or restore the configuration
	enable	Enable signed-configuration
	disable	Disable signed-configuration
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# signed-config enable moxa(config)# signed-config disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Diagnostics

## System Status

### Utilization

#### Show Device Current Information

##### Commands

**show env {all | power | RAM [statistics] | CPU [statistics]}**

<b>Syntax Description</b>	show	Displays the statistics information
	env	Displays switch related information
	all	Current information of all resources such as CPU, RAM and power
	Power	Current information of the power
	RAM	Current information of the RAM
	CPU	Current information of the CPU
	statistics	Statistics related information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	Moxa# show env all CPU Usage in current :1% CPU Usage in past 10 seconds :2% CPU Usage in past 30 seconds :3% CPU Usage in past 300 seconds :3% RAM Usage :54% RAM size :1056632832 bytes Current power consumption : 11 watt	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Power

### Show Power Status and PoE Power Status

#### Commands

#### show power

<b>Syntax</b>	<b>show</b>	Displays the statistics information
<b>Description</b>	<b>power</b>	Display power information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show power #max num of power module &gt; 1 #with EPS power System Power Information:  Index  Module present  Oper-status ----- 1      Yes             on 2      No                N/A  PoE Power Information:  Index  Oper-Status ----- 1      Off 2      N/A  #max num of power module &lt;= 1 #with EPS power System Power Information:  Index  Oper-status ----- 1      on 2      off  PoE Power Information:  Index  Oper-Status ----- 1      Off  #max num of power module &lt;= 1 #without EPS power System Power Information:  Index  Oper-status ----- 1      on 2      off </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Fiber Check

## Show Fiber Check Status

### Commands

**show fiber-check** [interface <iftype> <ifnum>]

<b>Syntax Description</b>	<b>show</b>	Display configuration status information
	<b>fiber-check</b>	Display fiber check information
	<b>interface</b>	Display interface information
	iftype	The interface type
	ifnum	The interface number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show fiber-check interface ethernet 3/1 Port Eth3/1   Model Name           : SFP-1GSXLC-T   Serial Number (S/N)  : F821150100   Wavelength (nm)     : 850   Temperature (Fahrenheit) : 106.81   Temperature (Celsius) : 41.56   Voltage (V)          : 3.36   Tx Power (dbm)       : -6.54   Rx Power (dbm)       : N/A   Mode                 : Auto   Temperature Warn (Fahrenheit) : [230.00]   Temperature Warn (Celsius)   : [110.00]   Tx Power Warn (dbm)         : [-12.50, -1.00]   Rx Power Warn (dbm)         : [-21.00, 3.00]  moxa# show fiber-check Port Eth3/1   Model Name           : SFP-1GSXLC-T   Serial Number (S/N)  : F821150100   Wavelength (nm)     : 850   Temperature (Fahrenheit) : 64.18   Temperature (Celsius) : 17.88   Voltage (V)          : 3.36   Tx Power (dbm)       : -6.49   Rx Power (dbm)       : N/A   Mode                 : Auto   Temperature Warn (Fahrenheit) : [230.00]   Temperature Warn (Celsius)   : [110.00]   Tx Power Warn (dbm)         : [-12.50, -1.00]   Rx Power Warn (dbm)         : [-21.00, 3.00]  Port Eth3/2   Model Name           : SFP-1GSXLC-T   Serial Number (S/N)  : G415070280   Wavelength (nm)     : 850   Temperature (Fahrenheit) : 66.14   Temperature (Celsius) : 18.97   Voltage (V)          : 3.36   Tx Power (dbm)       : -6.29   Rx Power (dbm)       : N/A   Mode                 : Auto   Temperature Warn (Fahrenheit) : [230.00]   Temperature Warn (Celsius)   : [110.00]   Tx Power Warn (dbm)         : [-12.50, -1.00] </pre>	

	Rx Power Warn (dbm) : [-21.00, 3.00]
<b>Error Messages</b>	N/A
<b>Related Commands</b>	fiber-check celsius-temperature-warning {<degrees-celsius(-128-128)>} fiber-check fahrenheit-temperature-warning <degrees-fahrenheit(-198.4-262.4)> fiber-check mode {auto   user-defined} fiber-check rx-power-warning-high <dbm(-40-8.2)> fiber-check rx-power-warning-low <dbm(-40-8.2)> fiber-check tx-power-warning-high <dbm(-40-8.2)> fiber-check tx-power-warning-low <dbm(-40-8.2)>

## Disable Fiber Check Warning Settings

### Commands

#### no fiber-check

<b>Syntax Description</b>	<b>no</b>	Remove configuration/reset to default values
	<b>fiber-check</b>	Reset fiber check parameters
<b>Defaults</b>	Mode : Auto	
	Temperature Warn (Fahrenheit) : [N/A]	
	Temperature Warn (Celsius) : [N/A]	
	Tx Power Warn (dbm) : [N/A, N/A]	
	Rx Power Warn (dbm) : [N/A, N/A]	
<b>Command Modes</b>	Privileged EXEC	Global Configuration
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no fiber-check	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Clear Fiber Check Warning Settings by Port

### Commands

#### no fiber-check

<b>Syntax Description</b>	<b>no</b>	Remove configuration/reset to default values
	<b>fiber-check</b>	Reset fiber check parameters
<b>Defaults</b>	Mode : Auto	
	Temperature Warn (Fahrenheit) : [N/A]	
	Temperature Warn (Celsius) : [N/A]	
	Tx Power Warn (dbm) : [N/A, N/A]	
	Rx Power Warn (dbm) : [N/A, N/A]	
<b>Command Modes</b>	Privileged EXEC	Interface Configuration
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config-if)# no fiber-check	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure Fiber Check Warning Mode

### Commands

**fiber-check mode** {auto | user-defined}

<b>Syntax Description</b>	<b>fiber-check</b>	Configure fiber check parameters
	<b>mode</b>	Configure the fiber check warning mode
	auto	Use the preset warning thresholds
	user-defined	Use user-specified warning thresholds
<b>Defaults</b>	The default mode is auto.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	In auto mode, the default pre-defined warning threshold values are used. In user-defined mode, the user-specified warning threshold values will be used.	
<b>Examples</b>	moxa(config-if)# fiber-check mode auto	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show fiber-check [interface <iftype> <ifnum>]	

## Configure Port Fiber Check Temperature (Fahrenheit) Warning Value

### Commands

**fiber-check fahrenheit-temperature-warning** <degrees-fahrenheit(-198.4-262.4)>

<b>Syntax Description</b>	<b>fiber-check</b>	Configure fiber check parameters
	<b>fahrenheit-temperature-warning</b>	Configure the temperature threshold in Fahrenheit
	<degrees-fahrenheit(-198.4-262.4)>	The Fahrenheit temperature warning threshold
<b>Defaults</b>	The default threshold is 262.4 degrees-fahrenheit.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	The user-defined temperature threshold will only be used if the fiber check warning mode is set to user-defined.	
<b>Examples</b>	moxa(config-if)# fiber-check fahrenheit-temperature-warning 262.4	
<b>Error Messages</b>	Invalid: The input data is not within the range.	
<b>Related Commands</b>	show fiber-check [interface <iftype> <ifnum>]	

## Configure Port Fiber Check Temperature (Celsius) Warning Value

### Commands

**fiber-check celsius-temperature-warning** <degrees- celsius (-128-128)>

<b>Syntax Description</b>	<b>fiber-check</b>	Configure fiber check parameters
	<b>celsius-temperature-warning</b>	Configure the temperature threshold in Celsius
	<degrees-celsius (-128-128)>	The Celsius temperature warning threshold
<b>Defaults</b>	The default threshold is 128 degrees-celsius.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	The user-defined temperature threshold will only be used if the fiber check warning mode is set to user-defined.	
<b>Examples</b>	moxa(config-if)# fiber-check celsius-temperature-warning 128	
<b>Error Messages</b>	Invalid: The input data is not within the range	
<b>Related Commands</b>	show fiber-check [interface <iftype> <ifnum>]	

## Configure Port Fiber Check Maximum Rx Power Threshold Warning Value

### Commands

**fiber-check rx-power-warning-high** <dbm(-40-8.2)>

<b>Syntax Description</b>	<b>fiber-check</b>	Configure fiber check parameters
	<b>rx-power-warning-high</b>	Configure the warning threshold for the maximum Rx power
	<dbm(-40-8.2)>	The maximum Rx power threshold value
<b>Defaults</b>	The default maximum Rx power warning threshold is 8.2 dBm.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	The threshold that is set by a user will only be referred to if user-defined mode is selected.	
<b>Examples</b>	moxa(config-if)# fiber-check rx-power-warning-high 8.2	
<b>Error Messages</b>	Invalid: rx-power-warning-low > rx-power-warning-high Invalid: The input data is not within the range (-40 ~ 8.2)	
<b>Related Commands</b>	show fiber-check [interface <iftyp> <ifnum>]	

## Configure Port Fiber Check Minimum Rx Power Threshold Warning Value

### Commands

**fiber-check rx-power-warning-low** <dbm(-40-8.2)>

<b>Syntax Description</b>	<b>fiber-check</b>	Configure fiber check parameters
	<b>rx-power-warning-low</b>	Configure the warning threshold for the minimum Rx power
	<dbm(-40-8.2)>	The minimum Rx power threshold value
<b>Defaults</b>	The default minimum Rx power warning threshold is -40 dBm.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	The threshold that is set by a user will only be referred to if user-defined mode is selected.	
<b>Examples</b>	moxa(config-if)# fiber-check rx-power-warning-low -40	
<b>Error Messages</b>	Invalid: rx-power-warning-low > rx-power-warning-high Invalid: The input data is not within the range (-40 ~ 8.2)	
<b>Related Commands</b>	show fiber-check [interface <iftyp> <ifnum>]	

## Configure Port Fiber Check Tx Power Highest Threshold Warning Value

### Commands

**fiber-check tx-power-warning-high** <dbm(-40-8.2)>

<b>Syntax Description</b>	<b>fiber-check</b>	Configure fiber check parameters
	<b>tx-power-warning-high</b>	Configure the warning threshold for the maximum Tx power
	<dbm(-40-8.2)>	The maximum Tx power threshold value
<b>Defaults</b>	The default maximum Tx power warning threshold is 8.2 dBm.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	The threshold that is set by a user will only be referred to if user-defined mode is selected.	
<b>Examples</b>	moxa(config-if)# fiber-check tx-power-warning-high 8.2	
<b>Error Messages</b>	Invalid: tx-power-warning-low > tx-power-warning-high Invalid: The input data is not within the range (-40 ~ 8.2)	
<b>Related Commands</b>	show fiber-check [interface <iftyp> <ifnum>]	

## Configure Port Fiber Check Tx Power Lowest Threshold Warning Value

### Commands

**fiber-check tx-power-warning-low** <dbm(-40-8.2)>

<b>Syntax Description</b>	<b>fiber-check</b>	Configure fiber check parameters
	<b>tx-power-warning-low</b>	Configure the warning threshold for the minimum Tx power
	<dbm(-40-8.2)>	The minimum Tx power threshold value
<b>Defaults</b>	The default minimum Tx power warning threshold is -40 dBm.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	The threshold that is set by a user will only be referred to if user-defined mode is selected.	
<b>Examples</b>	moxa(config-if)# fiber-check tx-power-warning-low -40	
<b>Error Messages</b>	Invalid: tx-power-warning-low > tx-power-warning-high Invalid: The input data is not within the range (-40 to 8.2)	
<b>Related Commands</b>	show fiber-check [interface <iftype> <ifnum>]	

## Module Information

### Show Module information

#### Commands

**show product information**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information		
	<b>product</b>	Display product information		
	<b>information</b>	Display product information		
<b>Defaults</b>	N/A			
<b>Command Modes</b>	User EXEC Privileged EXEC			
<b>Usage Guidelines</b>	N/A			
<b>Examples</b>	<pre> moxa# show product information Product Information   Model       : MDS-G4028   Serial Number : 123456789ABC   MAC         : 00:01:03:05:07:09   Firmware Version : v0.3 Build 2019_0502_2111   Hardware Version : V0.0.0 Module Information   Type      Module Name  Serial Number  Hardware Version Module [1]  MDS-G4028    123456789ABC  V0.0.0 Module [2]  --           --            -- Module [3]  --           --            -- Module [4]  --           --            -- Module [5]  --           --            -- Module [6]  --           --            -- Module [7]  --           --            -- Power Unit [1] --         --            -- Power Unit [2] --         --            -- </pre>			
<b>Error Messages</b>	N/A			
<b>Related Commands</b>	N/A			

