NET2EDGE

LIB-4400 Carrier Ethernet NID

and

LIB-4424 Carrier Ethernet NID / Aggregation Switch

Command Line Interface (CLI)
Reference Manual Rev D

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LIB-4400/4424 CLI Reference, Rev D

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Revision History

Rev	Date	Description
A	08/30/13	Initial release for LIB-4400 software v 1.6.
B	11/22/13	Revised for LIB-4400 software v 1.7 and add LIB-4424 and .
C	02/02/15	Revised for LIB-4400 software v 1.9. Adds ZTP, EVC Name, Performance Monitor, Link Fail-over, and Banner support.
D	23/11/2016	Re-Branded Document

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Introduction

Net2Edge Ltd. Carrier Ethernet solution delivers the promise of simplicity deployed. This comprehensive solution includes CE 2.0 compliant demarcation devices, access switches and service management platform.

The **LIB-4400** is a 10GE Carrier Ethernet NID. The LIB-4400 provides four 10GE SFP+ ports and it includes IEEE 1588v2 and Service Activation Test generation.

The **LIB-4424** access switch has twenty-four 100/1000Mbps ports and four 10GE uplinks. The LIB-4424 includes IEEE 1588v2 and Service Activation Test generation.

The LIB-4400/LIB-4424 offers a rich set of commands through its CLI for performing configuration and status monitoring. The CLI is accessible through the RJ-45 serial CONSOLE portor via telnet and SSH. The CLI incorporates user authentication for security purposes. The CLI interface can be accessed via Secure Shell (SSH) interface. The LIB-4xxx CLI works with any terminal emulator that supports VT100.

This manual is for experienced network administrators who are responsible for configuring and maintaining the LIB-4xxx. The CLI offers a comprehensive set of management features for use during initial setup (set IPs etc.) and troubleshooting, as well as for day-to-day management (device management, firmware upgrades, managing security features, etc.).

Note: CLI commands are not case sensitive. Enter the CLI commands in lower case or upper case unless otherwise specified. In order to execute the commands described in this manual, you must press the Enter key after you have entered the command text.

See the *LIB-4400/LIB-4424 Install Guide* manual for the LIB-4xxx models.

Check the Net2Edge web site at www.Net2Edge.com for additional white papers, application notes, etc.

Documentation Conventions

The conventions used within this manual for commands/input entries are described in the table below.

Table 1: Documentation Conventions

Convention	Meaning
Boldface text	Indicates the entry must be made as shown. For example: **ipaddr=<**addr> In the above, only **ipaddr=** must be entered exactly as you see it, including the equal sign (=).
< >	Arrow brackets indicate a value that must be supplied by you. Do not enter the symbols < >. For example: **ipaddr=<**addr> In place of <addr> you must enter a valid IP address.
[ ]	Indicates an optional keyword or parameter. For example: **go** [**s=**<xx>] In the above, **go** must be entered, but **s=** does not have to be.
{ } |	Indicates that a choice must be made between the items shown in the braces. The choices are separated by the | symbol. For example: **state=**{**enable** | **disable**} Enter **state=enable** or state**=disable**.
“ ”	Indicates that the parameter must be entered in quotes. For example: **time=**<“value”> Enter **time=”20100115 13:15:00”**.
>	Indicates a selection string. For example: Select **File>Save**. This means to first select/click **File** then select/click **Save**.

Command Line Editing

This section describes how to enter CLI commands.

A CLI command is a series of keywords and arguments. Keywords identify a command, and arguments specify configuration parameters.

Display Similar Commands

At the command line, you can use the keyboard Tab ⇤⇥ key or**?** key to show available commands in a category of commands after entering a part of the command.

For example, use the Tab ⇤⇥ key to enter part of the command to display all of the available commands that start with **show ether**. The commands display in a single row.

Use the **?** key after a partial CLI command entry to display all of the available commands that start with **show ether**, but in a single column:

Partial Keyword Lookup

If you terminate a partial keyword with a question mark, alternatives that match the initial letters are provided. (Remember to not leave a space between the command and question mark.) For example "**s?**" shows all the keywords starting with "**s**."

Recall Commands

To recall recently-entered commands from the command history, perform one of the optional actions below:

Ctrl-P or **Up arrow** (↑) key: Recall commands in the history buffer, beginning with the most recent command. Repeat the key sequence to recall successively older commands.

