Moxa Managed Switch Next-generation OS (v3.x) Layer 3 Command Line Interface

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www.moxa.com/products

Models covered by this user manual:

MDS-G4000-L3-4XGS Series Managed Ethernet Switches
RKS-G4000 Series Managed Ethernet Switches (L3 Models)

Moxa Managed Switch Next-generation OS (v3.x) Layer 3 Command Line Interface

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1. About This Manual

This manual describes how to use the command line to configure Moxa's layer 3 managed Ethernet switches. Both the web interface configuration utility and command line interface help system administrators easily and quickly manage, monitor, and configure Moxa's managed Ethernet switch.

2. Understanding the Command Line Interface

This chapter helps users understand the command line interface by giving a general overall introduction to the command line operations.

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.
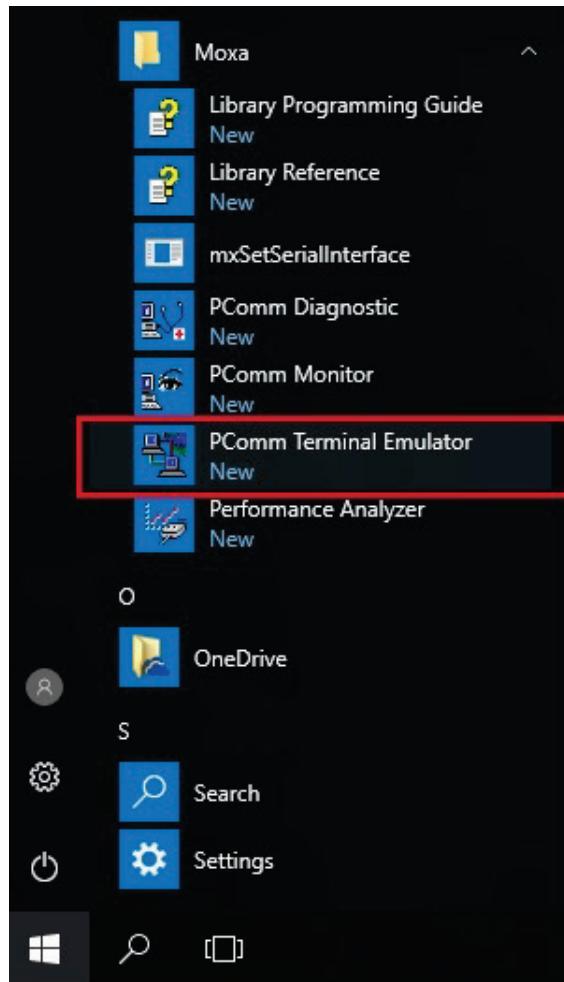
✏️ **NOTE**

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.

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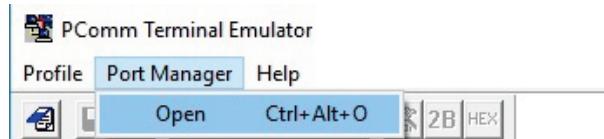
1. Use the RS-232 serial cable with RJ45 interface that is included with the switch.
2. Connect the RJ45 interface end to the console port on the switch, and the other end to the computer.
3. Download the **PComm Terminal Emulator** from the Moxa website and install the software.