# Intelligent Temperature Control System (ITCS)

## Show ITCS general information

### Commands

**show env** {fan | temperature | power}

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>env</b>	Display switch related information
	fan	Current information of the fan
	temperature	Current information of the system temperature
	power	Current information of the power
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show env fan Fan module 1 status is normal (green): 10% duty cycle, 5000 rpm. Fan module 2 status is abnormal (red): 10% duty cycle, 3500 rpm. Fan module # is not present. Total # fan modules are working normally. # fan modules are behaving abnormally.  moxa# show env temperature Current system temperature is normal (green): 30 degrees Celsius or 86 degrees Fahrenheit. System temperature alarm threshold is 70 degrees Celsius or 158 degrees Fahrenheit Power Cut-off is disabled. Auto Reboot in Power Cut-off is disabled. System operational status is normal.  Green: System Temp. &lt; 68 Degree Celsius or 154.4 Degree Fahrenheit Red: System Temp. &gt;= 68 Degree Celsius or 154.4 Degree Fahrenheit  moxa# show env power Current power consumption      : 0 watt  PWR 1 fan is normal (green): 5000 rpm. PWR 2 fan is not present.</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	system temperature alarm	

## System Temperature alarm

### Commands

**system temperature alarm celsius** <degrees-celsius(25-70)>

**system temperature alarm fahrenheit** <degrees-fahrenheit(77-158)>

<b>Syntax Description</b>	<b>system</b>	Config the system-base parameter
	<b>temperature</b>	Configure temperature parameters
	<b>alarm</b>	Configure the temperature alarm threshold
	<b>celsius</b>	Configure the alarm threshold temperature in Celsius
	<b>fahrenheit</b>	Configure the alarm threshold temperature in Fahrenheit
	<degrees-celsius(25-70)> <degrees-fahrenheit(77-158)>	Specify the temperature alarm threshold value
<b>Defaults</b>	celsius 70 fahrenheit 158	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# system temperature alarm celsius 56	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show env temperature	

## System Power-cut-off

### Commands

**system power-cut-off** {enable | disable}

<b>Syntax Description</b>	<b>system</b>	Config the system-base parameter
	<b>power-cut-off</b>	Configure the power cut-off function settings
	enable disable	Enable the power cut-off function Disable the power cut-off function
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# system power-cut-off enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show env temperature	

## System Auto-reboot-power-cut-off

### Commands

**system auto-reboot-power-cut-off** {enable | disable}

<b>Syntax Description</b>	<b>system</b>	Configure system-related parameters
	<b>auto-reboot-power-cut-off</b>	Configure auto-reboot for the power cut-off function
	enable disable	Enable auto-reboot for the power cut-off function Disable auto-reboot for the power cut-off function
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# system auto-reboot-power-cut-off enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show env temperature	

# Network Status

## Network Statistics

### Show Traffic Statistics

#### Commands

**show statistics** [ interface <interface-type> <interface-id> ]

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>statistics</b>	Display the interface statistics table
	interface-type	Display interface information
	interface-id	Display the specific interface information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode.	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show statistics interface ethernet 1/1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	clear statistics	

### Clear Traffic Statistics

#### Commands

**clear statistics** [ interface < interface-type> <interface-id> ]

<b>Syntax Description</b>	<b>clear</b>	Clear input
	<b>statistics</b>	Clear statistics
	interface-type	The interface type
	interface-id	The interface ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode.	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# clear statistics Ethernet 1/1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show statistics	

## LLDP

### Show LLDP Information

#### Commands

##### show lldp

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>lldp</b>	Display LLDP information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC User EXEC	
<b>Usage Guidelines</b>	Display the global LLDP settings.	
<b>Examples</b>	moxa# show lldp  LLDP is disabled Transmit Interval : 30 Holdtime Multiplier : 4 Reinitialization Delay : 2 Tx Delay : 2 Notification Interval : 5 Chassis Id SubType : Mac Address Chassis Id : 00:01:02:03:04:05	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	config lldp {enable   disable} config lldp chassis-id-subtype { chassis-comp <string(255)>   if-alias   port-comp <string(255)>   mac-addr   nw-addr   if-name   local <string(255)> } config lldp holdtime-multiplier <2-10> config lldp notification-interval <seconds(5-3600)> config lldp reinitialization-delay <seconds(1-10)> config lldp transmit-interval <seconds(5-32768)> config lldp tx-delay (1-8192)	

### Show the LLDP Interface

#### Commands

##### show lldp interface

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>lldp</b>	Display LLDP information
	<b>interface</b>	Show the LLDP interface information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC User EXEC	
<b>Usage Guidelines</b>	Display LLDP port interface information.	
<b>Examples</b>	moxa#show lldp interface Eth1/3: Tx State : Enabled Rx State : Enabled Tx SEM State : INITIALIZE Rx SEM State : WAIT PORT OPERATIONAL Notification Status : Enabled Notification Type : Remote Table Chang DestinationMacAddr : 01:80:c2:00:00:0e	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config-if > lldp {transmit   receive} config-if > lldp dest-mac <mac_addr>	

## Show LLDP Neighbors

### Commands

**show lldp neighbors [management-address | cip | detail]**

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>lldp</b>	Display LLDP information
	<b>neighbors</b>	Display LLDP neighbor information
	<b>management-address</b>	Display the management address configured in the system
	<b>cip</b>	Display CIP-related configuration
	<b>detail</b>	Display all detailed information
	<b>Defaults</b>	N/A
<b>Command Modes</b>	Privileged EXEC User EXEC	
<b>Usage Guidelines</b>	Display LLDP neighbor related configuration.	
<b>Examples</b>	<pre>moxa# show lldp neighbors</pre> <p>Capability Codes : (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device, (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other</p> <p>Local Intf: Eth2/1 Neighbor Chassis ID : 00:00:01:00:00:83 Neighbor Port ID : 00:00:01:00:00:83 Neighbor Port Description : Not Advertised Neighbor System Name : Not Advertised Hold Time : 3601 Capabilities :</p> <p>Total Entries Displayed : 1</p>	
	<pre>moxa# show lldp neighbors detail</pre> <p>Capability Codes : (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device, (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other</p> <p>Chassis Id SubType : Mac Address Chassis Id : 00:00:01:00:00:83 Port Id SubType : Mac Address Port Id : 00:00:01:00:00:83 Port Description : Not Advertised System Name : Not Advertised System Desc : Not Advertised Local Intf : Eth2/1 Time Remaining : 3500 Seconds System Capabilities Tlv : Not Advertised Management Address : Not Advertised</p> <p>Extended 802.3 TLV Info -MAC PHY Configuration &amp; Status Auto-Neg Support &amp; Status : Supported, Enabled Advertised Capability Bits : 8000 Other -Link Aggregation Link Aggregation Tlv : Not Advertised -Maximum Frame Size Tlv : Not Advertised</p> <p>Extended 802.1 TLV Info -Port VLAN Tlv : Not Advertised -Vlan Name Vlan Name Tlv : Not Advertised</p>	

	<pre>Total Entries Displayed : 1  moxa# show lldp neighbors management-address  Local   Interface  Management Address Interface -----  - Eth1/11 129      192.168.127.250  Total Entries Displayed : 1  moxa# show lldp neighbors cip  Eth1/1 : Extended EtherNet/IP TLV Info - CIP Identification TLV      : Vendor ID                    : 0x03DF Device Type                  : 0x002C Product Code                  : 0x1110 Major Revision                : 1 Minor Revision                : 1 Serial Number                 : 1027030  Eth1/2 : Extended EtherNet/IP TLV Info - CIP Identification TLV      : Vendor ID                    : 0x03DF Device Type                  : 0x002C Product Code                  : 0x1110 Major Revision                : 1 Minor Revision                : 1 CIP Serial Sumber           : 1027050  Total Entries Displayed : 2</pre>
<b>Error Messages</b>	N/A
<b>Related Commands</b>	<pre>show lldp config-if &gt; lldp {transmit   receive} config-if &gt; lldp dest-mac &lt;mac_addr&gt;</pre>

## Show LLDP Statistics

### Commands

#### show lldp statistics

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>lldp</b>	Display LLDP information
	<b>statistics</b>	Display LLDP remote table statistics information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC User EXEC	
<b>Usage Guidelines</b>	Display LLDP statistics for the local counter	
<b>Examples</b>	<pre>moxa# show lldp statistics  Remote Table Last Change Time : 182700 Remote Table Inserts          : 2 Remote Table Deletes          : 0 Remote Table Drops            : 0 Remote Table Ageouts          : 0 Remote Table Updates          : 0</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp	

## Show LLDP Error Information

### Commands

#### show lldp error

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>lldp</b>	Display LLDP information
	<b>error</b>	Display LLDP error information such as memory allocation failures, queue overflows, and table overflows
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC User EXEC	
<b>Usage Guidelines</b>	Display the LLDP error counter.	
<b>Examples</b>	moxa# show lldp errors Total Memory Allocation Failures : 0 Total Input Queue Overflows : 0 Total Table Overflows : 0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config lldp enable config-if lldp tlv-select basic-tlv config-if lldp tlv-select dot1t1v config-if lldp tlv-select dot3tlv	

## Show LLDP Traffic Information

### Commands

#### show lldp traffic

<b>Syntax Description</b>	<b>show</b>	Display configuration/statistics/general information
	<b>lldp</b>	Display LLDP information
	<b>traffic</b>	Display the LLDP local traffic
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC User EXEC	
<b>Usage Guidelines</b>	Display the local LLDP traffic counter.	
<b>Examples</b>	moxa# show lldp traffic  Total Frames Out : 82 Total Entries Aged : 0 Total Frames In : 81 Total Frames Received In Error : 81 Total Frames Discarded : 0 Total TLVS Unrecognized : 324 Total TLVs Discarded : 0 Total PDU length error Drops : 0	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config-if > lldp {transmit   receive} config-if > lldp dest-mac <mac_addr>	

## Show LLDP Local Configuration

### Commands

#### show lldp local

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>lldp</b>	Display LLDP information
	<b>local</b>	Local configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC/ User EXEC	
<b>Usage Guidelines</b>	Display LLDP local device related information.	
<b>Examples</b>	<pre> moxb# show lldp local  Capability Codes   : (R) Router, (B) Bridge, (T) Telephone, (C) DOCSIS Cable Device, (W) WLAN Access Point, (P) Repeater, (S) Station, (O) Other  Chassis Id SubType      : Mac Address Chassis Id              : 00:01:02:03:04:05 System Name             : moxb System Description      : EDS-G4012-8P-4QGS Product Revision: V0.0.0 FW Version: V4.0 System Capabilities Supported  : B System Capabilities Enabled   : B Management Address       : Interface Management Address ----- 129    192.168.127.253  Eth1/1 : Port Id SubType      : Interface Alias Port Id              : Eth1/1 Port Description     : Ethernet Interface Port 01 Enabled Tx TLVs      : Port Description, System Name,                       System Capability, Management Address,                       CIP Identification  Extended 802.3 TLV Info -MAC PHY Configuration &amp; Status Auto-Neg Support &amp; Status      : Not Supported, Disabled Advertised Capability Bits     : 0000 Operational MAU Type          : 0 -Link Aggregation Capability &amp; Status            : Not Capable, Not In Aggregation Aggregated Port Id            : 0 -Maximum Frame Size           : 9216  Extended 802.1 TLV Info -Port VLAN Id                : 1 -Vlan Name Vlan Id    Vlan Name          TxStatus ----- 1          Disabled  Extended EtherNet/IP TLV Info - CIP Identification TLV Vendor ID      : 0x03DF Device Type    : 0x002C Product Code   : 0x1110 Major Revision : 1 Minor Revision : 1 </pre>	

	Serial Number	: 1027030
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable LLDP

### Commands

**lldp enable**

**lldp disable**

<b>Syntax Description</b>	<b>lldp</b>	Configure LLDP parameters
	<b>enable</b>	Enable LLDP
	<b>disable</b>	Disable LLDP
<b>Defaults</b>	Enable	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Enable or disable global LLDP.	
<b>Examples</b>	moxa (config)# lldp enable moxa (config)# lldp disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp show lldp interface show lldp neighbors show lldp traffic show lldp errors show lldp statistics	

## Configure the Global LLDP Timer Interval

### Commands

**lldp transmit-interval** <seconds (5-32768)>

**no lldp transmit-interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lldp</b>	Configure LLDP parameters
	<b>transmit-interval</b>	Configure the transmit interval
	seconds	The interval time (5 to 32768 seconds)
<b>Defaults</b>	The default interval between successive transmit cycles is 30 seconds.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Configure the global LLDP transmit interval time	
<b>Examples</b>	moxa(config)# lldp transmit-interval 30 moxa(config)# no lldp transmit-interval	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config lldp enable	