Ctrl-N or **Down arrow** (↓) key: Return to more recent commands in the history buffer after recalling commands with Ctrl-P or the Up arrow key. Repeat the key sequence to recall successively more recent commands.

Keystroke Commands

The table below shows the optional keystrokes available to edit command lines (* indicates HyperTerminal support, ** indicates command prompt support, *** indicates both HyperTerminal and command prompt support by this keystroke).

Table 2: Keystroke Editing Commands

Capability	Keystroke	Purpose
Move the command line around to make changes or corrections	Ctrl-B *** or left (←) arrow key ***	Move the cursor back one character
	Ctrl-F *** or right (→) arrow key ***	Move the cursor forward one character
	Ctrl-A ***	Move the cursor to the beginning of the command line
	Ctrl-E ***	Move the cursor to the end of the command line
Recall commands from the buffer and paste them in the command line	Ctrl-Y ***	Recall the most recent entry in the buffer
	Ctrl-T **	Transpose the character to the left of the cursor with the character located at the cursor
	Ctrl-Y **	Recall the most recent entry in the buffer
Delete entries (if you make a mistake or change your mind)	Delete key *** or Backspace key ***	Erase the character to the left of the cursor
	Ctrl-D ***	Delete the character at the cursor
	Ctrl-K ***	Delete all characters from the cursor to the end of the command line
	Ctrl-U *** or Ctrl-X ***	Delete all characters from the cursor to the beginning of the command line
	Ctrl-W ***	Delete the word to the left of the cursor
	Esc D **	Delete from the cursor to the end of the word
Capitalize or lowercase words or capitalize a set of letters	Esc C *	Change case from capital to lower-case (or lower-case to capital) at the cursor
Redisplay the current command line if the switch unexpectedly sends a message to your screen	Ctrl-L *** or Ctrl-R ***	Redisplay the current command line (reverse-i-search)

COM Port Set-up

To use the CLI, connect a PC COM port to the RJ-45 CONSOLE connector and start a terminal emulation program (e.g., HyperTerminal). Set the COM port at 8 data bits, 1 stop bit, no parity, 115200 baud, no flow control.

Login

Enter CLI command mode via telnet, HyperTerminal, etc. Enter the default Username **admin** and then hit **Enter** twice to enter CLI command mode (no default Password). The following information displays.

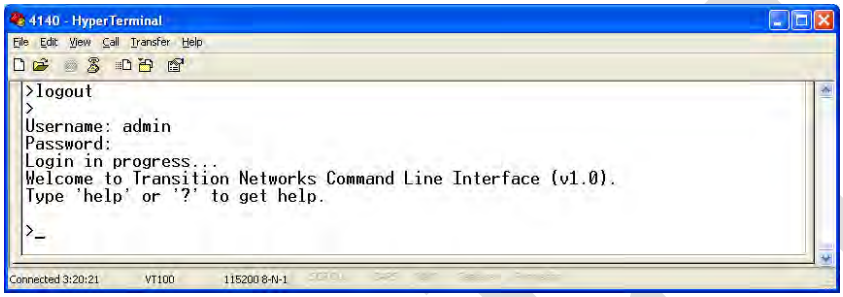


Figure 1: LIB-4xxx CLI Welcome Screen

At the **>** prompt, type **?** (or type **Help**) and press **Enter** to display the CLI help screen as shown below.