4. In Windows, click **Start > Moxa > PComm Terminal Emulator**.
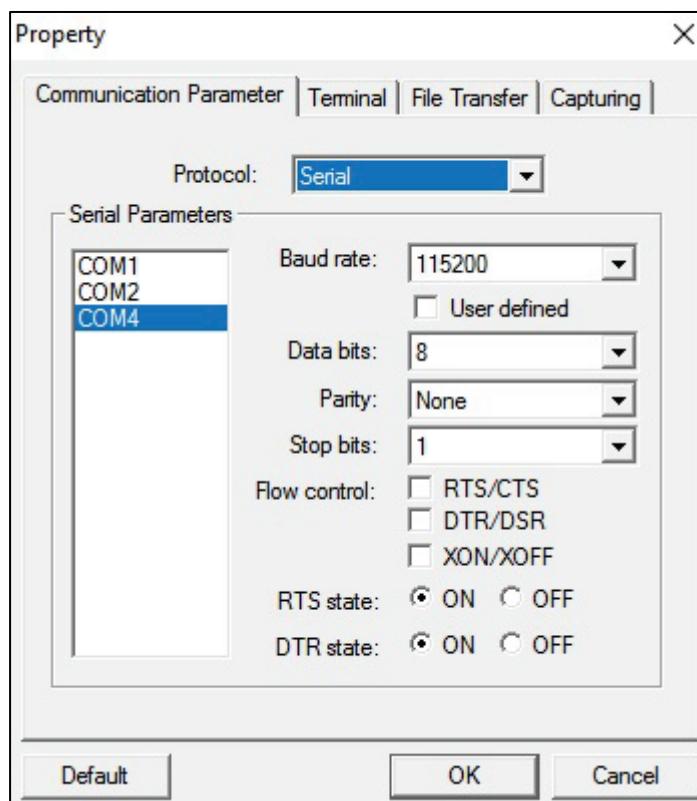
5. Click **Port Manager > Open** to establish a new connection.
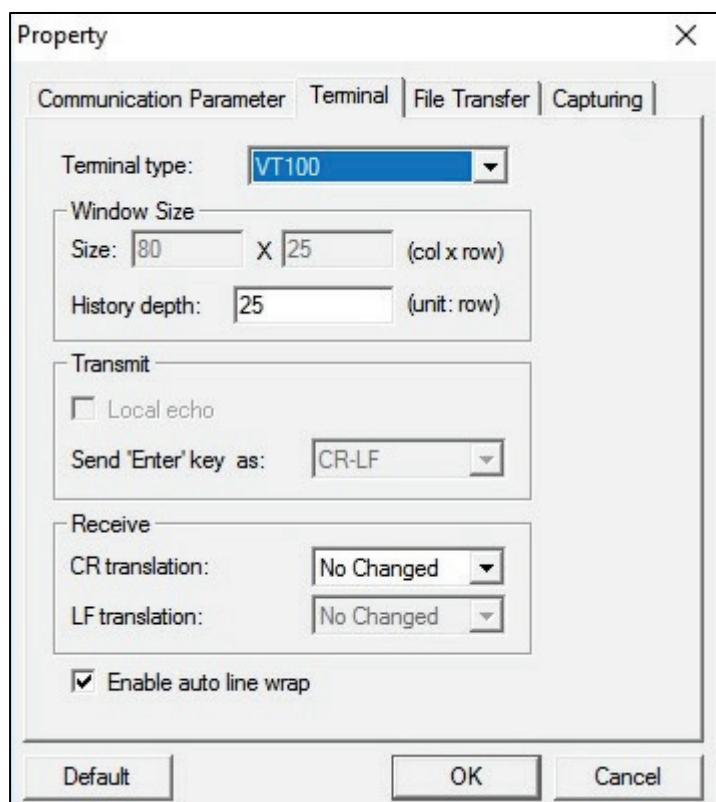
The Property window will appear.
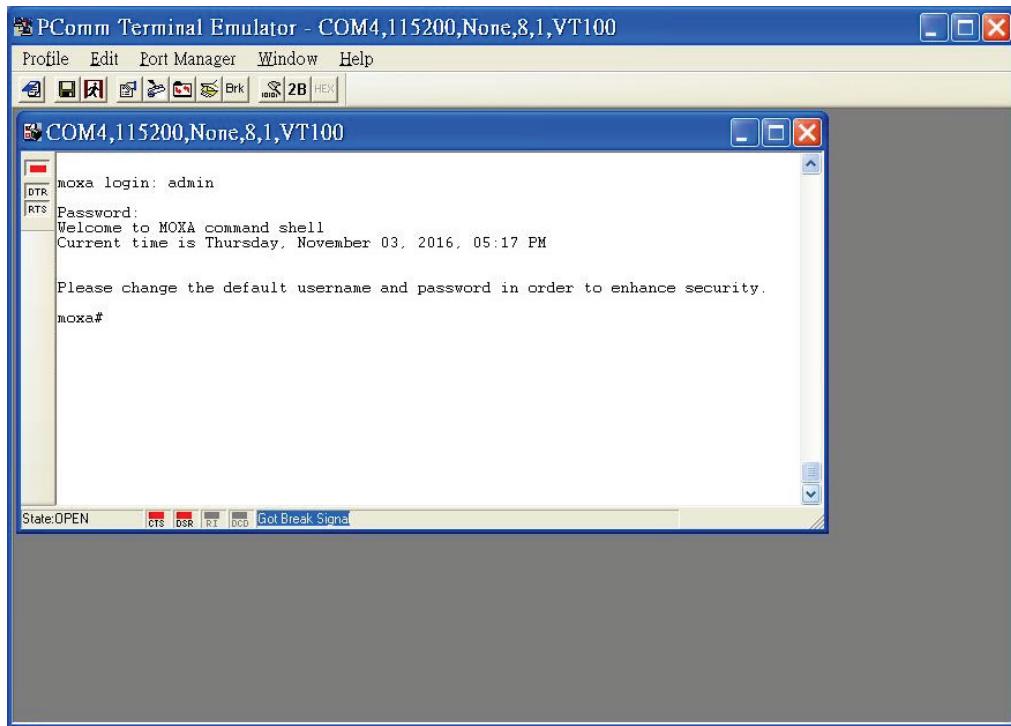
6. On the **Communication Parameter** tab, select the COM port that will be used for the console connection. Configure the fields as follows: **115200** for **Baud rate**, **8** for **Data bits**, **None** for **Parity**, and **1** for **Stop bits**.

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

8. 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).

9. 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.
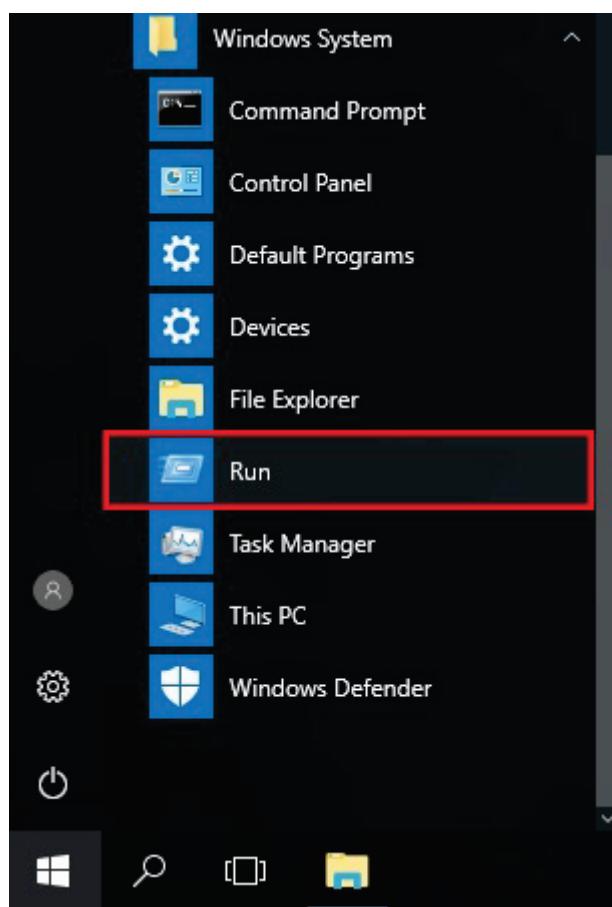
✎ **NOTE**
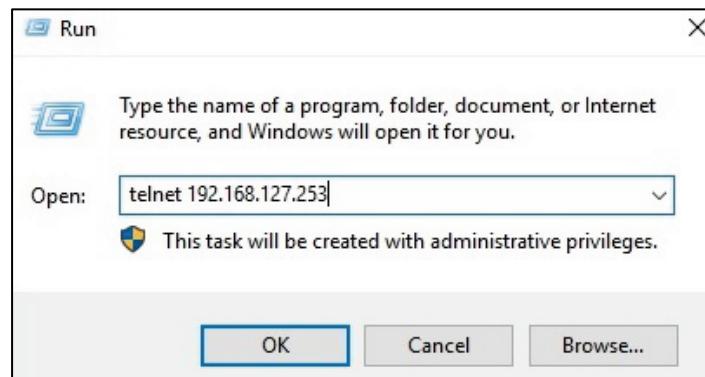
The Moxa switch's default IP address is 192.168.127.253 with subnet mask of 255.255.255.0.