## Configure the LLDP Hold Time Multiplier

### Commands

**lldp holdtime-multiplier** <value (2-10)>

**no lldp holdtime-multiplier**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lldp</b>	Configure LLDP parameters
	<b>holdtime-multiplier</b>	Configure the hold time multiplier applied to the transmit interval used to calculate the TTL value txTTL
	value	The multiplier value (2 to 10)
<b>Defaults</b>	The default hold time multiplier is 4.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# lldp holdtime-multiplier 4 moxa(config)# no lldp holdtime-multiplier	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config lldp enable config lldp tx-delay	

## Configure the LLDP Transmission Delay

### Commands

**lldp tx-delay** <seconds (1-8192) // tx\_delay <= (0.25 x transmit-interval)

**no lldp tx-delay**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lldp</b>	Configure LLDP parameters
	<b>tx-delay</b>	Configure the minimum delay between successive LLDP frame transmissions
	seconds	The transmission delay time (1 to 8192 seconds)
<b>Defaults</b>	The default LLDP transmission delay time is 2 seconds.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Configure the LLDP tx-delay parameter	
<b>Examples</b>	moxa(config)# lldp tx-delay 4 moxa(config)# no lldp tx-delay	
<b>Error Messages</b>	"Invalid: Tx Delay should be less than or equal to the value = 0.25 * Transmit Interval."	
<b>Related Commands</b>	show lldp config lldp enable config lldp transmit-interval	

## Configure the LLDP Reinitialization Delay

### Commands

**lldp reinitialization-delay** <seconds (1-10)>

**no lldp reinitialization-delay**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lldp</b>	Configure LLDP parameters
	<b>reinitialization-delay</b>	Configure the delay after the admin status becomes 'disabled' before reinitialization is attempted
	seconds	The reinitialization delay (1 to 10 seconds)
<b>Defaults</b>	The default reinitialization delay time is 2 seconds.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Configure the LLDP reinitialization delay time.	
<b>Examples</b>	moxa(config)# lldp reinitialization-delay 4 moxa(config)# no lldp reinitialization-delay	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config lldp enable	

## Configure the LLDP Notification Interval

### Commands

**lldp notification-interval** <seconds(5-3600)>

**no lldp notification-interval**

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lldp</b>	Configure LLDP parameters
	<b>notification-interval</b>	Configure LLDP event notifications
	seconds	The notification interval (5 to 3600 seconds)
<b>Defaults</b>	The default notification interval time is 5 seconds.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Configure the LLDP notification interval time.	
<b>Examples</b>	moxa(config)# lldp notification-interval 5 moxa(config)# no lldp notification-interval	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config lldp enable	

## Configure LLDP Global Settings

### Commands

**lldp chassis-id-subtype** { chassis-comp <string(255)> | if-alias | port-comp <string(255)> | mac-addr | nw-addr | if-name | local <string(255)> }

<b>Syntax Description</b>	<b>lldp</b>	Configure LLDP parameters
	<b>chassis-id-subtype</b>	Configure the chassis-component and local system sybtypes
	chassis-comp	Specify the value of the entPhysicalAlias object of a chassis component as the chassis identifier
	if-alias	Specify the value of ifAlias of an interface on the containing chassis as the chassis identifier
	port-comp	Specify the value of the entPhysicalAlias object of a port or backplane within the chassis as the chassis identifier
	mac-addr	Specify the unicast source MAC address of a port on the chassis as the chassis identifier
	nw-addr	Specify a network address associated with a particular chassis as the chassis identifier. The encoded address is actually composed of two fields. The first field is a single octet, representing the IANA AddressFamilyNumbers value for the specific address type, and the second field is the network address value.
	if-name	Specify the value of an if Name object of an interface on the containing chassis as the chassis identifier
local	Specify a locally defined value as the chassis identifier	
<b>Defaults</b>	The default chassis ID subtype is mac-addr, representing the system's MAC address.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Configure the LLDP chassis ID subtype parameters.	
<b>Examples</b>	moxa (config)# lldp chassis-id-subtype chassis-comp moxa	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp show lldp local config lldp enable	

## Configure LLDP Port Settings

### Commands

**lldp** {transmit | receive}

**no lldp** {transmit | receive}

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>lldp</b>	Configure LLDP parameters
	transmit	Enable the transmission of LLDPDU from one of the ports of the server to the LLDP module
	receive	Enable the reception of LLDPDU from one of the ports of the server to the LLDP module
<b>Defaults</b>	LLPDU transmission and reception are both enabled by default.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	Configure the LLDP TX or RX for the port interface	
<b>Examples</b>	moxa(config-if)# lldp transmit moxa(config-if)# no lldp transmit	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp show lldp interface	

## Configure the LLDP Port ID Subtype

### Commands

**lldp port-id-subtype** { if-alias | port-comp <string(255)> | mac-addr | if-name | local <string(255)> }

<b>Syntax Description</b>	<b>lldp</b>	Configure LLDP parameters
	<b>port-id-subtype</b>	Configure LLDP port subtype
	if-alias	Specify the value of ifAlias of an interface on the containing chassis as the port identifier
	port-comp	Specify the value of the entPhysicalAlias object of a port or backplane within the chassis as the port identifier
	mac-addr	Specify the unicast source MAC address of a port on the chassis as the port identifier
	if-name	Specify the value of an if Name object of an interface on the containing chassis as the port identifier
	local	Specify a locally defined value as the port identifier
<b>Defaults</b>	mac-addr uses sys_mac, others are none.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	Configure the LLDP notification interval time	
<b>Examples</b>	moxa(config-if)# lldp port-id-subtype mac-addr moxa(config-if)# no lldp port-id-subtype	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp config lldp enable	

## Configure LLDP TLV Settings

### Commands

**lldp tlv-select basic-tlv** { port-descr | sys-name | sys-descr }

<b>Syntax Description</b>	<b>lldp</b>	Configure LLDP parameters
	<b>tlv-select</b>	Configure basic LLDP TLV transmission parameters
	<b>basic-tlv</b>	Configure basic TLV parameters
	port-descr	Use a port description for the TLV.
	sys-name	Use the system name for the TLV.
	sys-descr	Use the system description for the TLV.
<b>Defaults</b>	mac-addr use sys_mac, others are none	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	Configure the LLDP basic TLV	
<b>Examples</b>	moxa (config-if)# lldp tlv-select basic-tlv port-descr moxa (config-if)# no lldp tlv-select basic-tlv port-descr	
<b>Error Messages</b>	"Invalid: The format of Basic Transmit TLVs are Port Description, Device Name, Device Description, and Device Capability."	
<b>Related Commands</b>	show lldp local	

## Configure LLDP TLV DOT1 Settings

### Commands

**lldp tlv-select dot1tlv** { port-vlan-id | {all | <vlan-id>} | vlan-name {all |} | }

<b>Syntax Description</b>	<b>lldp</b>	Configure LLDP parameters
	<b>tlv-select</b>	Configure basic LLDP TLV transmission parameters
	<b>dot1tlv</b>	Configure specific IEEE 802.1 TLV parameters
	port-vlan-id	Use the port PVID for the TLV
	vlan-name	Use a VLAN name for the TLV
<b>Defaults</b>	N/A.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	Configure LLDP DOT1 TLV parameters.	
<b>Examples</b>	moxa (config-if)# lldp tlv-select dot1tlv port-vlan-id moxa (config-if)# no lldp tlv-select dot1tlv port-vlan-id	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show lldp local show lldp neighbors show lldp errors	

## Configure LLDP TLV DOT3 Settings

### Commands

**lldp tlv-select dot3tlv** { link-aggregation | max-framesize }

<b>Syntax Description</b>	<b>lldp</b>	Configure LLDP parameters
	<b>tlv-select</b>	Configure basic LLDP TLV transmission parameters
	<b>dot3tlv</b>	Configure specific IEEE 802.3 TLV parameters
	link-aggregation	Configure the link aggregation protocol statistics for each port on the device
	max-framesize	Specify the maximum frame size of the TLV
<b>Defaults</b>	N/A.	
<b>Command Modes</b>	Privileged EXEC Interface Configuration	
<b>Usage Guidelines</b>	Configure LLDP DOT3 TLV parameters.	
<b>Examples</b>	moxa (config-if)# lldp tlv-select dot3tlv macphy-config moxa (config-if)# no lldp tlv-select dot3tlv macphy-config	
<b>Error Messages</b>	"Invalid: The value of 802.3 Transmit TLVs capability are Link Aggregation Statistics and Maximum Frame Size."	
<b>Related Commands</b>	show lldp local show lldp neighbors show lldp errors	

## ARP Table

### Show IP ARP Table

#### Commands

**show ip arp**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>ip</b>	Display IP information
	<b>arp</b>	Display the ARP table
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show ip arp	
	IP Address	MAC Address            Interface
	-----	-----
	192.168.127.95	00:19:cb:d6:db:b4    vlan1
	Total ARP Entries displayed: 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Clear ARP Cache

#### Commands

**clear ip arp**

<b>Syntax Description</b>	<b>clear</b>	Clear/flush the dynamically learnt ARP entries
	<b>ip</b>	Clear IP-related information
	<b>arp</b>	Clear ARP cache entries
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# clear ip arp	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Tools

## Port Mirroring

### Enable/Disable Mirroring

#### Commands

**port-mirror** {enable | disable}

<b>Syntax Description</b>	<b>port-mirror</b>	Configure port mirror parameters
	enable	Enable mirroring
	disable	Disable mirroring
<b>Defaults</b>	Port mirroring is enabled by default.	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# port-mirror enable	
	moxa# configure moxa(config)# port-mirror disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Display the mirroring information that is present in the system

#### Commands

**show monitor** { **session** <session-id (1-7)> | **range** <session-list> | **vlan** | **port** }

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>monitor</b>	Display Port Mirror information
	<b>session</b>	Mirroring information related to a specific session
	<b>session-id</b>	Session index of the mirroring session
	<b>range</b>	Mirroring information for the specified list of mirroring session
	<b>session-list</b>	Session list (Example: 1-7)
	<b>vlan</b>	Display vlan Mirror session
	<b>port</b>	Display port Mirror session
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# show monitor session 1	
	Mirroring is globally Enabled. Rspan Intermediate is Enabled. Rspan Intermediate Vlan Id : 5.  ----- [SPAN] Session : 1 Reflect Port Mode Enabled Source Ports Rx : None Tx : None Both : Eth1/1 Reflect Port : Eth1/2 Session Status : Active -----  moxa-product# show monitor range 1-7	
		Mirroring is globally Enabled. Rspan Intermediate Disabled.

	<pre> ----- [SPAN] Session   : 1 Reflect Port Mode Enabled Source Ports   Rx           : None   Tx           : None   Both         : Eth1/1 Reflect Port    : Eth1/2 Session Status  : Active -----  % Session 2 does not exist % Session 3 does not exist % Session 4 does not exist % Session 5 does not exist  -----  [RSPAN] Session   : 6 Reflect Port Mode Disabled Rspan Type       : Source Rspan Vlan Id    : 3 Source Ports   Rx           : None   Tx           : None   Both         : Eth1/3,po1 Designated Port  : Eth1/4 Session Status   : Active -----  [RSPAN] Session   : 7 Reflect Port Mode Disabled Rspan Type       : Destination Rspan Vlan Id    : 4 Source Ports   Rx           : None   Tx           : None   Both         : None Destination Port(s) : Eth2/1,Eth2/2 Session Status    : Active -----  moxa-product# show monitor vlan Mirroring is globally Enabled. Rspan Intermediate is Disabled. -----  [SPAN] Session   : 1 Reflect Port Mode Disabled Source Vlans   Rx           : 2 Destination Port(s) : Eth1/4 Session Status    : Active ----- </pre>
<b>Error Messages</b>	<pre> % Invalid: Monitor session range must be in between (1-7) Example: Key "range 1-8" % Invalid: Invalid Session List Example: Key "range 0-7" </pre>
<b>Related Commands</b>	N/A

## Configure the Source for a Mirroring Session

### Commands

**monitor session** <session-id (1-7)> { **source** { **interface** { **port-channel** <port-channel-id> | <interface-type> <interface-id> } [{ **rx** | **tx** | **both** ] } }