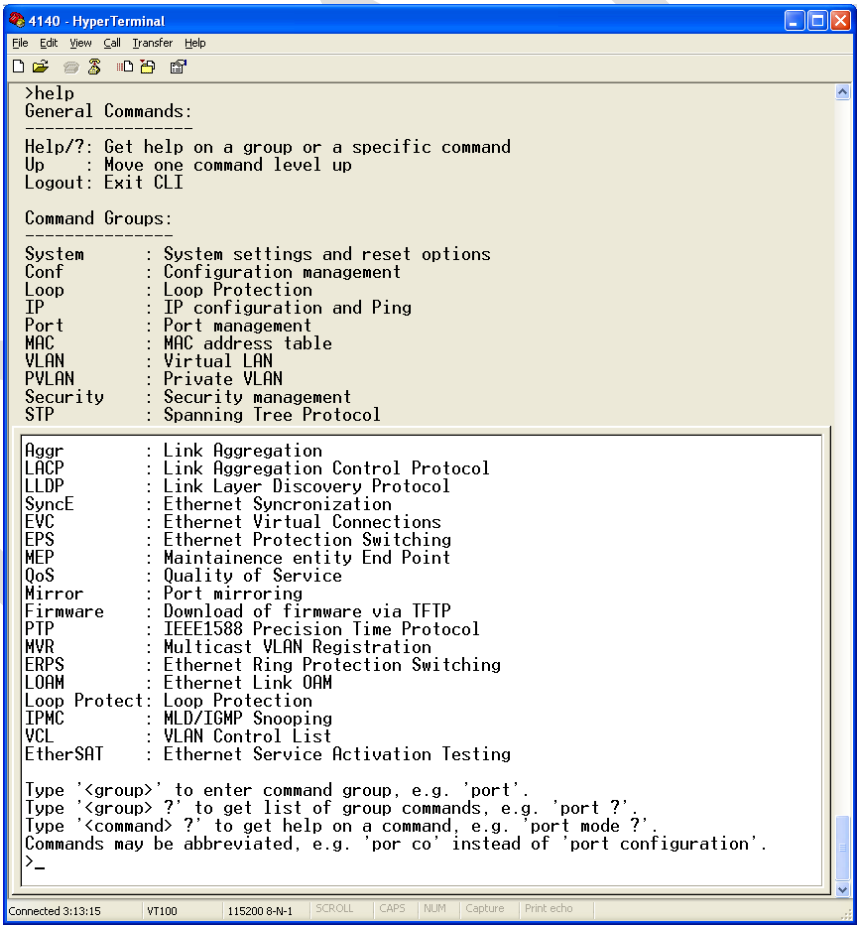


Figure 2: LIB-4xxx CLI Commands Screen

Navigation

Type '<**group**>' to enter a command group (e.g., '**port'** group of commands).
Type '<**group**>' to get a list of group commands (e.g., '**port ?**' group, with a space between 'port' and the ?).
Type '<**command**> ?' to get help on a command (e.g., '**port mode ?**')
Commands may be abbreviated (e.g., '**po co**' instead of 'port configuration'.
CLI syntax is case-independent (command entry is not case sensitive).

All of the CLI command groups and the individual commands are discussed in the following sections.

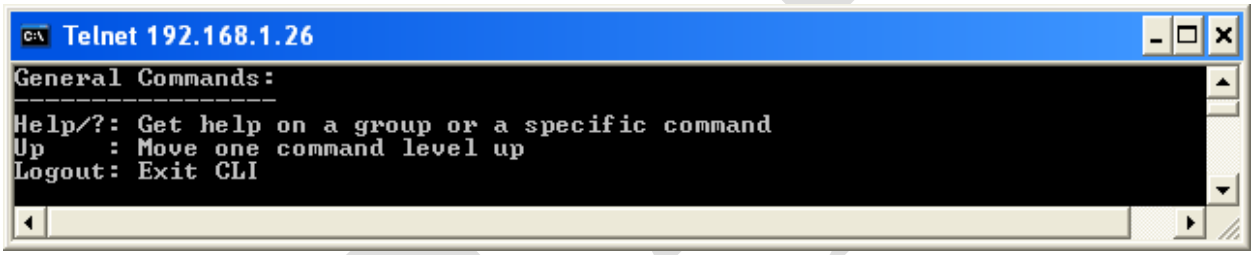
CLI Command Groups

The commands are grouped based on functions, and offer submenus that are context sensitive (e.g., all 'VLAN' commands are accessible using the 'vlan' keyword or by entering the 'vlan' submenu).

The LIB-4xxx supports 30 command groups which include a total of over 500 commands.

General Commands

The General commands include **Help**, **Up**, **/** (go to root), and **Logout**. The General commands in Telnet are shown below.



The General commands in HyperTerminal are shown below.

```
>?
General Commands:
-----------------
Help/?: Get help on a group or a specific command
Up    : Move one command level up
Logout: Exit CLI
```

The General commands (Help, Up, /, and Logout) are explained below.