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:
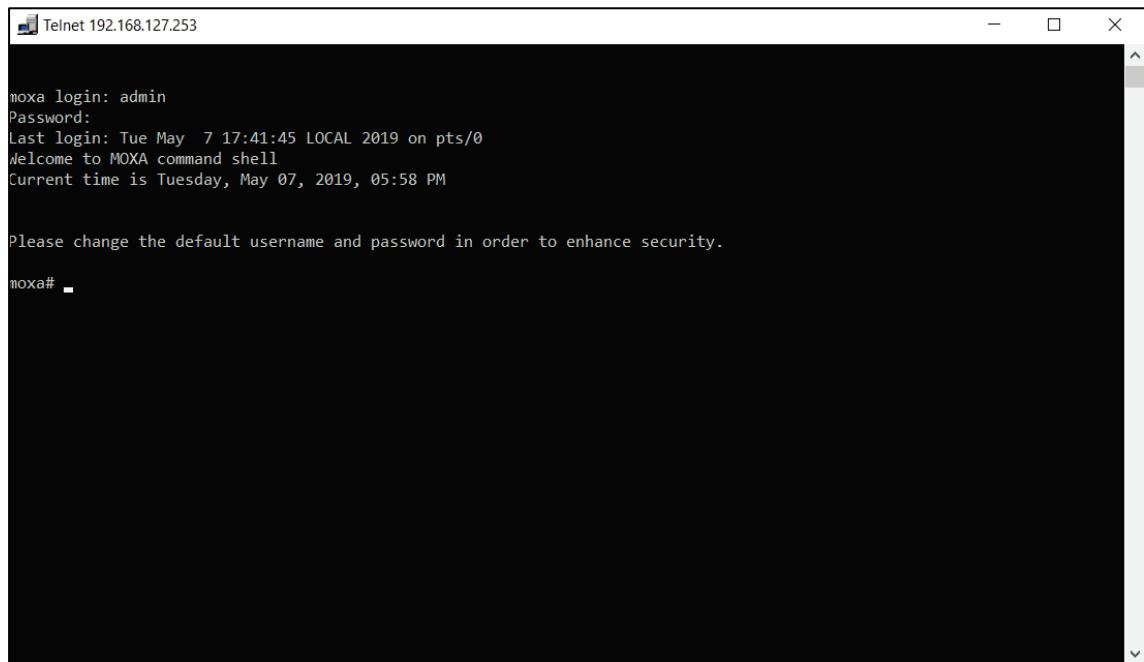
1. In Windows, click **Start > Run**.

2. 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.

3. 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# _
```

4. 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 key pair
cli                 Configure the CLI display parameters
configure           Enter configuration mode
copy                Perform copy operation
debug               Configures trace for the protocol
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
remove              Remove an online account
show                Display configuration / statistics / general
                    information
tech-support        Trouble-shooting purpose

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 **user**.	moxa>	Enter the **exit** 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 **admin**.	moxa #	Enter the **exit** command. This will return you to the previous configuration mode.	Use this mode to verify commands that you have entered.
Global configuration	Enter the **configure** command while in Privileged EXEC mode.	moxa (config)#	Enter the **exit** 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 **interface** command, followed by an interface identification.	moxa (config-if)#	Enter the **exit** 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#
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 enclose the command in quotation marks ("”), as shown below.

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

! ---------------------------------------
! Time: 2019-05-07 18:01:08
! Model name: MDS-G4020-L3
! Firmware version: v1.9.6 Build 2020_1230_0945
! Product revision: V1.0.0
! IP address: 192.168.127.253
! MAC address: 00:90:E8:7A:02:2C
! Serial number: TAICB1122978
! Module M2 product revision: None
! Module M3 product revision: None
! Module M4 product revision: None
! Module M5 product revision: None
! ---------------------------------------
configure terminal
session timeout 0
contact "test#"
ip telnet server enable
snmp-server access enable
interface ethernet 1/1
qos scheduler-type wrr
spanning-tree bpduguard
spanning-tree bpdufilter
switchport mode trunk
gvrp
switchport acceptable-frame-type all
```

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)#
```

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 displayed, as shown below.

```
moxa# c?
clear
cli
configure
copy


moxa# c_
```

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 customer-key
  clear debug destination { ram | file }
  clear ip arp
  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> <interface-id> }]
  clear syslog-server certificate-and-key
  cli eth-index-naming { modular | non-modular }
  cli pagination turn {on | off}
  configure [ terminal ]
  copy customer-key {tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename} private {tftp://server/fil
ename | sftp://<user-name>:<pass-word>@server/filename} certificate label <string (16)>
  copy debug destination file {tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename}
  copy debug destination ram {tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename}
  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>@server/filename} [included-default] [pass
word <string(60)>]
  copy startup-config {tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename} [included-default] [pass
word <string(60)>]
  copy syslog-server {tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename} client-certificate {tftp:
//server/filename | sftp://<user-name>:<pass-word>@server/filename} client-key {tftp://server/filename | sftp://<user-na
me>:<pass-word>@server/filename} ca-key
  copy { tftp://server/filename running-config | sftp://<user-name>:<pass-word>@server/filename running-config } [passwo
```