<b>Syntax Description</b>	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	session-id	The index of the mirroring session
	source	Configure the mirroring source port
	interface	Configure the interface
	port-channel	Configure the port channel interface
	port-channel-id	Specify the port channel ID, the range is from 1 to (total ports/2)
	interface-type	Specify the interface type
	interface-id	Specify the interface number
	<b>rx, tx, both</b>	Specify the traffic type to mirror: received, transmitted, or both
<b>Defaults</b>	The traffic type to mirror is set to Both by default.	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa-product# configure moxa-product(config)# monitor session 1 source interface ethernet 1/1  moxa-product# configure moxa-product(config)# monitor session 1 source interface ethernet 1/1 rx  moxa-product# configure moxa-product(config)# monitor session 1 source interface ethernet 1/1 tx  moxa-product# configure moxa-product(config)# monitor session 1 source interface port-channel 1</pre>	
<b>Error Messages</b>	<pre>% Invalid: Duplicated Rx source port. % Invalid: Duplicated Tx source port. % Invalid: The destination port conflicts with the Tx source port or Rx source port. % Invalid: If the port is a Port-Channel member, it cannot be set to the destination port, RX source port, or TX source port. % Invalid: The RSPAN session cannot be active when the RSPAN Intermediate Role is enabled. % Invalid: The Port-Channel with no member ports cannot be set to the RX source port. % Invalid: The Port-Channel with no member ports cannot be set to the TX source port. % Invalid: When GVRP is enabled, the Reflect Port Mode cannot be enabled or the RSPAN session cannot be active. % Invalid: The RSPAN destination session cannot configure the Tx source port or Rx source port. % Invalid: The source port VLAN ID cannot be the same as the RSPAN VLAN ID. % Invalid: The source port of the SPAN session with the Reflect Port Mode enabled must be a VLAN access port.</pre>	
<b>Related Commands</b>	<pre>moxa-product(config)# no monitor session &lt;session-id (1-7)&gt; { source { interface { port-channel &lt;port-channel-id&gt;   &lt;interface-type&gt; &lt;interface-id&gt; } }</pre>	

## Remove Source Port Configurations for a Mirroring Session

### Commands

**no monitor session** <session-id (1-7)> {**source { interface** {port-channel <port-channel-id> | <interface-type> <interface-id> }}}

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	session-id	The index of the mirroring session
	source	Configure the mirroring source port
	interface	Configure the interface
	port-channel	Configure the port channel interface
	port-channel-id	Specify the port channel ID, the range is from 1 to (total ports/2)
	interface-type	Specify the interface type
interface-id	Specify the interface number	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa-product# configure moxa-product(config)# no monitor session 1 source interface ethernet 1/1  moxa-product# configure moxa-product(config)# no monitor session 1 source interface port-channel 1</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>moxa-product(config)# monitor session &lt;session-id (1-7)&gt; { source { interface { port-channel &lt;port-channel-id&gt;   &lt;interface-type&gt; &lt;interface-id&gt; } [{ rx   tx   both }] }}</pre>	

## Configure the Destination for a Mirroring Session

### Commands

**monitor session** <session-id (1-7)> destination {interface <interface-type> <interface-id>} [**reflect-port-mode**]

<b>Syntax Description</b>	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	session-id	The index of the mirroring session
	destination	Configure the mirroring destination port
	interface	Configure the interface
	interface-type	Specify the interface type
	interface-id	Specify the interface number
	<b>reflect-port-mode</b>	Enable Reflect Port Mode
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# configure moxa(config)# monitor session 1 destination interface ethernet 1/2 reflect-port-mode</pre>	
<b>Error Messages</b>	<p>% Invalid: Duplicated destination port.</p> <p>% Invalid: The destination port conflicts with the Tx source port or Rx source port.</p> <p>% Invalid: If the port is a Port-Channel member, it cannot be set to the destination port, RX source port, or TX source port.</p> <p>% Invalid: If the port is set as the ring port of Turbo Ring v2, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the coupling port of Turbo Ring v2, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the Turbo Chain head/tail/member port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the RSTP port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the Dual Homing redundant port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the MSTP port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the MRP port, it cannot be set to the destination port.</p> <p>% Invalid: If Dot1x is enabled on this port, it cannot be set to the destination port.</p> <p>% Invalid: The RSPAN destination session cannot be active with the Reflect Port Mode enabled.</p> <p>% Invalid: There is more than one destination port.</p> <p>% Invalid: The source port of the SPAN session with the Reflect Port Mode enabled must be a VLAN access port.</p> <p>% Invalid: The PVID of the reflect port is in a session that conflicts with the reflect port PVID or the RSPAN VLAN ID of another session, or the RSPAN Intermediate VLAN ID.</p> <p>% Invalid: The RSPAN VLAN ID of an RSPAN session conflicts with the PVID of the reflect port in another session.</p> <p>% Invalid: When GVRP is enabled, the Reflect Port Mode cannot be enabled or the RSPAN session cannot be active.</p> <p>% Invalid: The Speed/Duplex settings of the reflect port must be in AUTO mode and enabled.</p> <p>% Invalid: Invalid RSPAN session type</p>	
<b>Related Commands</b>	<pre>moxa-product(config)# no monitor session &lt;session-id (1-7)&gt; destination { interface &lt;interface-type&gt; &lt;interface-id&gt; } [reflect-port-mode]</pre>	

## Delete the Destination Configuration for a Mirroring Session

### Commands

**no monitor session** <session-id (1-7)> destination {interface <interface-type> <interface-id>} [**reflect-port-mode**]

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	session-id	The index of the mirroring session
	destination	Configure the mirroring destination port
	interface	Configure the interface
	interface-type	Specify the interface type
	interface-id	Specify the interface number
	<b>reflect-port-mode</b>	Disable Reflect Port Mode
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# configure moxa(config)# no monitor session 1 destination interface ethernet 1/2 reflect-port-mode</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>moxa(config)# monitor session &lt;session-id (1-7)&gt; destination { interface &lt;interface-type&gt; &lt;interface-id&gt;} [reflect-port-mode]</pre>	

## Delete Mirroring Configurations

### Commands

**no monitor session** {range <session-list> | session-id (1-7)}

<b>Syntax Description</b>	<b>no</b>	Remove configuration/delete entry/reset to default value
	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	range	The list of sessions for which the mirroring configuration should be removed
	session-list	The mirroring session list
	session-id	The index of the mirroring session
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# configure moxa(config)# no monitor session 1  moxa# configure moxa(config)# no monitor session range 1-7</pre>	
<b>Error Messages</b>	<pre>% Invalid: Monitor session range must be in between (1-7) Example: Key "range 1-8" % Invalid: Invalid Session List Example: Key "range 0-7"</pre>	
<b>Related Commands</b>	N/A	

## Configure the Designated Port for a Mirroring Session

### Commands

**monitor session** <session-id (6-7)> **designated** { interface <interface-type> <interface-id> } [**reflect-port-mode**]

<b>Syntax Description</b>	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	session-id	The index of the mirroring session
	<b>designated</b>	Configure the designated port parameters
	interface	Configure interface-related configuration
	interface type	Specify the interface type
	interface-id	Specify the interface ID
	<b>reflect-port-mode</b>	Enable Reflect Port Mode
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa-product# configure moxa-product(config)# monitor session 6 designated interface ethernet 1/2 reflect-port-mode</pre>	
<b>Error Messages</b>	<p>% Invalid: Duplicated destination port.</p> <p>% Invalid: The destination port conflicts with the Tx source port or Rx source port.</p> <p>% Invalid: If the port is a Port-Channel member, it cannot be set to the destination port, RX source port, or TX source port.</p> <p>% Invalid: If the port is set as the ring port of Turbo Ring v2, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the coupling port of Turbo Ring v2, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the Turbo Chain head/tail/member port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the RSTP port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the Dual Homing redundant port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the MSTP port, it cannot be set to the destination port.</p> <p>% Invalid: If the port is set as the MRP port, it cannot be set to the destination port.</p> <p>% Invalid: If Dot1x is enabled on this port, it cannot be set to the destination port.</p> <p>% Invalid: There is more than one destination port.</p> <p>Invalid: The reflect port cannot be configured to the Management VLAN ID.</p> <p>% Invalid: The PVID of the reflect port must be equal to the RSPAN VLAN ID in an RSPAN source session.</p> <p>% Invalid: The RSPAN VLAN ID of an RSPAN session conflicts with the PVID of the reflect port in another session.</p> <p>% Invalid: When GVRP is enabled, the Reflect Port Mode cannot be enabled or the RSPAN session cannot be active.</p> <p>% Invalid: The Speed/Duplex settings of the reflect port must be in AUTO mode and enabled.</p> <p>% Invalid: Invalid RSPAN session type</p> <p>% Invalid: The RSPAN reflect port must be a VLAN trunk or hybrid port.</p>	
<b>Related Commands</b>	<pre>moxa-product(config)# no monitor session &lt;session-id (6-7)&gt; designated { interface &lt;interface-type&gt; &lt;interface-id&gt; } [reflect-port-mode]</pre>	

## Remove the Designated Port Configurations for a Mirroring Session

### Commands

**no monitor session** <session-id (6-7)> **designated { interface** <interface-type> <interface-id> }  
**[reflect-port-mode]**

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	session-id	The index of the mirroring session
	<b>designated</b>	Configure the designated port parameters
	<b>interface</b>	Configure interface-related configuration
	interface-type	Specify the interface type
	interface-id	Specify the interface ID
	<b>reflect-port-mode</b>	Disable Reflect Port Mode
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa-product# configure moxa-product(config)# no monitor session 6 designated interface ethernet 1/2 reflect-port-mode	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	moxa-product(config)# monitor session <session-id (6-7)> designated { interface <interface-type> <interface-id> } [reflect-port-mode]	

## Configure the RSPAN Session Type and VLAN

### Commands

**monitor session** <session-id (6-7)> **rspan-type** {source | destination} **vlan** <vlan-id (1-4094)>

<b>Syntax Description</b>	<b>monitor</b>	Configure port mirroring parameters
	<b>session</b>	Configure the mirroring session
	session-id	The index of the mirroring session
	<b>rspan-type</b>	Configure RSPAN session type parameters
	source	Enable the RSPAN source session
	destination	Enable the RSPAN destination session
	<b>vlan</b>	Configure RSPAN session VLAN parameters
	vlan-id	Specify the VLAN ID
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa-product# configure moxa-product(config)# monitor session 6 rspan-type source vlan 3  moxa-product# configure moxa-product(config)# monitor session 7 rspan-type destination vlan 2</pre>	
<b>Error Messages</b>	<p>% Invalid: The RSPAN VLAN ID must be configured to an existing VLAN ID.</p> <p>% Invalid: Duplicated RSPAN VLAN ID.</p> <p>% Invalid: The RSPAN session cannot be active when the RSPAN Intermediate Role is enabled.</p> <p>% Invalid: The RSPAN destination session cannot be active with the Reflect Port Mode enabled.</p> <p>% Invalid: There is more than one RSPAN source session.</p> <p>% Invalid: There is more than one RSPAN destination session.</p> <p>% Invalid: The PVID of the reflect port is in a session that conflicts with the reflect port PVID or the RSPAN VLAN ID of another session, or the RSPAN Intermediate VLAN ID.</p> <p>% Invalid: The RSPAN VLAN ID of an RSPAN session conflicts with the PVID of the reflect port in another session.</p> <p>% Invalid: When GVRP is enabled, the Reflect Port Mode cannot be enabled or the RSPAN session cannot be active.</p> <p>% Invalid: When the RSPAN destination session is active, at least one VLAN trunk port must be enabled.</p>	
<b>Related Commands</b>	N/A	

## Configure the RSPAN Intermediate Role

### Commands

**monitor rspan-intermediate-role** {enable | disable} [vlan <vlan-id (1-4094)>]

<b>Syntax Description</b>	<b>monitor</b>	Configure port mirroring parameters
	<b>rspan-intermediate-role</b>	Configure RSPAN intermediate role parameters
	enable	Enable the RSPAN intermediate role
	disable	Disable the RSPAN intermediate role
	vlan	Configure RSPAN session VLAN parameters
	vlan-id	Specify the VLAN ID
<b>Defaults</b>	disable	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa-product# configure moxa-product(config)# monitor rspan-intermediate-role enable vlan 2  moxa-product# configure moxa-product(config)# monitor rspan-intermediate-role disable</pre>	
<b>Error Messages</b>	<p>% Invalid: When GVRP is enabled, the RSPAN Intermediate cannot be enabled.</p> <p>% Invalid: The RSPAN Intermediate VLAN ID must be configured to an existing VLAN ID.</p> <p>% Invalid: When the RSPAN Intermediate Role is enabled, at least one VLAN trunk port must be active.</p> <p>% Invalid: The PVID of the reflect port is in a session that conflicts with the reflect port PVID or the RSPAN VLAN ID of another session, or the RSPAN Intermediate VLAN ID.</p> <p>% Invalid: Maximum number of Intermediate VLAN IDs reached.</p> <p>% Invalid: This Intermediate VLAN ID is already in use.</p>	
<b>Related Commands</b>	N/A	

## Configure the source vlan for a mirroring session

### Commands

**monitor session** <session-id (1-7)> { **source** { **vlan** <vlan-range>} [{**rx**}]}

<b>Syntax Description</b>	<b>monitor</b>	Configure Port Mirror parameters
	<b>session</b>	Mirroring session related configuration
	<b>session-id</b>	Index of mirroring session
	<b>source</b>	Source port related configuration
	<b>vlan</b>	Interface related configuration
	<b>vlan-range</b>	a series of VLANs(1-4094) separated by a comma
	<b>rx</b>	Mirror received
<b>Defaults</b>	rx	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa-product# configure moxa-product(config)# monitor session 1 source vlan 2  moxa-product# configure moxa-product(config)# monitor session 1 source vlan 2 rx</pre>	
<b>Error Messages</b>	<p>% Invalid: Duplicated Rx source port.</p> <p>% Invalid: Duplicated Tx source port.</p> <p>//todo</p>	
<b>Related Commands</b>	<pre>moxa-product(config)# no monitor session &lt;session-id (1-7)&gt; { source { vlan &lt;vlan-range&gt;} [{rx}]}</pre>	