Command: / (Go to root level)
Syntax: /
Description: Type / (slash character) to go to the CLI root level in the CLI command structure.
Example:

```
>system
Type 'up' to move up one level or '/' to go to root level
System>/
>
```

Command: **Help** or **?**
Syntax: **help** <cr> or **?**<cr>
Description: Get assistance (help) on a group of commands or on a specific command.
Example:

```
>help
General Commands:
-----------------
Help/?: Get help on a group or a specific command
Up    : Move one command level up
Logout: Exit CLI

Command Groups:
---------------
System      : System settings and reset options
Conf        : Configuration management
Loop        : Loop Protection
IP          : IP configuration and Ping
Port        : Port management
MAC         : MAC address table
VLAN        : Virtual LAN
PVLAN       : Private VLAN
Security    : Security management
STP         : Spanning Tree Protocol
Aggr        : Link Aggregation
LACP        : Link Aggregation Control Protocol
LLDP        : Link Layer Discovery Protocol
SyncE       : Ethernet Syncronization
EVC         : Ethernet Virtual Connections
EPS         : Ethernet Protection Switching
MEP         : Maintainence entity End Point
QoS         : Quality of Service
Mirror      : Port mirroring
Firmware    : Download of firmware via TFTP
PTP         : IEEE1588 Precision Time Protocol
MVR         : Multicast VLAN Registration
ERPS        : Ethernet Ring Protection Switching
LOAM        : Ethernet Link OAM
Loop Protect: Loop Protection
IPMC        : MLD/IGMP Snooping
VCL         : VLAN Control List
EtherSAT    : Ethernet Service Activation Testing

Type '<group>' to enter command group, e.g. 'port'.
Type '<group> ?' to get list of group commands, e.g. 'port ?'.
Type '<command> ?' to get help on a command, e.g. 'port mode ?'.
Commands may be abbreviated, e.g. 'por co' instead of 'port
            configuration'.
>
```

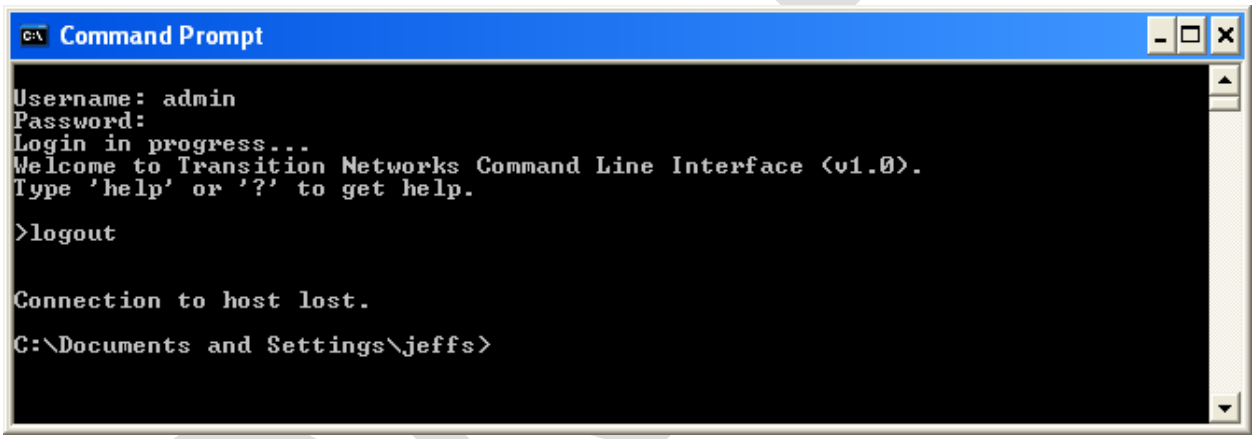
Command: **Up**
Syntax: **up**
Description: Move one command level up (e.g., from group level to root level).
Example:

```
>system
Type 'up' to move up one level or '/' to go to root level
System>up
>system
Type 'up' to move up one level or '/' to go to root level
System>/
>
```