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
debug                   Debugging information
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
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
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
receiver                Configure receiver related parameters
rmon                    Configure RMON configuration
snmp-server             Configure snmp-server parameters
snmp-trap               Configure snmp-trap parameters
spanning-tree           Configure the related spanning tree parameters
tacacs-server           Configure TACACS server related parameters
trusted-access          Configure IP trusted access parameters
```

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 layer 3 function commands that can be used to configure Moxa's layer 3 managed Ethernet switches.

Layer 3 Routing

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] }

Syntax Description	no	Remove configuration/delete entry/reset to default value
	ip	Global IPv4 configuration subcommands
	route	Static routing entry
	prefix	Address prefix
	mask	Subnet mask
	next-hop	Next hop address
	vlan	Specified VLAN ID
	distance	Distance metric
Defaults	N/A	
Command Modes	Global Configuration Mode	
Usage Guidelines	N/A	
Examples	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	
Error Messages	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.	
Related Commands	show ip route	
	show ip route static	

Display the Existing ARP Entry List

<u>Commands</u>

show ip arp

Syntax Description	show	Display configuration/statistics/general/information
	ip	IP related information
	arp	ARP related information
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	moxa# show ip arp IP Address MAC Address Interface --------------- ----------------- ---------- 192.168.127.95 00:19:cb:d6:db:b4 vlan1	
Error Messages	N/A	
Related Commands	N/A	

Flush the ARP Entries

<u>Commands</u>

clear ip arp

Syntax Description	clear	Clear/flush the dynamically learnt arp entries
	ip	IP related information
	arp	ARP cache entries
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# clear ip arp	
Error Messages	N/A	
Related Commands	N/A	

IP Interface

Configure the Interface Settings

<u>Commands</u>

interface vlan <vlanid>

no interface vlan <vlan_id>

Syntax Description	no	Remove configuration/delete entry/reset to default value
	interface	Configure interface parameters
	vlan	VLAN interface
	vlanid	VLAN ID
Defaults	N/A	
Command Modes	Global Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config)# interface vlan 10	
Error Messages	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with other Interface IPv4 address. Invalid: [data.l3VlanIfTable] must contain less than or equal to 256 items. Invalid: Interface name is duplicated. Invalid: No such interface.	
Related Commands	N/A	

Configure Interface Alias Description

Commands

description <string(63)>

no description

Syntax Description	no	Remove configuration/delete entry/reset to default value
	description	Set the mnemonic name of this interface
	<string(63)>	The specific mnemonic name for the interface
Defaults	N/A	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config)# interface 10 moxa(config-if)# description "Switch interface 10"	
Error Messages	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with other Interface IPv4 address. Invalid: [data.l3VlanIfTable] must contain less than or equal to 256 items. Invalid: Interface name is duplicated. Invalid: No such interface.	
Related Commands	N/A	

Enable/Disable the Interface

Commands

shutdown

no shutdown

Syntax Description	no	Remove configuration/delete entry/reset to default value
	shutdown	Shutdown the interface
Defaults	N/A	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config)# interface vlan 10 moxa(config-if)# shutdown	
Error Messages	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with other Interface IPv4 address. Invalid: [data.l3VlanIfTable] must contain less than or equal to 256 items. Invalid: Interface name is duplicated. Invalid: No such interface.	
Related Commands	N/A	

Configure the IPv4 Address for the Interface

<u>Commands</u>

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

no ip address <ip-address>

Syntax Description	no	Remove configuration/delete entry/reset to default value
	ip address	Configure the interface IPv4 address
	<ip-address>	IPv4 address string
	<subnet-mask>	Should be 255.255.255.255.
Defaults	N/A	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	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	
Error Messages	Invalid: Invalid IPv4 Address ipv4_config['ipAddress']/ ipv4_config['netmask'] Invalid: This IPv4 address overlaps with other Interface IPv4 address. Invalid: [data.l3VlanIfTable] must contain less than or equal to 256 items. Invalid: Interface name is duplicated. Invalid: No such interface.	
Related Commands	N/A	

Show Interface Information

<u>Commands</u>

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

Syntax Description	show	Display configuration/statistics/general information
	ip	IP related information
	interface	Interface related information
	vlan	VLAN related information
	<vlan-id>	Specified vlan ID
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	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	
Error Messages	% Invalid interface Index	
Related Commands	N/A	

Configure Interface MTU

<u>**Commands**</u>

ip mtu <mtu size>

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

Show MTU Settings of the Existing Interfaces

<u>**Commands**</u>

show interfaces mtu [vlan <vlan_id>]

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

Enable/Disable Proxy ARP

<u>**Commands**</u>

ip proxy-arp

no ip proxy-arp

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

Show ARP Status for the Existing Interfaces

<u>Commands</u>

show ip proxy-arp

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

Configure DNS Server Settings

<u>Commands</u>

ip management name-server server-index server-address
no ip management name-server server-index

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

Debug

This section introduces the commands for displaying or saving detailed debugging information, such as system, protocol stacks, and switch status when troubleshooting is needed.

Activate/Deactivate the Debug Function

<u>Commands</u>

debug { start | stop }

Syntax Description	debug	Debugging information
	start	Start the run-time troubleshooting information
	stop	Stop the run-time troubleshooting information
Defaults	Disable	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# debug start	
Error Messages	N/A	
Related Commands	debug system startup	

Activate/Deactivate the Debug Function After System Reboots

<u>**Commands**</u>

debug system startup

no debug system startup

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	debug	Debugging information
	system	Switch system internal
	startup	System startup
Defaults	Disable	
Command Modes	Global Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa# configure terminal	
	moxa(config)# debug system startup	
	moxa# copy running-config startup-config	
Error Messages	N/A	
Related Commands	debug { start	stop }	

✏️ **NOTE**

When used, the debug function will be activated/deactivated after the system reboots. The command "debug start/stop" will immediately activate/deactivate the debug function.