# Ping

## Ping the Host

### Commands

**ping host** [ repeat repeat-count ] [ size payload-size ] [ timeout request-timeout ]

<b>Syntax Description</b>	<b>ping</b>	Ping a target to check its status
	<b>host</b>	The IP address or domain name of the node to be pinged
	repeat	The number of ping packets that are sent to the destination address
	repeat-count	The repeat value
	size	The size of the ping packet
	payload-size	The length of the ping packet value
	timeout	The time in seconds after which the entity waiting for the ping response times out
	request-timeout	The timeout value
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# ping 192.168.127.254 repeat 5 PING 192.168.127.254 (192.168.127.254) 56(84) bytes of data. 64 bytes from 192.168.127.254: icmp_seq=1 ttl=64 time=1.52 ms 64 bytes from 192.168.127.254: icmp_seq=2 ttl=64 time=0.803 ms 64 bytes from 192.168.127.254: icmp_seq=3 ttl=64 time=0.879 ms 64 bytes from 192.168.127.254: icmp_seq=4 ttl=64 time=0.791 ms 64 bytes from 192.168.127.254: icmp_seq=5 ttl=64 time=0.845 ms  --- 192.168.127.254 ping statistics --- 5 packets transmitted, 5 received, 0% packet loss, time 4002ms rtt min/avg/max/mdev = 0.791/0.968/1.523/0.279 ms	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Event Logs and Notifications

## Event Logs

### Show Logging Event Log

#### Commands

##### show logging event-log

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>logging</b>	Display logging information
	<b>event-log</b>	Display event log entries
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Examples</b>	moxa# show logging event-log  Total number of log entries = 7 Boot SEV Timestamp Message ----- 19 Notice 2018-02-05 12:00:51 [Account:admin] successfully logged in via local. 19 Notice 2018-02-05 12:00:14 Port 7/4 link up. 19 Notice 2018-02-05 12:00:12 Port 7/1 link up. 19 Notice 2018-02-05 12:00:11 Port 7/2 link up. 19 Notice 2018-02-05 12:00:11 System has performed a warm start. 19 Notice 2018-02-05 12:00:09 Port 4/3 link up. 19 Notice 2018-02-05 12:00:08 Port 4/4 link up.	
<b>Help Message</b>	Display the log entries information	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	clear logging event-log	

### Show Log Capacity

#### Commands

##### show logging log-capacity

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>logging</b>	Display logging information
	<b>log-capacity</b>	Display log capacity information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show logging log-capacity	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Clear the Event Log

#### Commands

##### clear logging event-log

<b>Syntax Description</b>	<b>clear</b>	Clear the event log
	<b>logging</b>	Display logging information
	<b>event-log</b>	The local event log entries to be cleared
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# clear logging event-log	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show logging event-log	

## Export an Event Log File

### Commands

**copy event-log** {tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename}

<b>Syntax Description</b>	<b>copy</b>	Copy the target file or input
	<b>event-log</b>	Export the system event log
	tftp://server/filename	The address of the remote TFTP server and target filename in the format "tftp://server/filename"
	sftp://<username>:<password>@server/filename	The address of the remote SFTP server and target filename in the format "sftp://username:password@server/filename"
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# copy event-log tftp://192.168.127.11/test1.log	
<b>Help Message</b>	Copy the system logs to a remote site	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show logging event-log	

## Configure Event Log Capacity Settings

### Commands

**logging log-capacity threshold** <short (50-100)>

<b>Syntax Description</b>	<b>logging</b>	Configure logging parameters
	<b>log-capacity</b>	Configure log capacity parameters
	<b>threshold</b>	Configure the log capacity threshold
	short (50-100)	The log capacity threshold in percentage after which the oversize action is triggered
<b>Defaults</b>	The default log threshold is set to 80%.	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# logging log-capacity threshold <short (50-100)>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Delete Logging Log Capacity Threshold

### Commands

**no logging log-capacity threshold**

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>logging</b>	Reset logging parameters
	<b>log-capacity</b>	Reset log capacity parameters
	<b>threshold</b>	Reset the log capacity threshold
<b>Defaults</b>	The default log threshold is set to 80%	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no logging log-capacity threshold	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	logging log-capacity threshold	

## Configure Oversized Log Action Settings

### Commands

**logging oversized-action** { overwrite-oldest | stop-recording }

<b>Syntax Description</b>	<b>logging</b>	Configure logging parameters
	<b>oversize-action</b>	Configure the action when exceeding the log threshold
	overwrite-oldest	Overwrite the oldest entry
	stop-recording	Stop recording events
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# logging oversized-action { overwrite-oldest   stop-recording }	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Copy the Event Log

### Commands

**copy event-log** { <tftp\_url> | <sftp\_url> }

<b>Syntax Description</b>	<b>copy</b>	Copy the target file or input
	<b>event-log</b>	Copy the system event log
	tftp_url	The address of the remote TFTP server and filename in the format "tftp://server/filename"
	sftp_url	The address of the remote SFTP server and filename in the format "sftp://username:password@server/filename"
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# copy event-log tftp://www.test.com	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# Event Notification

## Show Event Notification Settings

### Commands

**show event-notification** {general-event | poe-event | port-event | switching-event}

<b>Syntax Description</b>	<b>show</b>	Displays running information for the feature
	<b>event-notification</b>	Display event notification settings
	general-event	Show general event notification settings
	poe-event	Show PoE event notification settings
	port-event	Show port event notification settings
	switching-event	Show switching event notification settings
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC /User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre> moxa# show event-notification poe-event PD Power On Event Enable      :Enabled Registered Action :Trap, Email, PD Power Off Event Enable      :Enabled Registered Action :Trap, Email, Low Input Voltage Event Enable      :Enabled Registered Action :Trap, Email, PD Over Current Event Enable      :Enabled Registered Action :Trap, Email, PD No Response Event Enable      :Enabled Registered Action :Trap, Email, Over Power Budget Limit Event Enable      :Enabled Registered Action :Trap, Email, Power Detection Failure Event Enable      :Enabled Registered Action :Trap, Email,  moxa# show event-notification port-event Port link up Event Enable      :Enabled Registered Action :Trap, Email, Registered Port   :1/1, 1/2, 1/3, 1/4, 2/1, 2/2, 2/3, 2/4, 3/1, 3/2, 3/3, 3/4 , 4/1, 4/2, 4/3, 4/4, 5/1, 5/2, 5/3, 5/4, 6/1, 6/2, 6/3, 6/4, 7/1, 7/2, 7/3, 7/4 , Port link down Event Enable      :Enabled Registered Action :Trap, Email, Registered Port   :1/1, 1/2, 1/3, 1/4, 2/1, 2/2, 2/3, 2/4, 3/1, 3/2, 3/3, 3/4 , 4/1, 4/2, 4/3, 4/4, 5/1, 5/2, 5/3, 5/4, 6/1, 6/2, 6/3, 6/4, 7/1, 7/2, 7/3, 7/4 , Port shutdown by Rate Limit Event Enable      :Enabled Registered Action :Trap, Email, Registered Port   :1/1, 1/2, 1/3, 1/4, 2/1, 2/2, 2/3, 2/4, 3/1, 3/2, 3/3, 3/4 , 4/1, 4/2, 4/3, 4/4, 5/1, 5/2, 5/3, 5/4, 6/1, 6/2, 6/3, 6/4, 7/1, 7/2, 7/3, 7/4 , Port recovery by Rate Limit Event Enable      :Enabled Registered Action :Trap, Email, </pre>	

	Registered Port :1/1, 1/2, 1/3, 1/4, 2/1, 2/2, 2/3, 2/4, 3/1, 3/2, 3/3, 3/4 , 4/1, 4/2, 4/3, 4/4, 5/1, 5/2, 5/3, 5/4, 6/1, 6/2, 6/3, 6/4, 7/1, 7/2, 7/3, 7/4 , Port shutdown by Port Security Event Enable :Enabled Registered Action :Trap, Email, Registered Port :1/1, 1/2, 1/3, 1/4, 2/1, 2/2, 2/3, 2/4, 3/1, 3/2, 3/3, 3/4 , 4/1, 4/2, 4/3, 4/4, 5/1, 5/2, 5/3, 5/4, 6/1, 6/2, 6/3, 6/4, 7/1, 7/2, 7/3, 7/4
<b>Error Messages</b>	N/A
<b>Related Commands</b>	event-notification general-event event-notification poe-event event-notification port-event event-notification switching-event

## Configure General Event Notifications

### Commands

**event-notification general-event all**

**event-notification general-event cold-start**

**event-notification general-event all action trap mgmt-relay**

**event-notification general-event cold-start action email pwr1-relay**

**no event-notification general-event all**

**no event-notification general-event cold-start action email pwr2-relay**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/deletes the entry/reset to default values
	<b>event-notification</b>	Configure event notification settings
	<b>general-event</b>	Configure notifications for general events
	<b>all</b>	Notify for all general events
	<b>cold-start</b>	Notify when the system performs a cold start
	<b>warm-start</b>	Notify when the system performs a warm start
	<b>config-change</b>	Notify when the system configuration changes
	<b>login-success</b>	Notify when a user successfully logs in
	<b>login-fail</b>	Notify when a user failed to log in
	<b>login-lockout</b>	Notify when a user is locked out due to the login policy
	<b>account-setting-changed</b>	Notify when the user account information changes, including create account, remove account, and change of username, permission
	<b>password-changed</b>	Notify when the user account password changes
	<b>config-import</b>	Notify when the system configuration is imported
	<b>ssl-certificated-changed</b>	Notify when the system certificate changes
	<b>log-capacity</b>	Notify when the system log reaches the capacity threshold
	<b>power-on</b>	Notify when the power supply is on
	<b>power-off</b>	Notify when the power supply is off
	<b>di-on</b>	Notify when the digital input is on
	<b>di-off</b>	Notify when the digital input is off
	<b>action</b>	Set the action for event notifications
	<b>trap</b>	Set the trap action for notifications
	<b>email</b>	Set the email action for notifications
	<b>mgmt-relay</b>	Set the MGMT relay action for notifications
	<b>pwr1-relay</b>	Set the PWR1 relay action for notifications
	<b>pwr2-relay</b>	Set the PWR2 relay action for notifications
<b>Defaults</b>	All configuration, trap, email event notifications are enabled by default.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# config moxa(config)# event-notification general-event all action trap moxa(config)# no event-notification general-event all action trap email	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show event-notification event-notification poe-event event-notification port-event event-notification switching-event	

## Configure PoE Event Notifications

### Commands

**event-notification poe-event all**

**event-notification poe-event pd-power-on**

**event-notification poe-event all action trap mgmt-relay**

**event-notification poe-event pd-power-on action email pwr1-relay**

**no event-notification poe-event all**

**no event-notification poe-event cold-start action email pwr2-relay**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>event-notification</b>	Configure event notification settings
	<b>poe-event</b>	Configure notifications for PoE events
	<b>all</b>	Notify for all PoE events
	<b>pd-power-on</b>	Notify when a powered device powers on
	<b>pd-power-off</b>	Notify when a powered device powers off
	<b>low-input-voltage</b>	Notify when the input voltage from the power sourcing equipment is low
	<b>pd-over-current</b>	Notify when the current exceeds the threshold
	<b>pd-no-response</b>	Notify when the device does not receive a response from the powered device
	<b>over-power-budget-limit</b>	Notify when the PoE power consumption exceeds the budget
	<b>power-detection-failure</b>	Notify when a power failure is detected
	<b>action</b>	Set the action for event notifications
	<b>trap</b>	Set the trap action for notifications
	<b>email</b>	Set the email action for notifications
	<b>mgmt-relay</b>	Set the MGMT relay action for notifications
	<b>pwr1-relay</b>	Set the PWR1 relay action for notifications
<b>pwr2-relay</b>	Set the PWR2 relay action for notifications	
<b>Defaults</b>	All configuration, trap, email event notifications are enabled by default.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# config moxa(config)# event-notification poe-event all action trap moxa(config)# no event-notification poe-event all action trap email	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show event-notification event-notification general-event event-notification port-event event-notification switching-event	