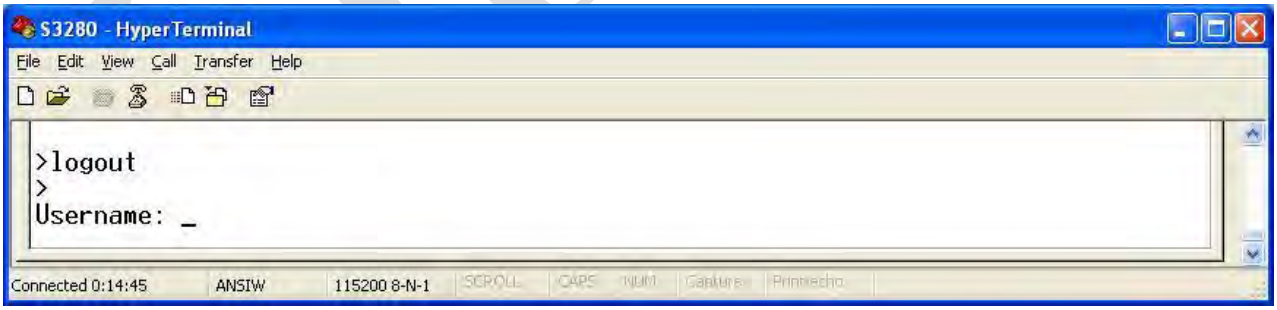
Command: **Logout**
Syntax: **logout**
Description: Exit the CLI. The telnet or HyperTerminal connection is dropped. You must log back in after entering the **logout** command.
Example:

```
>logout
>
Username:
```

Example: Telnet:



HyperTerminal:



System Commands

The LIB-4xxx 'System' group of commands provide System settings and reset options.

>**system ?**
Available Commands:

1. **System Configuration** [all | (port <port_list>)]
2. **System Log Configuration**
3. **System Timezone Configuration**
4. **System Version**
5. **System Log Server Mode** [enable|disable]
6. **System Name** [<name>]
7. **System Timezone Offset** [<offset>]
8. **System Contact** [<contact>]
9. **System Log Server Address** [<ip_addr_string>]
10. **System Timezone Acronym** [<acronym>]
11. **System DST Configuration**
12. **System Location** [<location>]
13. **System Log Level** [info|warning|error]
14. **System DST Mode** [disable|recurring|non-recurring]
15. **System DST start** <week> <day> <month> <date> <year> <hour> <minute>
16. **System Log Lookup** [<log_id>] [all|info|warning|error]
17. **System DST end** <week> <day> <month> <date> <year> <hour> <minute>
18. **System Log Clear** [all|info|warning|error]
19. **System Reboot**
20. **System Date**
21. **System DST Offset** [<dst_offset>]
22. **System PowerSupply Present** [<power_supply>]
23. **System Load**
24. **System ZTP Auto Discovery** [enable|disable]
25. **System Banner MOTD** [<motd-banner-txt>]
26. **System Banner Login** [<login-banner-txt>]
27. **System Banner Exec** [<exec-banner-txt>]

>

The LIB-4xxx 'System' group of commands are explained below.

Command: **Show System Configuration**
Syntax: **system config** [all | (port <port_list>)]
Description: Displays all of the current LIB-4xxx operating parameters. The default is "Show system configuration". The parameters are:
all : Show all switch configuration (this is a long display if you include the "all" keyword).
port : Show switch port configuration.
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:
```
>sys config
System Contact  :
System Name     :
System Location :
ZTP Auto Disc   : Enabled  (ZTP not completed)
MAC Address     : 00-c0-f2-56-16-d0
Software ID     : LIB-4424
Product ID      : LIB-4424
Serial #        : 3012
Board Rev       : 3
FPGA Version    : v2.3
Board Temp      : 36 C
CPU Temp        : 45 C
Chip ID         : VSC7460 Rev. B
System Time     : 1970-01-01T00:08:51+00:00
System Uptime   : 00:08:51
Software Version: LIB-4424 (standalone) 1.9.4
Software Date   : 2015-02-02T19:51:18-05:00
Previous Restart: Cool
>
```

Command: **Show System Log Configuration**
Syntax: **sys log config**
Description: Displays the current system log configuration.
Example:
```
>sys log config

System Log Configuration:
=========================

System Log Server Mode     : Enabled
System Log Server Address  :
System Log Level           : Warning
>
```

Command: **Show System Version**
Syntax: **system version**
Description: Displays the current LIB-4xxx software version information.
Example:
```
>sys ver
Version      : LIB-4424 (standalone) 1.9.4
Build Date   : 2015-02-02T19:51:18-05:00
>
```

Command: **System Name**
Syntax: **system name** [<name>] [clear]
Description: Set, clear, or show the LIB-4xxx system name, where:
<**name**>: System name string. (1-255).
Use **""** to clear the string. The default is a blank field.
System name is a text string drawn from the alphabet (A-Z, a-z), digits (0-9), minus sign (-). In the CLI, no blank or space characters are permitted as part of a name. The first character must be an alpha character, and the first or last character must not be a minus sign.
Setting a system name will add the new name in front of the > command prompt thereafter.
Any entry with an _ (underscore) character is ignored.
"": Clear the current system name entry.