Configure the Module Debug Categories

<u>**Commands**</u>

debug module [keyword1] [keyword2] [keyword3]

no debug module [keyword1] [keyword2] [keyword3]

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	debug	Debugging information
	module	Display the name of the module that can be debugged
	keyword1	The category of the module
	keyword2	The sub-category of the module
	keyword3	The option/feature of the sub-category
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# configure terminal	
	moxa(config)# debug module ospf hello	
	moxa#	
Error Messages	N/A	
Related Commands	debug { start	stop }	

Configure the Debug Level Settings

<u>Commands</u>

debug level global { level }

Syntax Description	debug	Debugging information
	level	The intended level for debug messages; level "debug" will display the most sophisticated information, while level "emergency" only prints out the most imminent urgent messages, which needs administrator's immediate involvement. The debug logs in level "debug" will comprise of those in level "info", and so on.
	global	Global configuration
	level options	Level options can be set as {emergency | alert | critical | error | warn | notice | info | debug}
Defaults	level notice	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# configure terminal moxa(config)# debug level global error moxa#	
Error Messages	N/A	
Related Commands	debug {start | stop}	

Configure the Global Debug Level Settings for Modules

<u>Commands</u>

debug level <module> { level } {reset}

Syntax Description	debug	Debugging information
	module	Module name
	level	The intended debugging level for the specific module; level "debug" will display the most sophisticated information, while level "emergency" only prints out the most imminent urgent messages, which needs administrator's immediate involvement. The debug logs in level "debug" will comprise of those in level "info", and so on.
	reset	Reset the level settings to the global settings or default value
Defaults	Same as the global debug level	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# configure terminal moxa(config)# debug level ospf error moxa#	
Error Messages	N/A	
Related Commands	debug level global { emergency | alert | critical | error | warn | notice | info | debug }	

✏️ **NOTE**

Each module's debug level will directly inherit from the global level settings; users can configure different debug levels for different modules.

Configure the Debug Burst Settings

<u>Commands</u>

debug burst

no debug burst

Syntax Description	no	Unlimited number of debug messages
	debug	Debugging information
	burst	Burst limitation
Defaults	50 messages in 3 seconds	
Command Modes	Privileged EXEC	
Usage Guidelines	If the output debug messages exceed the burst limit, the run-time debug mechanism will immediately be stopped, and event log will have the message "Warning! Disabling the burst limitation could seriously impact system performance" Users have to manually activate the debug function by "debug start".	
Examples	moxa# configure terminal moxa(config)# debug burst moxa#	
Error messages	N/A	
Warning messages	Burst count threshold exceeded; turn off the debug log.	
Related commands	debug burst threshold <integer(1-100)> debug burst period <integer(1-10)>	

Configure the Debug Burst Threshold Settings

<u>Commands</u>

debug burst threshold <integer(1-100)>

Syntax Description	debug	Debugging information
	burst	Burst limitation
	threshold	Maximum number of debug messages
	<integer>	The allowable range is from 1 to 100
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# configure terminal moxa(config)# debug burst threshold 30 moxa#	
Error Messages	N/A	
Warning Messages	Burst count threshold exceeded; turn off the debug log.	
Related Commands	no debug burst debug burst period <integer(1-10)>	

✏️ **NOTE**

To avoid potential performance deterioration, you can set the maximum allowable number of debug messages in a certain period. The system default is at most 50 messages in 3 seconds.

Configure the Debug Burst Period Settings

<u>Commands</u>

debug burst period <integer (1-10)>

Syntax Description	**debug**	Debugging information
	burst	The burst limitation
	period	The burst period
	<integer>	The allowable range is 1 to 10
Defaults	50 messages in 3 seconds	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# configure terminal moxa(config)# debug burst period 1 moxa#	
Error Messages	N/A	
Warning Messages	Burst count threshold exceeded; turn off the debug log.	
Related Commands	no debug burst debug burst threshold <integer(1-100)>	

Configure the Debug Destination Settings

<u>Commands</u>

debug destination { console | file | ram }

no debug destination { console | file | ram }

Syntax Description	**no**	Disable the configuration/delete the entry/reset to default value
	debug	Debugging information
	destination	The output media
	console	Console
	file	File in local non-volatile memory
	ram	RAM disk or volatile memory
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# configure terminal moxa(config)# debug destination file moxa#	
Error Messages	N/A	
Related Commands	debug destination { file	ram } size <integer 1-10>	

✏️ **NOTE**

Debug messages can be redirected to either console, local file, or RAM disk.

Configure the Debug Destination Size Settings

<u>**Commands**</u>

debug destination { file | ram} **size** <integer 1-10>

Syntax Description	debug	Debugging information
	destination	Destination
	file	File in local non-volatile storage
	ram	RAM disk or volatile memory
	size	Maximum capacity of the reserved storage. Once the capacity is exceeded, the latest logs will overwrite the oldest 1Mb records.
	<integer 1-10>	Size (M)
Defaults	console	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# configure terminal moxa(config)# debug destination file size 6 moxa#	
Error Messages	N/A	
Related Commands	N/A	

✏️ **NOTE**

You can change the size of file/RAM storage used for debug message output.

Configure the Debug Terminal Settings

<u>**Commands**</u>

debug terminal

Syntax Description	debug	Debugging information
	terminal	Current terminal
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# debug terminal moxa#	
Error Messages	N/A	
Warning Messages	Terminal output is transferred to console Terminal output is transferred to Telnet/SSH Terminal output is transferred to current terminal	
Related Commands	no debug burst debug burst threshold <integer(1-100)>	

Display Global Settings for Debug Functions

<u>Commands</u>

show debug module global

Syntax Description	**show**	Display configuration/statistics/general information
	debug	Display debugging information
	module	Module
	global	Global configuration
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# show debug module global Status: Started Configure to Start Debug Log on System Startup: Yes Level: Notice Burst Limitation: Disabled Burst Threshold (count): 50 Burst Period (seconds): 3 Destination Console: Enabled Destination Ram: Disabled Destination File: Disabled Current Terminal: Console Minimum Reserved Destination Ram Size: 4 (M) Minimum Reserved Destination File Size: 4 (M) Current Destination Ram Size: 0 (0.00 M) Current Destination File Size: 2338389 (2.23 M)	
Error Messages	N/A	
Related Commands	show debug module <module>	

Display Global Settings for Debug Functions

<u>Commands</u>

show debug module <module>