## Configure Port Event Notifications

### Commands

**event-notification port-event all**

**event-notification port-event cold-start**

**event-notification port-event all action trap mgmt-relay**

**event-notification port-event cold-start action email pwr1-relay**

**no event-notification port-event all**

**no event-notification port-event cold-start action email pwr2-relay**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>event-notification</b>	Configure event notifications
	<b>port-event</b>	Configure notifications for port events
	<b>all</b>	Notify for all port events
	<b>port-link-up</b>	Notify when a port link goes up
	<b>port-link-down</b>	Notify when a port link goes down
	<b>port-shutdown-by-rate-limit</b>	Notify when a port shuts down by rate limit
	<b>port-recovery-by-rate-limit</b>	Notify when a port recovers by rate limit
	<b>port-shutdown-by-port-security</b>	Notify when a port shuts down by port security
	<b>action</b>	Set the action for event notifications
	<b>trap</b>	Set the trap action for notifications
	<b>email</b>	Set the email action for notifications
	<b>mgmt-relay</b>	Set the MGMT relay action for notifications
	<b>pwr1-relay</b>	Set the PWR1 relay action for notifications
	<b>pwr2-relay</b>	Set the PWR2 relay action for notifications
<b>Defaults</b>	All configuration, trap, email event notifications are enabled by default. Port event notifications are enabled for all ports by default.	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# config moxa(config)# event-notification port-event all action trap moxa(config)# no event-notification port-event all action trap email moxa (config-if)# event-notification port-event all	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show event-notification event-notification general-event event-notification poe-event event-notification switching-event	

## Configure Switching Event Notifications

### Commands

**event-notification switching-event { all | topology-changed | coupling-changed | master-changed | master-mismatched | rstp-topology-changed | rstp-root-changed | rstp-migration | rstp-invalid-bpdu | rstp-new-port-role | redundant-port-health-check-fail | dual-homing-path-changed | dot1x-auth-fail | lldp-table-changed | rmon-raising-alarm | rmon-falling-alarm } [action [trap] [email] [mgmt-relay] [pwr1-relay] [pwr2-relay]**

**no event-notification switching-event { all | topology-changed | coupling-changed | master-changed | master-mismatched | rstp-topology-changed | rstp-root-changed | rstp-migration | rstp-invalid-bpdu | rstp-new-port-role | redundant-port-health-check-fail | dual-homing-path-changed | dot1x-auth-fail | lldp-table-changed | rmon-raising-alarm | rmon-falling-alarm } [action [trap] [email] [mgmt-relay] [pwr1-relay] [pwr2-relay]**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/deletes the entry/resets to default value
	<b>event-notification</b>	Configure event notifications
	<b>switching-event</b>	Configure notifications for switching events
	<b>all</b>	Notify for all switching events
	<b>topology-changed</b>	Notify when the network topology changes
	<b>Turbo-ring-topology-changed</b>	Notify when the Turbo Ring v2 topology changes
	<b>Turbo-chain-topology-changed</b>	Notify when the Turbo Chain topology changes
	<b>Dual-homing-topology-changed</b>	Notify when the dual-homing topology changes
	<b>coupling-changed</b>	Notify when the Turbo Ring v2 coupling changes
	<b>master-changed</b>	Notify when the Turbo Ring v2 master changes
	<b>master-mismatched</b>	Notify when the Turbo Ring v2 master mismatches
	<b>rstp-topology-changed</b>	Notify when the RSTP network topology changes
	<b>rstp-root-changed</b>	Notify when the RSTP root device changes
	<b>rstp-migration</b>	Notify for RSTP migration
	<b>rstp-invalid-bpdu</b>	Notify when the RSTP device receives an invalid BPDU
	<b>rstp-new-port-role</b>	Notify when the RSTP port role changes
	<b>redundant-port-health-check-fail</b>	Notify when the redundant port health check fails
	<b>dual-homing-path-changed</b>	Notify when the dual homing path changes
	<b>dot1x-auth-fail</b>	Notify when 802.1x authentication fails
	<b>lldp-table-changed</b>	Notify when the LLDP remote table changes
	<b>rmon-raising-alarm</b>	Notify when RMON alarm variables values reach or exceed the raising threshold
	<b>rmon-falling-alarm</b>	Notify when RMON alarm variables values reach or fall below the falling threshold
	<b>action</b>	Set the action for event notifications
	<b>trap</b>	Set the trap action for notifications
	<b>email</b>	Set the email action for notifications
	<b>mgmt-relay</b>	Set the MGMT relay action for notifications
	<b>pwr1-relay</b>	Set the PWR1 relay action for notifications
	<b>pwr2-relay</b>	Set the PWR2 relay action for notifications
<b>Defaults</b>	All configuration, trap, email event notifications are enabled by default	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# config moxa(config)# event-notification switching-event all action trap moxa(config)# no event-notification switching -event all action trap email</pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	<pre>show event-notification event-notification general-event event-notification poe-event</pre>	

## Syslog

### Configure Logging Server Settings

#### Commands

**logging-server** <short(1-3)> { ipv4 <ucast\_addr> | <dns\_host\_name> } [ port <integer(1-65535)>]

<b>Syntax Description</b>	<b>logging-server</b>	Configure logging server parameters
	short (1-3)	The index of the syslog server
	ipv4	Configure IPv4 parameters
	ucast_addr	The syslog server IP address
	dns_host_name	The syslog server host domain name
	port	Configure port parameters
	integer (1-65535)	The syslog server port number
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# logging-server 1 ipv4 10.128.1.8 port 514	
<b>Error Messages</b>	'Invalid: The server addresses are duplicated.'	
	'Invalid: The syslog server address cannot be empty if it is enabled.'	
<b>Related Commands</b>	no logging-server <short(1-3)> show logging server	

### Delete a Logging Server Entry

#### Commands

**no logging-server** <short (1-3)>

<b>Syntax Description</b>	<b>no</b>	Remove configuration / delete entry / reset to default value
	<b>logging-server</b>	Configure logging server parameters
	short (1-3)	The index of the logging server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# no logging-server 1	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	logging-server <short(1-3)> { ipv4 <ucast_addr>   <dns_host_name>} [ port <integer(1-65535)>] show logging syslog-server	

### Enable/Disable the Syslog Server

#### Commands

**logging syslog-server** { enable | disable }

<b>Syntax Description</b>	<b>logging</b>	Configure logging server parameters
	<b>syslog-server</b>	Configure the syslog server
	enable	Enable the syslog server
	disable	Disable the syslog server
	<b>Defaults</b>	N/A
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# logging syslog-server { enable   disable }	
<b>Error Messages</b>	'Invalid: The server addresses are duplicated.'	
	'Invalid: The syslog server address cannot be empty if it is enabled.'	
<b>Related Commands</b>	show logging server	

## Show the Syslog Server Configuration

### Commands

show logging syslog-server

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>logging</b>	Display logging server information
	<b>syslog-server</b>	Display syslog server information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Examples</b>	<pre>moxa# show logging syslog-server  Syslog Server Configuration Syslog Enable: disable Index  Server Address  Port  Status  Auth Enable ----- 1      111.2.21.1          514   enable  TLS 2      200.2.2.2           2540  enable  disable 3 Authentication Common name(CN)  Start Time  End Time ----- PKI-123          2020-01-01  2020-12-31</pre>	
<b>Help Message</b>	Display the Syslog logging server table	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	logging server enable logging-server <short(1-3)> {ipv4 <ucast_addr>   <dns_host_name>} [ port <integer(1-65535)>]	

## Copy the Syslog Server Client Certificate and Key

### Commands

copy syslog-server client-certificate {<tftp\_url> | <sftp\_url>} client-key {<tftp\_url> | <sftp\_url>} ca-key {<tftp\_url> | <sftp\_url>}

<b>Syntax Description</b>	<b>copy</b>	Perform the copy operation
	<b>syslog-server</b>	Copy syslog server configurations
	<b>client-certificate</b>	Copy the syslog server client certificate file
	<b>client-key</b>	Copy the syslog server client key file
	<b>ca-key</b>	Copy the syslog server CA key file
	<b>tftp_url</b>	The address of the file on the TFTP server
	<b>sftp_url</b>	The address of the file on the SFTP server
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Examples</b>	<pre>moxa# copy syslog-server client-certificate tftp://192.168.127.200/filename1 client-key tftp://192.168.127.200/filename2 ca-key tftp://192.168.127.200/filename3 moxa# copy syslog-server client-certificate sftp://username:password@192.168.127.200/filename1 client-key sftp://username:password@192.168.127.200/filename2 ca-key sftp://username:password@192.168.127.200/filename3</pre>	
<b>Error Messages</b>	The certificate and key are not in the same set.	
<b>Related Commands</b>	show logging syslog-server clear syslog-server certificate-and-key	

## Clear the Syslog Server Client Certificate and Key

### Commands

**clear syslog-server certificate-and-key**

<b>Syntax Description</b>	<b>clear</b>	Perform the clear operation
	<b>syslog-server</b>	Clear the syslog server configuration
	<b>certificate-and-key</b>	Clear the syslog authentication certificate and key file
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Examples</b>	moxa# clear syslog-server certificate-and-key	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show logging syslog-server copy syslog-server client-certificate {<tftp_url>   <sftp_url>} client-key {<tftp_url>   <sftp_url>} ca-key {<tftp_url>   <sftp_url>}	

## Disable Syslog Server TLS Authentication

### Commands

**logging-server <short(1-3)> authentication {disable | tls}**

<b>Syntax Description</b>	<b>logging-server</b>	Configure logging server parameters
	<b>short(1-3)</b>	The index of the syslog server
	<b>authentication</b>	Configure the authentication method
	disable	Disable authentication
	tls	Use TLS authentication
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# logging-server 1 authentication tls moxa(config)# logging-server 2 authentication disable	
<b>Error Messages</b>	The authentication certificate and key do not exist.	
<b>Related Commands</b>	no logging-server <short(1-3)> show logging server	

## SNMP Trap/Inform

### Show SNMP Trap Information

#### Commands

**show snmp-trap information**

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>snmp-trap</b>	Display SNMP trap information
	<b>information</b>	Display general SNMP trap information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show snmp-trap information ----- snmp-trap : ----- inform-retry : 3 inform-timeout : 10	
<b>Error Messages</b>	% Can't get snmp-trap information % Can't get snmp-trap jason object	
<b>Related Commands</b>	snmp-trap	

## Show SNMP Trap User Account Information

### Commands

**show snmp-trap user**

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>snmp-trap</b>	Display SNMP trap information
	<b>user</b>	Display SNMP trap user accounts
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show snmp-trap user ----- snmp-trap user-account      : 1 ----- user-name                   : testNoAuthNoPriv authenticate-type           : none encryption-method           : disable</pre>	
<b>Error Messages</b>	<pre>% Can't get snmp-trap user-account information % Can't get snmp-trap user-account table % Can't get snmp-trap user-account table index ('%d')</pre>	
<b>Related Commands</b>	snmp-trap	

## Show SNMP Trap Host Information

### Commands

**show snmp-trap host**

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>snmp-trap</b>	Display SNMP trap information
	<b>host</b>	Display SNMP trap host information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	<pre>moxa# show snmp-trap host ----- snmp-trap host-table       : 2 ----- hostName                   : 192.168.137.254 mode                       : trap-v1 community                  : public  hostName                   : 192.168.127.253 mode                       : inform-v3 community                  :</pre>	
<b>Error Messages</b>	<pre>% Can't get snmp-trap host information % Can't get snmp-trap host table % Can't get snmp-trap host table index('%d')</pre>	
<b>Related Commands</b>	snmp-trap	

## Email Settings

### Configure Email Notification Server Settings

#### Command

**email-notification server server-address** <uicast\_addr> [server-port <integer(1-65535)>] **username** <string(60)> **password** <string(60)>

Syntax	Description	
	<b>email-notification</b>	Configure email notification parameters
	<b>server</b>	Configure email server parameters
	<b>server-address</b>	Configure the email notification server IP address
	uicast_addr	The email notification server IP address
	server-port	The email notification server IP port
	<b>username</b>	Configure the email notification server username
	string(60)	The email server username
	<b>password</b>	Configure the email notification server password
	string(60)	The email server password
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# email-notification server-address 1.2.3.4 username aaa password bbb	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Configure the Email Notification Sender

#### Commands

**email-notification sender** <string (60)>

Syntax	Description	
	<b>email-notification</b>	Configure email notification parameters
	<b>sender</b>	Configure the email notification sender's email address
	string (60)	The sender's email address (up to 60 characters)
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# email-notification sender testuser@test.com	
<b>Error Messages</b>	Invalid Email Format	
<b>Related Commands</b>	N/A	

### Configure the Email Notification Server TLS Mode Setting

#### Commands

**email-notification server tls** {enable | disable}

Syntax	Description	
	<b>email-notification</b>	Configure email notification parameters
	<b>server</b>	Configure server parameters
	<b>tls</b>	Configure the email notification server TLS mode
	enable	Enable TLS mode
	disable	Disable TLS mode
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# mail-server server tls enable (config)# mail-server server tls disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure the Email Notification Recipient