Example:
```
>system name
System Name     :
>system name LIB-4400-dev1
>system name
System Name     : LIB-4400-dev1
LIB-4400-dev1:/>system name ""
LIB-4400-dev1:/>system name
System Name     :
>
```

Command: **System Contact**
Syntax: **System Contact** [<contact>] [clear]
Description: Set, clear, or show the system contact, where:
<**contact**>: System contact string. (1-255). Use 'clear' or "" to clear the string.
In CLI, no blank or space characters are permitted as part of a contact, unless the name is enclosed in double quotes.
clear : Clear the system contact entry.

Example:
```
>system contact
System Contact  :
>system contact RJ-Stylesh-dev1
>system contact
System Contact  : RJ-Stylesh-dev1
>system contact clear
>system contact
System Contact  :
>
```

Command: **System Location**
Syntax: **system location** [<location>] [clear]
Description: Set, clear, or show the system location, where:
<**location**>: System location string. (1-255). Use "" to clear the string. In CLI, no blank or space characters are permitted as part of a location, unless the name is enclosed in double quotes.
clear : Clear the current system location entry.

Example:
```
>system location
System Location :
>system location 10900_Red_CircleDrive
>system location
System Location : 10900_Red_CircleDrive
>system location clear
>system location
System Location :
>
```

Command: **System Log Configuration**
Syntax: **system log config**
Description: Show system log configuration.
Example:

```
>system log config

System Log Configuration:
=========================

System Log Server Mode     : Enabled
System Log Server Address  : 192.168.1.30
System Log Level           : Warning
>
```

Command: **System Log Server Mode**
Syntax: **system log server mode** [enable|disable]
Description: Show or set the system log server mode, where:
enable : Enable system log server mode
disable: Disable system log server mode
(The default is 'Show system Log server mode'.)
Example:

```
>sys log server mode
System Log Server Mode     : Enabled
>sys log server mode disable
>sys log server mode
System Log Server Mode     : Disabled
>sys log server mode enable
>sys log server mode
System Log Server Mode     : Enabled
>
```

Command: **System Log Server Address**
Syntax: **system log server address** [<ip_addr_string>]
Description: Show or set the system log server address, where:
<**ip_addr_string**>: the IP host address (a.b.c.d)
Example:

```
>system log server address
System Log Server Address  : 192.168.1.30
>system log server address 192.168.1.33
>system log server address
System Log Server Address  : 192.168.1.33
>
```

Command: **System Log Level**
Syntax: **system log level** [info|warning|error]
Description: Show or set the system log level. Set defines the kind of message to be sent to a third party syslog server, where:
info : Send informations, warnings, and errors.
warning : Send just warnings and errors.
error : Send errors only.
all: Send all three levels of syslog messages (info, warning ,and error).

Example:
```
>system log level
System Log Level           : Info
>system log level error
>system log level
System Log Level           : Error
>
```

Command: **Clear System Log**
Syntax: **System log clear** [all|info|warning|error]
Description: Clear some or all of the system log, where:
all *: Show all levels (default)*
info *: Show informations*
warning *: Show warnings*
error *: Show errors*