Syntax Description	**show**	Display configuration/statistics/general information
	debug	Display debugging information
	module	Module
	<module>	Module name
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# show debug module secureSystemDiagnostics Module: secureSystemDiagnostics Level: Disable Module List Status ----------- ------ user Enabled user.enable Enabled user.disable Enabled account Enabled ui Enabled	
Error Messages	N/A	
Related Commands	show debug global	

Show Debug Destination File Information

show debug destination {ram | file} {[filter] | [latest [<integer(1-10000)>]]}

Syntax Description	**show**	Display configuration/statistics/general information
	debug	Display debugging information
	destination	Destination
	ram	RAM disk or memory
	file	The local debug file
	filter	Grep the associated debug messages with the specified "string"
	latest	Display the latest instead of the complete messages.
	<integer(1-10000)>	Number of debug entries
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# show debug destination file <5> 2020-09-29T22:43:49+00:00 moxa local6 ospf.general Rx Event 4096 <5> 2020-09-29T22:43:50+00:00 moxa local6 ospf.general Rx Event 4096 <5> 2020-09-29T22:43:51+00:00 moxa local6 ospf.general Rx Event 4096 <5> 2020-09-29T22:43:52+00:00 moxa local6 ospf.general Rx Event 4096 <5> 2020-09-29T22:43:53+00:00 moxa local6 ospf.general Rx Event 4096 <5> 2020-09-29T22:43:54+00:00 moxa local6 secureSystemDiagnostics.user.enable User enable <5> 2020-09-29T22:43:54+00:00 moxa local6 secureSystemDiagnostics.user User login <5> 2020-09-29T22:43:54+00:00 moxa local6 ospf.general Rx Event 4096 <5> 2020-09-29T22:43:55+00:00 moxa local6 ospf.general Rx Event 4096 … moxa# show debug destination file filter Exceed <3> 2020-09-29T23:11:53+00:00 moxa local6 moxa_debug_log.events Exceed the burst count threshold, turn off the debug log <3> 2020-09-29T23:11:58+00:00 moxa local6 moxa_debug_log.events Exceed the burst count threshold, turn off the debug log <3> 2020-09-29T23:12:03+00:00 moxa local6 moxa_debug_log.events Exceed the burst count threshold, turn off the debug log <3> 2020-09-29T23:13:47+00:00 moxa local6 moxa_debug_log.events Exceed the burst count threshold, turn off the debug log <3> 2020-09-29T23:13:51+00:00 moxa local6 moxa_debug_log.events Exceed the burst count threshold, turn off the debug log <3> 2020-09-29T23:13:56+00:00 moxa local6 moxa_debug_log.events Exceed the burst count threshold, turn off the debug log …	
Error messages	N/A	
Related commands	copy debug destination {ram|file} {tftp://server/filename | sftp://<user-name>:<pass-word>@server/filename}	

Copy Debug Destination Files

copy debug destination {ram|file} {tftp://server/filename | sftp://<user-name>:<password>@server/filename}

Syntax Description	copy	Perform copy operation
	debug	Debug log
	destination	Destination
	ram	RAM disk or volatile memory
	file	File in local non-volatile storage
	<tftp_url>	File in remote location to be copied via TFTP
	<sftp_url>	File in remote location to be copied via SFTP
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# copy debug destination ram tftp://192.168.127.168/debuglog.log Export success	
Error Messages	"Error! The permission is not allowed."	
Related Commands	show debug destination {ram	file} [filter <string(64)>]	

Delete the Debug Destination Files

Commands

clear debug destination {ram | file}

Syntax Description	clear	Clear the key pair
	debug	Debugging information
	destination	Destination
	ram	RAM disk or volatile memory
	file	File in local non-volatile storage
Defaults	N/A	
Command Modes	Privileged EXEC	
Usage Guidelines	N/A	
Examples	moxa# clear debug destination ram	
Error Messages	"Error! The permission is not allowed."	
Related Commands	show debug global	

OSPF

Show OSPF Interface Information

<u>**Commands**</u>

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

Syntax Description	ip	IP related information
	ospf	OSPF related information
	interface	Interface related information
	vlan	VLAN related information
	<vlan id>	Specified VLAN ID
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	

Examples	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
	
	 Interface name : vlan1
	  IP Address : 192.168.127.253 is disable.	

Error Messages	N/A	
Related Commands	N/A	

Show OSPF Neighbor Information

show ip ospf neighbor [vlan <vlan id>**]**

Syntax Description	ip	IP related information
	ospf	OSPF related information
	neighbor	Neighbor router
	vlan	VLAN related information
	<vlan id>	Specified VLAN ID
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	

Examples	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	

Error Messages	N/A	
Related Commands	N/A	

Show OSPF Request List

show ip ospf request-list

Syntax Description	ip	IP related information
	ospf	OSPF related information
	request-list	OSPF Link state request list information
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	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	
Error Messages	N/A	
Related Commands	N/A	

Show OSPF Re-transmission List

show ip ospf retransmission-list

Syntax Description	ip	IP related information
	ospf	OSPF related information
	retransmission-list	OSPF Link state retransmission list information
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	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	
Error Messages	N/A	
Related Commands	N/A	

Show OSPF Virtual Link Information

show ip ospf virtual-links

Syntax Description	ip	IP related information
	ospf	OSPF related information
	virtual-links	OSPF virtual link information
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	

Examples	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	

Error Messages	N/A	
Related Commands	N/A	

Show OSPF Border Router Information

show ip ospf border-routers

Syntax Description	ip	IP related information
	ospf	OSPF related information
	border-routers	OSPF border and boundary router information
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	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	
Error Messages	N/A	
Related Commands	N/A	

Show OSPF Area Range Information

show ip ospf area-range

Syntax Description	ip	IP related information
	ospf	OSPF related information
	area-range	Associated with the OSPF address range.
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	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	
Error Messages	N/A	
Related Commands	N/A	

Show OSPF Information

show ip ospf

Syntax Description	ip	IP related information
	ospf	OSPF related information
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	

Examples	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	

Error Messages	N/A	
Related Commands	N/A	

Show OSPF Route Information

Commands

show ip ospf route

Syntax Description	ip	IP related information
	ospf	OSPF related information
	route	route Routes learnt by OSPF process
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	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	
Error Messages	N/A	
Related Commands	N/A	

Show OSPF Database Information

show ip ospf database [{database-summary | self-originate}]

Syntax Description	ip	IP related information
	ospf	OSPF related information
	database	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)
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	
Examples	moxa# show ip ospf database database-summary	