### Commands

**email-notification receiver** <string (60)> **index** <integer (1-5)>

**no email-notification receiver index** <integer (1-5)>

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>email-notification</b>	Configure email notification parameters
	<b>receiver</b>	Configure the email notification receiver
	string (60)	The receiver's name (up to 60 characters)
	<b>index</b>	Configure the index of the receiver
	integer (1-5)	The number index of the recipient (1 to 5)
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	(config)# email-notification receiver testuser@test.com index 1 (config)# no email-notification receiver index 1	
<b>Error Messages</b>	Invalid Email Format	
<b>Related Commands</b>	N/A	

## Show Email Notification Server Settings

### Commands

**show email-notification server**

<b>Syntax Description</b>	<b>show</b>	Display the configuration/statistics/general information
	<b>email-notification</b>	Display email notification parameters
	<b>server</b>	Display server parameters
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC / User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	# show email-notification server	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Relay Alarm

### Configure Relay Alarm Cut-off Settings

#### Commands

**relay alarm cut-off mgmt-relay**

**relay alarm cut-off pwr1-relay**

**relay alarm cut-off pwr2-relay**

<b>Syntax Description</b>	<b>relay</b>	Configure relay parameters
	<b>alarm</b>	Configure the relay alarm
	<b>cut-off</b>	Configure relay alarm cut-off settings
	<b>mgmt-relay</b>	Cut off the mgmt-relay alarm
	<b>pwr1-relay</b>	Cut off the pwr1-relay alarm
	<b>pwr2-relay</b>	Cut off the pwr2-relay alarm
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# relay alarm cut-off mgmt-relay	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable fault-led-display

### Commands

relay alarm fault-led-display enable

relay alarm fault-led-display disable

<b>Syntax Description</b>	<b>relay</b>	Relay related command
	<b>alarm</b>	Set relay alarm related command
	<b>fault-led-display</b>	Set relay fault-led-display related command
	<b>enable</b>	Enable fault-led-display
	<b>disable</b>	Disable fault-led-display
<b>Defaults</b>	Fault LED Display is default disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# config moxa(config)# relay alarm fault-led-display enable moxa(config)# relay alarm fault-led-display disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show Relay Alarm

### Commands

show relay alarm status {mgmt-relay | pwr1-relay | pwr2-relay}

<b>Syntax Description</b>	<b>show</b>	Displays running information for the feature
	<b>relay</b>	Display relay information
	<b>alarm</b>	Display relay alarm information
	<b>status</b>	Display all relay status
	<b>mgmt-relay</b>	Display mgmt-relay status
	<b>pwr1-relay</b>	Display pwr1-relay status
	<b>pwr2-relay</b>	Display pwr2-relay status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC /User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show relay alarm status Relay Alarm Status: mgmt-relay : Short pwr1-relay : Open pwr2-relay : Not Present  moxa# show relay alarm status mgmt-relay Relay Alarm Status: mgmt-relay : Short	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	show relay alarm status mgmt-relay show relay alarm status pwr1-relay show relay alarm status pwr2-relay	

## Show fault-led-display

### Commands

**show relay alarm fault-led-display**

<b>Syntax Description</b>	<b>show</b>	Displays running information for the feature
	<b>relay</b>	Display relay information
	<b>alarm</b>	Display relay alarm information
	<b>fault-led-display</b>	Display relay alarm fault-led-display configuration
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC /User EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show relay alarm fault-led-display Relay Alarm Fault-LED-Display :Enabled	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Maintenance and Tools

### Locator

#### Show the Locator

##### Commands

**locator** [ duration ]

<b>Syntax Description</b>	<b>locator</b>	Activate the device locator to force the device LEDs to blink
	duration	The duration of the locator in seconds
<b>Defaults</b>	The locator duration is set to 60 seconds by default.	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# locator 100	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

### Reboot

#### Reboot the Switch

##### Commands

**reload**

<b>Syntax Description</b>	<b>reload</b>	Perform a warm restart
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# reload Are you sure you want to restart the device? [y/N] y Restarting device...	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Reset to Default

### Reset to Default

#### Commands

**reload factory-default [all]**

<b>Syntax Description</b>	<b>reload</b>	Halt and perform a warm restart
	<b>factory-default</b>	Halt and perform a warm restart with factory default
	<b>all</b>	Reset startup configurations, log files, certificate, and key to factory default
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# reload factory-default Are you sure you want to reset the system configuration to the factory default settings? [Y/N] Resetting device into factory default and restarting...  moxa# reload factory-default all Are you sure you want to reset the system configuration and all user data including configuration, log files, and credential keys to the factory default settings? [Y/N] Resetting device into factory default and restarting...	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Log Out

#### Commands

**exit**

<b>Syntax Description</b>	<b>exit</b>	Log out from the device
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# exit	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable or Disable the Tech Support Mechanism

#### Commands

**tech-support system [ enable | disable ]**

<b>Syntax Description</b>	<b>tech-support</b>	Configure tech support troubleshooting settings
	<b>system</b>	Configure tech support for the switch system
	enable	Enable the tech support function
	disable	Disable the tech support function
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# tech-support system enable Warning! The Telnet/HTTP service will be disabled. Account Name: moxasupport Account Password: nZParGhefA	
<b>Error Messages</b>	"% Error! tech-support system hasn't yet been enabled." "% Account: Invalid: Max user account amount reached."	
<b>Warning Messages</b>	"Warning! The Telnet/HTTP service will be disabled." "Please save config to eliminate the account, moxasupport, from the system."	
<b>Related Commands</b>	tech-support system login	

## Log In to the Tech Support Mechanism

### Commands

#### tech-support system login

<b>Syntax Description</b>	<b>tech-support</b>	Configure tech support troubleshooting settings
	<b>system</b>	Configure tech support for the switch system
	<b>login</b>	Log in to the Linux shell
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# tech-support system login CLI console locked Enter Password to unlock the console: #	
<b>Error Messages</b>	"% Error! tech-support system hasn't yet been enabled."	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	tech-support system enable	

## Industrial Applications

### IEC 61850

#### MMS

#### Enable/Disable MMS

### Commands

**mms** {enable | disable}

<b>Syntax Description</b>	<b>mms</b>	Configure MMS parameters
	enable	Enable MMS
	disable	Disable MMS
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# mms enable moxa(config)# mms disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

#### Configure MMS IED Name

### Commands

**mms ied** <iedname>

<b>Syntax Description</b>	<b>mms</b>	Configure MMS parameters
	<b>ied</b>	Configure the IED name
	<b>&lt;iedname&gt;</b>	Specify the IED name
<b>Defaults</b>	Switch model name	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	This command is to configure MMS IED name.	
<b>Examples</b>	moxa (config)# mms ied test	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Configure MMS RCB Settings

### Commands

**mms rcb** < rcb name > { dchg < **enable** | **disable** > | qchg < **enable** | **disable** > | dupd < **enable** | **disable** > | integrity < **enable** | **disable** > | bufTime <1-4294967295> | intgPd <1-4294967295> }

**mms rcb** {urcbLnkSt | brcbLnkSt | urcbSysSt | brcbSysSt} {{dchg | qchg | dupd | integrity} {**enable** | **disable**} | {bufTime | intgPd} <value (1-4294967295)>}

Syntax Description		
	<b>mms</b>	Configure MMS parameters
	<b>rcb</b>	Configure RCB parameters
	<b>enable</b>	Enable the specified RCB parameters
	<b>disable</b>	Disable the specified RCB parameters
	<b>urcbLnkSt</b>	Configure the urcbLnkSt table
	<b>brcbLnkSt</b>	Configure the brcbLnkSt table
	<b>urcbSysSt</b>	Configure the urcbSysSt table
	<b>brcbSysSt</b>	Configure the brcbSysSt table
	dchg	Configure the dchg for the specific RCB
	qchg	Configure the qchg for the specific RCB
	dupd	Configure the dupd for the specific RCB
	integrity	Configure the integrity for the specific RCB
	bufTime	Configure the buffer time for the specific RCB
	intgPd	Configure the integrity period for the specific RCB
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	This command is to configure RCB attributes.	
<b>Examples</b>	moxa (config)# mms rcb rcname1 dchg disable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Export the MMS CID File

### Commands

**mms cid export** { tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename }

Syntax Description		
	<b>mms</b>	Configure MMS parameters
	<b>cid</b>	Configure the CID file
	<b>export</b>	Export the CID file
	tftp://server/filename	The address of the remote TFTP server and filename in the format "tftp://server/filename"
	sftp://<user-name>:<pass-word>@server/filename	The address, username, and password of the remote SFTP server and filename in the format "sftp://username:password@server/filename"
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	This command is to export the CID file of the switch.	
<b>Examples</b>	moxa (config)# mms cid export tftp://192.168.127.50/export_cid	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable MMS T-profile Security

### Commands

**mms t-profile security** { enable | disable }

<b>Syntax Description</b>	<b>mms</b>	Configure MMS parameters
	<b>t-profile</b>	Configure T-profile settings
	<b>security</b>	Configure security setting
	<b>enable</b>	Enable T-profile security
	<b>disable</b>	Disable T-profile security
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# mms t-profile security enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Import/Export the MMS T-Profile CA File

### Commands

**mms t-profile ca import** { tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename }

**mms t-profile ca export** { tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename }

<b>Syntax Description</b>	<b>mms</b>	Configure MMS parameters
	<b>t-profile</b>	Configure T-profile settings
	<b>ca</b>	Configure the CA file
	<b>import</b>	Import the CA file
	<b>export</b>	Export the CA file
	tftp://server/filename	The address of the remote TFTP server and filename in the format "tftp://server/filename"
sftp://<user-name>:<pass-word>@server/filename	The address, username, and password of the remote SFTP server and filename in the format "sftp://username:password@server/filename"	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	This command is to import or export the T-profile CA file of the switch.	
<b>Examples</b>	moxa(config)# mms t-profile ca import tftp://192.168.127.50/tprofile_ca moxa(config)# mms t-profile ca export tftp://192.168.127.50/tprofile_ca	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Import/Export the T-profile Certificate File

### Commands

**mms t-profile certificate import** { tftp://server/filename | sftp://<user-name>:<password>@server/filename }

**mms t-profile certificate export** { tftp://server/filename | sftp://<user-name>:<password>@server/filename }

<b>Syntax Description</b>	<b>mms</b>	Configure MMS parameters
	<b>t-profile</b>	Configure T-profile settings
	<b>certificate</b>	Configure certificate settings
	<b>import</b>	Import the certificate file
	<b>export</b>	Export the certificate
	tftp://server/filename	The address of the remote TFTP server and filename in the format "tftp://server/filename"
sftp://<user-name>:<password>@server/filename	The address, username, and password of the remote SFTP server and filename in the format "sftp://username:password@server/filename"	
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	This command is to import or export the T-profile certificate file of the switch.	
<b>Examples</b>	moxa(config)# mms t-profile certificate import tftp://192.168.127.50/tpprofile_pfx moxa(config)# mms t-profile certificate export tftp://192.168.127.50/tpprofile_pfx	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Enable/Disable MMS A-profile Security

### Commands

**mms a-profile security** { enable | disable }

<b>Syntax Description</b>	<b>mms</b>	Configure MMS parameters
	<b>a-profile</b>	Configure the A-profile settings
	<b>security</b>	Configure security settings
	<b>enable</b>	Enable A-profile security
	<b>disable</b>	Disable A-profile security
<b>Defaults</b>	Enabled	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# mms a-profile security enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Import/Export the A-profile Certificate File

### Commands

**mms a-profile certificate import** { tftp://server/filename | sftp://<user-name>:<password>@server/filename }

**mms a-profile certificate export** { tftp://server/filename | sftp://<user-name>:<password>@server/filename }

<b>Syntax Description</b>	<b>mms</b>	Configure MMS parameters
	<b>a-profile</b>	Configure A-profile settings
	<b>certificate</b>	Configure certificate settings
	<b>import</b>	Import the certificate file
	<b>export</b>	Export the certificate file
	tftp://server/filename	The address of the remote TFTP server and filename in the format "tftp://server/filename"
	sftp://<user-name>:<password>@server/filename	The address, username, and password of the remote SFTP server and filename in the format "sftp://username:password@server/filename"
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	This command is to import or export the A-profile certificate file of the switch.	
<b>Examples</b>	moxa(config)# mms a-profile certificate import tftp://192.168.127.50/tprofile_pfx moxa(config)# mms a-profile certificate export tftp://192.168.127.50/tprofile_pfx	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show the MMS Status

### Commands

**show mms enable**

<b>Syntax Description</b>	<b>show</b>	Display the configuration
	<b>mms</b>	Display MMS settings
	<b>enable</b>	Display the MMS status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command shows MMS status information.	
<b>Examples</b>	moxa# show mms enable mms enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show the MMS IED Name