Example:
```
>system log lookup
Number of entries:
Info   : 10
Warning: 0
Error  : 3
All    : 13

ID    Level   Time                        Message
----  ------  --------------------------  -------
   1  Info    1970-01-01T00:00:07+00:00  Switch just made a cold boot.
   2  Info    1970-01-01T00:00:09+00:00  Power supply 1 present
   3  Info    1970-01-01T00:00:09+00:00  Power supply 2 present
   4  Info    1970-01-01T00:00:09+00:00  Link up on port 5
   5  Info    1970-01-02T19:10:53+00:00  Link down on port 5
   6  Info    1970-01-02T19:10:55+00:00  Link up on port 5
   7  Info    1970-01-03T00:13:20+00:00  Link down on port 5
   8  Info    1970-01-03T00:13:22+00:00  Link up on port 5
   9  Error   1970-01-03T00:48:27+00:00  E ether_sat 00:48:27 62/saDbTestFin ...
  10  Error   1970-01-03T00:48:27+00:00  E ether_sat 00:48:27 62/handler_con ...
  11  Error   1970-01-03T00:54:27+00:00  E web 00:54:27 62/handler_config_vl ...
  12  Info    1970-01-03T01:36:46+00:00  Link up on port 2
  13  Info    1970-01-03T01:36:47+00:00  Link up on port 1
>
```

Command: **System Log Lookup**
Syntax: **system log lookup** [<log_id>] [all|info|warning|error] [clear]
Description: Show or clear the system log. See "System Log Messages" on page 391 for the full set of System Log message descriptions. The parameters are:
<**log_id**>: System log ID or range (default: All entries)
all : Show all levels (default)
info : Show informational level messages only.
warning : Show warning level messages only.
error : Show error level messages only.
clear : Clear the system log.

Example 1:
```
>system log lookup 1
ID     : 1
Level  : Info
Time   : -
Message:

Switch just made a cold boot.
```

Example 2:
```
>system log lookup
Number of entries:
Info   : 3
Warning: 0
Error  : 0
All    : 3

ID    Level   Time                        Message
----  ------  --------------------------  -------
   1  Info    -  Switch just made a cold boot.
   2  Info    1970-01-01T00:01:03+00:00  Link up on port 1
   3  Info    1970-01-01T00:39:51+00:00  Link up on port 9
>
```

Command: **Display System Timezone Configuration**
Syntax: **system timezone config**
Description: Display the current system Timezone configuration.
Example:
```
>system timezone config

System Timezone Configuration:
==============================

Timezone Offset : 0 ( 0 minutes)
Timezone Acronym :
>
```

Command: **System Timezone Offset**
Syntax: **system Timezone Offset** [<offset>]
Description: Set or show the system timezone offset, where:
<**offset**>: Time zone offset in minutes (-7200 to 7201) relative to UTC.
Example:
```
>sys timezone offset
Timezone Offset : 0 ( 0 minutes)
>sys timezone offset 42
>sys timezone offset
Timezone Offset : 42 ( 4 minutes)
>
```

Command: **System Timezone Acronym**
Syntax: **system timezone acronym** [<acronym>]
Description: Set or show the system timezone acronym, where:
<**acronym**>: Time zone acronym (0 - 16 characters; the space character is not allowed).

Example:
```
>System Timezone Acronym
Timezone Acronym :
>System Timezone Acronym MnDST
>System Timezone Acronym
Timezone Acronym : MnDST
>
```

Command: **System DST Mode**
Syntax: **system dst mode** [disable|recurring|non-recurring]
Description: Set or show the daylight saving time (DST) mode, where:
disable: Disable Daylight Saving Time.
recurring : Enable Daylight Saving Time as recurring mode.
non-recurring : Enable Daylight Saving Time as non-recurring mode.

Example:
```
>system dst mode
Daylight Saving Time Mode : Disabled.
>system dst mode recurring
>system dst mode
Daylight Saving Time Mode : Recurring.
>system dst mode non-recurring
>system dst mode
Daylight Saving Time Mode : Non-Recurring.
>
```

Command: **Show System DST Configuration**
Syntax: **system dst configuration**
Description: Display the current Daylight Saving Time (DST) configuration.

Example:
```
>system dst config

System Daylight Saving Time(DST) Configuration:
================================================

Daylight Saving Time Mode : Disabled.
Daylight Saving Time Start Time Settings :
        Week: 0
        Day: 0
        Month: 0
        Date: 0
        Year: 0
        Hour: 0
        Minute: 0
Daylight Saving Time End Time Settings :
        Week: 0
        Day: 0
        Month: 0
        Date: 0
        Year: 0
        Hour: 0
        Minute: 0
Daylight Saving Time Offset : 1 (minutes)
```

* : This symbol indicates the parameter must be set to a reasonable value.