```
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
```

	-------	----------	---	----	--------	----------
	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
```

Error Messages	N/A
Related commands	N/A

Show OSPF Database by Specific LSA Type

Commands

show ip ospf database { asbr-summary | external | network | nssa-external | router | summary }

Syntax Description	**ip**	IP related information
	ospf	OSPF related information
	database	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
Defaults	N/A	
Command Modes	Privileged EXEC/ User EXEC	
Usage Guidelines	N/A	

Examples	moxa# show ip ospf database
	
	OSPF Router with ID (10.4.0.1)
	<pre> 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</pre>	

```
-------      ----------     ---     ----      --------
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
```

Error Messages	N/A
Related Commands	N/A

Enable/Disable OSPF Settings

Commands

router ospf {enable | disable}

Syntax Description	**router**	Configures router related information
	ospf	OSPF related configuration
	enable/disable	Enable/disable OSPF routing process
Defaults	disable	
Command Modes	Global Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config)# router ospf enable	
Error Messages	N/A	
Related Commands	N/A	

Configure Router OSPF Settings

Commands

router ospf

Syntax Description	**router**	Configure router related information
	ospf	OSPF related configuration
Defaults	N/A	
Command Modes	Global Configuration Mode	
Usage Guidelines	Enter OSPF router configuration mode	
Examples	moxa(config)# router ospf	
Error Messages	N/A	
Related Commands	N/A	

Configure Route ID

router-id <ip_addr>

no router-id

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	router-id	Set OSPF router ID
	ip_addr	IP address for the router
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	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	
Examples	moxa(config-router)# router-id 10.4.0.1	
Error messages	N/A	
Related commands	N/A	

Configure Network Area Settings

Commands

network <ip_addr> **area** <area-id>

no network <ip_addr> **area** <area-id>

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	network	Configures network related information
	<ip_addr>	IPv4 address of the network
	area	Area related configuration
	<area-id>	Area associated with the OSPF address range
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-router)# network 10.4.0.1 area 0.0.0.0	
Error Messages	% 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.	
Related Commands	N/A	

Configure Redistribute Settings

Commands

redistribute {static | connected | all} [**metric** <integer(1-16777214)>] [**metric-type** <integer(1-2)>]

no redistribute {static | connected | all}

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	redistribute	Configures route redistribution related parameters
	static/connected/ rip/all	Redistribute protocol
	metric	Metric related configuration
	metric-type	OSPF exterior metric type for redistributed routes
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-router)# redistribute static	
Error Messages	N/A	
Related Commands	N/A	

Configure Area Settings

Commands

area <area-id> [{ nssa | stub }] [no-summary]

no area <ip_addr> [{ stub [no-summary] | nssa[no-summary]}]

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	area	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
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	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	
Examples	moxa(config-router)#area 0.0.0.6 nssa	
Error Messages	% 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.	
Related Commands	N/A	

Configure Area Virtual Link Settings

<u>**Commands**</u>

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]**

Syntax Description	area	Configures area related information
	<area-id>	Area associated with the OSPF address rang
	virtual-link	Virtual link related configuration
	<router-id>	Router ID of the virtual neighbor
	auth	Authentication related configuration
	hello-interval	Interval between hello packets that the software sends on the OSPF virtual link interface
	dead-interval	Interval at which hello packets must not be seen before its neighbors declare the router down
	auth-key	Authentication key value
	key-id	Cryptographic authentication key ID
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	N/A	
Examples	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	
Error Messages	% 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.	
Related Commands	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]**

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	area	Configures area related information
	range	Address range configuration
	Summary/ Type7	LSA type is set as summary LSA or Type-7 LSA
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-router)# area 0.0.0.6 range 10.10.2.0 255.255.255.0 summary	
Error Messages	% 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.)	
Related Commands	N/A	

Configure the Neighbor Router Priority Settings

Commands

neighbor <neighbor-ip-address> [**priority** <integer (0-255)>]

no neighbor <ip_addr> **[priority]**

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	neighbor	Specify a neighbor router
	priority	0 means no election; larger number means higher priority
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-router)# neighbor 10.10.2.8 priority 1	
Error messages	% 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.	
Related commands	N/A	

Configure OSPF with Legacy OSPFv2 (RFC1583) Compatibility

<u>Commands</u>

compatible rfc1583

no compatible rfc1583

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	Compatible rfc1583	Set OSPF compatibility list compatible with RFC 1583
Defaults	N/A	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-router)# compatible rfc1583	
Error Messages	N/A	
Related Commands	N/A	