### Commands

**show mms iedname**

<b>Syntax Description</b>	<b>show</b>	Display the configuration
	<b>mms</b>	Display MMS settings
	<b>iedname</b>	Display the IED name
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command shows MMS IED information.	
<b>Examples</b>	moxa# show mms iedname IED name: RKS4000	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show MMS RCB Information

### Commands

show mms rcb

<b>Syntax Description</b>	<b>show</b>	Display the configuration
	<b>mms</b>	Display MMS settings
	<b>rcb</b>	Display RCB information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command shows MMS RCB information.	
<b>Examples</b>	<pre> moxa# show mms rcb Report Control Block Table ----- urcbLnkSt  DataChange      = ENABLED QualityChange   = DISABLED DataUpdate      = DISABLED Integrity       = ENABLED BufferTime      = 1000 IntegrityPeriod = 5000 ----- brcbLnkSt  DataChange      = ENABLED QualityChange   = DISABLED DataUpdate      = DISABLED Integrity       = ENABLED BufferTime      = 1000 IntegrityPeriod = 5000 ----- urcbSysSt  DataChange      = ENABLED QualityChange   = DISABLED DataUpdate      = DISABLED Integrity       = ENABLED BufferTime      = 1000 IntegrityPeriod = 5000 ----- brcbSysSt  DataChange      = ENABLED QualityChange   = DISABLED DataUpdate      = DISABLED Integrity       = ENABLED BufferTime      = 1000 IntegrityPeriod = 5000 </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show the MMS T-profile Status

### Commands

**show mms t-profile enable**

<b>Syntax Description</b>	<b>show</b>	Display the configuration
	<b>mms</b>	Display MMS settings
	<b>t-profile</b>	Display T-profile settings
	<b>enable</b>	Display the T-profile status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command is used to check if MMS T-profile is enabled.	
<b>Examples</b>	moxa# show mms t-profile enable mms t-profile enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show the MMS A-profile Status

### Commands

**show mms a-profile enable**

<b>Syntax Description</b>	<b>show</b>	Display the configuration
	<b>mms</b>	Display MMS settings
	<b>a-profile</b>	Display A-profile settings
	<b>enable</b>	Display the A-profile status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC Mode	
<b>Usage Guidelines</b>	This command is used to check if MMS A-profile is enabled.	
<b>Examples</b>	moxa# show mms a-profile enable mms a-profile enable	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## GOOSE Check

### Show GOOSE Check Information

#### Commands

**show goose-check**

<b>Syntax Description</b>	<b>show</b>	Show running system information
	<b>goose-check</b>	Display GOOSE Check setting
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show goose-check GOOSE Check : Enabled GOOSE Lock : Disabled GOOSE Check Tamper Response : No Action	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	goose-check	

## Display GOOSE Monitoring Table

### Commands

**show goose-check table [ basic | status ]**

<b>Syntax Description</b>	<b>show</b>	Show running system information
	<b>goose-check</b>	Display GOOSE Check information
	<b>table</b>	Display GOOSE monitoring table
	<b>basic</b>	Display GOOSE basic information
	<b>status</b>	Display GOOSE received counter and status
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show goose-check table basic	
	<pre> Index  APP ID  GOOSE Address      GoCB Name          VID  Port  Type -----  -----  - 1      0x0017  01:0C:CD:01:00:01 REF615LD0/gcbgoose1  1   1/1  Static 2      0x0018  01:0C:CD:01:00:01 REF615LD0/gcbgoose2  1   2/1  Static 3      0x0019  01:0C:CD:01:00:01 REF615LD0/gcbgoose3  2   3/1  Dynamic 4      0x0020  01:0C:CD:01:00:01 REF615LD0/gcbgoose4  40  4/1  Dynamic </pre>	
<b>Examples</b>	moxa# show goose-check table status	
	<pre> Lock Violation Status : Normal Index  APP ID  GOOSE Address      Rx Counter  status ----  - 1      0x0017  01:0C:CD:01:00:01  0           Healthy 2      0x0018  01:0C:CD:01:00:01  0           Healthy 3      0x0019  01:0C:CD:01:00:01  12          Timeout 4      0x0020  01:0C:CD:01:00:01  8           SA Tampered </pre>	
<b>Error Messages</b>	N/A	
<b>Related Commands</b>	goose-check	

## Enable/disable GOOSE Check Function

### Commands

**goose-check { enable | disable }**

<b>Syntax Description</b>	<b>goose-check</b>	Configure GOOSE Check
	<b>enable</b>	Enable GOOSE Check
	<b>disable</b>	Disable GOOSE Check
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# goose-check enable	
	moxa(config)# goose-check disable	
<b>Error Messages</b>	% Goose Check: Invalid: Entry limit reached. To add more GOOSE Check entries, delete unnecessary ACL entries, binding database entries used by Dynamic ARP Inspection or IP Source Guard, or GOOSE Check entries.	
<b>Related Commands</b>	show goose-check	

## Enable/disable GOOSE Check GOOSE lock Function

### Commands

**goose-check lock**

**no goose-check lock**

<b>Syntax Description</b>	<b>goose-check</b>	Configure GOOSE Check
	<b>lock</b>	Configure GOOSE lock
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# goose-check lock moxa(config)# no goose-check lock	
<b>Error Messages</b>	% Goose Check: Invalid: The gooseLockEnable command is unavailable if GOOSE Check is disabled.	
<b>Related Commands</b>	show goose-check	

## Configure response of tamper event

### Commands

**goose-check tamper-response drop**

**goose-check tamper-response port-disable**

**no goose-check tamper-response**

<b>Syntax Description</b>	<b>goose-check</b>	Configure GOOSE Check
	<b>tamper-response</b>	Configure GOOSE Check tamper response
	<b>drop</b>	Drop incoming tampered GOOSE messages
	<b>port-disable</b>	Disable admin status of tampered GOOSE messages ingress ports
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# goose-check tamper-response drop moxa(config)# goose-check tamper-response port-disable moxa(config)# no goose-check tamper-response	
<b>Error Messages</b>	% Goose Check: Invalid: The tamperResponse command is unavailable if GOOSE Check is disabled.	
<b>Related Commands</b>	show goose-check	

## Add GOOSE Address

### Commands

**goose-check add** [appid] [address]

**no goose-check** [appid] [address]

<b>Syntax Description</b>	<b>goose-check</b>	Configure GOOSE Check
	<b>add</b>	Add a static entry
	appid	GOOSE application identifier (hex format)
	address	The destination MAC address of GOOSE message
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# goose-check add 0xA0F1 01:0C:CD:01:00:23	
	moxa(config)# no goose-check 0xA0F1 01:0C:CD:01:00:23	
<b>Error Messages</b>	% Goose Check: Invalid: The 4 bytes of the MAC address prefix should be in the format: 01:0c:cd:01	
	% Goose Check: Invalid: The same static goose entry already exists.	
	% Goose Check: Invalid: Reached the maximum number of GOOSE entries (100).	
<b>Related Commands</b>	N/A	

## Reset counter

### Commands

**goose-check reset** [appid] [address]

<b>Syntax Description</b>	<b>goose-check</b>	Configure GOOSE Check
	<b>reset</b>	Reset received counter and timeout counter
	appid	GOOSE application identifier (hex format)
	address	The destination MAC address of GOOSE message
<b>Defaults</b>	NULL	
<b>Command Modes</b>	Interface configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# goose-check reset 0xA0F1 01:0C:CD:01:00:23	
<b>Error Messages</b>	% Goose Check: Invalid: The 4 bytes of the MAC address prefix should be in the format: 01:0c:cd:01	
<b>Related Commands</b>	N/A	

# Modbus TCP

## Enable/Disable Modbus TCP

### Commands

**modbus-tcp** { enable|disable}

<b>Syntax Description</b>	<b>modbus-tcp</b>	Configure Modbus TCP parameters
	enable	Enable Modbus TCP
	disable	Disable Modbus TCP
<b>Defaults</b>	Disabled	
<b>Command Modes</b>	Global Configuration Mode	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)# modbus-tcp enable moxa(config)# modbus-tcp disable	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	Are you sure you want to enable a non-secure protocol (Modbus TCP)? [y/N]	
<b>Related Commands</b>	show modbus-tcp	

## Show Modbus TCP Information

### Commands

Show **modbus-tcp**

<b>Syntax Description</b>	<b>show</b>	Display configuration/status information
	<b>modbus-tcp</b>	Display Modbus TCP information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show modbus-tcp Modbus TCP Service: Disabled Listening TCP Port: 502 Maximum Session: 5	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# PROFINET

## Enable/Disable PROFINET

### Commands

**profinet** {enable | disable}

<b>Syntax Description</b>	<b>profinet</b>	Configure PROFINET parameters
	enable	Enable PROFINET on the switch
	disable	Disable PROFINET on the switch
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)#profinet enable moxa(config)#profinet disable	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	"Are you sure you want to enable a non-secure protocol (PROFINET)? [y/N]"	
<b>Related Commands</b>	N/A	

## Configure the PROFINET Device Name

### Commands

**profinet device-name** <profinet-device-name>

<b>Syntax Description</b>	<b>profinet</b>	Configure PROFINET parameters
	<b>device-name</b>	Configure PROFINET device name parameters
	profinet-device-name	Specify the device name in accordance to the PROFINET naming rules defined by IEC 61158-6-10
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)#no profinet interface	
<b>Error Messages</b>	Invalid: The maximum number of characters for a device name is 240. Invalid: The device name cannot be in IP address format. Invalid: The device name cannot start with "port-" followed by 3 or more digits. Invalid: Each label must be between 1 and 63 characters long. Invalid: Labels cannot start or end with a period (.). Invalid: Labels cannot start or end with a dash (-). Invalid: Only a-z, 0-9 . - are allowed.	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Reset the PROFINET Device Name

### Commands

**no profinet device-name**

<b>Syntax Description</b>	<b>no</b>	Disable the configuration/delete the entry/reset to default value
	<b>profinet</b>	Configure PROFINET parameters
	<b>device-name</b>	Reset the PROFINET device name
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# configure moxa(config)#no profinet device-name	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

## Show PROFINET Information

### Commands

**show profinet**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>profinet</b>	Display PROFINET information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show profinet PROFINET: Disabled Device Name: Interface Name: vlan1 Link Status: Disconnected	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# EtherNet/IP

## Enable/Disable EtherNet/IP

### Commands

**eip** {enable | disable}

<b>Syntax Description</b>	<b>eip</b>	Configure EtherNet/IP parameters
	enable	Enable EtherNet/IP on the switch
	disable	Disable EtherNet/IP on the switch
<b>Defaults</b>	Disable	
<b>Command Modes</b>	Global Configuration	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa(config)# eip enable moxa(config)# eip disable	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	Are you sure you want to enable a non-secure protocol EtherNet/IP? [y/N]	
<b>Related Commands</b>	show eip	

## Show EtherNet/IP Information

### Commands

**show eip**

<b>Syntax Description</b>	<b>show</b>	Display configuration / statistics / general information
	<b>eip</b>	Display EtherNet/IP information
<b>Defaults</b>	N/A	
<b>Command Modes</b>	User EXEC Privileged EXEC	
<b>Usage Guidelines</b>	N/A	
<b>Examples</b>	moxa# show eip EtherNet/IP Status: Enabled	
<b>Error Messages</b>	N/A	
<b>Warning Messages</b>	N/A	
<b>Related Commands</b>	N/A	

# A. Protocol port numbers for external interfaces

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## Protocol: TCP

Service Type	Port Number	Default state	Port can be modified	CLI Command to show port status
SSH	22	Enabled	Y	show ip service information
Telnet	23	Disabled	Y	show ip service information
E-Mail Server (SMTP)	25	Disabled	Y	show email-notification server
TACACS+	49	Disabled	Y	show tacacs server
HTTP	80	Enabled	Y	show ip service information
MMS	102	Disabled	N	N/A
HTTPS	443	Enabled	Y	show ip service information
Moxa Service	443	Enabled	N	N/A
Modbus	502	Disabled	N	Show Modbus TCP Information
Ethernet/IP	44818	Disabled	N	N/A

## Protocol: UDP

Service Type	Port Number	Default state	Port can be modified	CLI Command to show port status
DHCP Server	67	Disabled	N	N/A
NTP	123	Disabled	N	N/A
SNMP	161	Disabled	Y	show ip service information
PTP (IP based)	319/320	Disabled	N	N/A
Syslog	514	Disabled	Y	show logging syslog-server
RADIUS	1812	Disabled	Y	Show RADIUS Server Information
Ethernet/IP	2222	Disabled	N	N/A
PROFINET	34964/49152	Disabled	N	N/A
Moxa Service	40404	Enabled	N	N/A