Configure SPF (Shortest Path First) Holdtime Settings

<u>Commands</u>

spf holdtime < integer(0-65535)>

Syntax Description	**spf holdtime**	Minimum time (in milliseconds) between two consecutive SPF calculations
	Integer(0-65535)	Set the spf holdtime in milliseconds
Defaults	5000	
Command Modes	OSPF Router Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-router)# spf holdtime 7000	
Error Messages	N/A	
Related Commands	N/A	

Configure OSPF Passive Interface Settings

<u>Commands</u>

ip ospf passive-interface

no ip ospf passive-interface

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	ip	Configure IP related information
	ospf	OSPF related configuration
	passive-interface	Configure routing update details
Defaults	N/A	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-if)# ip ospf passive-interface	
Error Messages	N/A	
Related Commands	N/A	

Configure OSPF Priority Settings

Commands

ip ospf priority <integer(0 - 255)>

no ip ospf priority

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	ip	Configures IP related information
	ospf	OSPF related configuration
	priority	Router priority configuration
	integer(0-255)	Set the priority parameter
Defaults	N/A	
Command Modes	Interface Configuration Mode	
Usage Guidelines	1	
Examples	moxa(config-if)# ip ospf priority 10	
Error Messages	N/A	
Related Commands	N/A	

Configure OSPF Hello Interval Settings

Commands

ip ospf hello-interval <integer(1 - 65535)>

no ip ospf hello-interval

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	ip	Configure IP related information
	ospf	OSPF related configuration
	hello-interval	Interval (in seconds) between hello packets sent on the interface
	integer(1 - 65535)>	Interval parameter
Defaults	10	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-if)# ip ospf hello-interval 15	
Error Messages	% OSPF: Invalid: The Dead Interval should be bigger than the Hello Interval.	
Related Commands	N/A	

Configure OSPF Dead Interval Settings

Commands

ip ospf dead-interval <integer(1-65535)>

no ip ospf dead-interval

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	ip	Configures IP related information
	ospf	OSPF related configuration
	dead-interval	Interval (in seconds) at which hello packets must not be seen before neighbors declare the router down
	integer(1-65535)	Set the interval parameter
Defaults	40	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-if)# ip ospf dead-interval 20	
Error Messages	% OSPF: Invalid: The Dead Interval should be bigger than the Hello Interval.	
Related Commands	N/A	

Configure the OSPF Cost Settings

Commands

ip ospf cost <integer (1-65535)>

no ip ospf cost

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	ip	Configures IP related information
	ospf	OSPF related configuration
	cost	Path cost configuration
	integer(10-65535)	Set the cost parameter
Defaults	1	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-if)# ip ospf cost 30	
Error Messages	N/A	
Related Commands	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

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	ip	Configures IP related information
	ospf	OSPF related configuration
	auth	Authentication related configuration
	md5, sha-1, sha-223, sha-256, sha-384, sha-512	Set the authentication methods
	key-id	Cryptographic authentication key ID
	auth-key	Authentication key value
Defaults	N/A	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-if)# ip ospf auth simple auth-key 123456	
Error Messages	% 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.	
Related Commands	N/A	

Configure OSPF Network Settings

Commands

ip ospf network {broadcast | non-broadcast | point-to-multipoint | point-to-point}

no ip ospf network

Syntax Description	no	Disable the configuration/delete the entry/reset to default value
	ip	Configures IP related information
	ospf	OSPF related configuration
	network	Network related configuration
Defaults	broadcast	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config-if)# ip ospf network point-to-multipoint	
Error Messages	% 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.	
Related Commands	N/A	

VRRP

Enable/Disable VRRP Functions

Commands

router vrrp { enable | disable }

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

Enter the VRRP Configuration Mode

Commands

router vrrp

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

Configure the VRRP Version Settings

vrrp version { v2 | v3 }

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

Configure the Virtual Router IP Address

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

Syntax Description	vrrp	Configures the VRRP related parameters
	vrid	virtual router ID
	ip	IP related configuration
	ip-addr	IP address
Defaults	N/A	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config)# interface vlan 2 moxa(config-if)# vrrp 2 ip 192.168.2.1	
Error Messages	% 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.	
Related Commands	N/A	

Delete the Virtual Router in the Interface

no vrrp <vrid(1-255)>

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

Enable the Virtual Router in the Interface

Commands

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

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

Disable the Virtual Router in the Interface

Commands

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

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

Set the Virtual Router Priority

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

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

Set the Virtual Router Priority to the Default Value

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

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

Enable the Preempt Mode

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

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

Disable the Preempt Mode

<u>**Commands**</u>

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

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

Set the Authentication Type for the Virtual Router to Simple Password

<u>**Commands**</u>

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

Syntax Description	**vrrp**	Configures the VRRP related parameters
	vrid	virtual router ID
	text-authentication	simple password authentication related configuration
	password	authentication password used to validate the incoming VRRP packets
Defaults	no authentication	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	moxa(config)# interface vlan 2 moxa(config-if)# vrrp 2 text-authentication aaaaaaaa	
Error Messages	% 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.	
Related Commands	N/A	

Set the Authentication Type for the Virtual Router to None

<u>**Commands**</u>

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

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

Set the Advertisement Timer for the Virtual Router

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

Syntax Description	**vrrp**	Configures the VRRP related parameters
	vrid	virtual router ID
	timer	timer related configuration
	msec	Unit is changed to milli-seconds
	interval	Acceptable range for version 2 and version 3 are (1-40secs)/(30-40000msecs)
Defaults	1sec/1000msecs	
Command Modes	Interface Configuration Mode	
Usage Guidelines	N/A	
Examples	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	
Error Messages	% 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.	
Related Commands	N/A	

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

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

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

Enable the Accept Mode

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

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

Disable the Accept Mode

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

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

Show the VRRP Information

Commands

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

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

Show the VRRP Information for the Interface

<u>Commands</u>

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

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