Command: **System DST Start**
Syntax: **system dst start** <week> <day> <month> <date> <year> <hour> <minute>
Description: Set or show the daylight saving time start time settings, where:
<**week**> : Week (1-5), 0: ignored.
<**day**> : Day (1-7), 0: ignored.
<**month**> : Month (1-12), 0: ignored.
<**date**> : Date (1-31), 0: ignored.
<**year**> : Year (2000-2097).
<**hour**> : Hour (0-23).
<**minute**>: Minutes (0-59).

Example:
```
>system dst start 1 2 3 4 2012 5 6
>
```

Messages: *Missing <week> parameter*

Command: **System DST End**
Syntax: **system dst end** <week> <day> <month> <date> <year> <hour> <minute>
Description: Set or show the daylight saving time end time and date settings, where:
<**week**> : Week (1-5), 0: ignored.
<**day**> : Day (1-7), 0: ignored.
<**month**> : Month (1-12), 0: ignored.
<**date**> : Date (1-31), 0: ignored.
<**year**> : Year (2000-2097).
<**hour**> : Hour (0-23).
<**minute**>: Minutes (0-59).

Example:
```
>system dst end 0 0 0 0 2012 1 1
>
```

Messages: *Missing <week> parameter*

Command: **System DST Offset**
Syntax: **system dst offset** [<dst_offset>]
Description: Set or show the daylight saving time offset, where:
<**dst_offset**>: DST offset in minutes (1 to 1440).

Example:
```
>system dst offset
Daylight Saving Time Offset : 1 (minutes)
>system dst offset 5
>system dst offset
Daylight Saving Time Offset : 5 (minutes)
>
```

Command: **Show System Power Supply Status**
Syntax: **System PowerSupply Status** [<power_supply>]
Description: Show power supply status, where:
<**power_supply**>: Display Power Supply 1 or 2 status.

Example 1:
```
>system powerSupply Status
Power Supply Present Powered Type Fan RPM Temp
------------ ------- ------- ---- ------- ------
1            Yes     No      AC   5102    27 C
2            No      -       -    -       -
>
```

Example 1:
```
>system powerSupply Status
Power Supply Present Powered Type Fan RPM Temp
------------ ------- ------- ---- ------- ------
1            Yes     Yes     AC   4267    27 C
2            Yes     No      DC   4569    27 C
>
```

Messages: *E tn_monitor 00:04:44 55/tn_monitor_temp#308: Error: Failed to read Power Supply info 0*

Command: **System Reboot**
Syntax: **system reboot**
Description: Reboots (warm start) the LIB-4xxx, displays a series of text data, and then displays the password prompt. You must log in to the LIB-4xxx again when the system reboot is completed.

Example:
```
>system reboot
System will reboot in a few seconds
+M25PXX : Init device with JEDEC ID 0xC22018.
LIB-4400 board detected (VSC7460 Rev. B).

RedBoot(tm) bootstrap and debug environment [ROMRAM]
Non-certified release, version 1_15-TN - built 14:02:07, Apr 10 2013

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Platform: VCore-III (MIPS32 24KEc) JAGUAR
RAM: 0x80000000-0x88000000 [0x80021ed8-0x87fe1000 available]
FLASH: 0x40000000-0x40ffffff, 256 x 0x10000 blocks
== Executing boot script in 1.000 seconds - enter ^C to abort
RedBoot> fis load -d managed
Image loaded from 0x80040000-0x80903868
RedBoot> go

Username:
```

Messages: *E misc 00:00:00 26/hpic_spi_init_start#1792: Error: hpic_spi_read_version failed : -2*

Command: **System Date**
Syntax: system date
Description: View the current date and time. Note that this command only lets you view the date and time; use NTP for persistent setting.

Example:
```
>system date
1970-01-01T00:43:49+00:42
>
```

Command: **System Load**
Syntax: **system load**
Description: Show current CPU load: 100ms, 1s and 10s running average (in percent; zero is idle).

Example:
```
>system load
Load average(100ms, 1s, 10s):   2%,   1%,   1%
>
```

Command: **System ZTP Auto Discovery**
Syntax: **system ztp auto discovery** [enable|disable]
Description: Set or show the Zero Touch Provision auto discovery mode, where:
enable: enable the Zero Touch Provision Auto Discovery mode (default = enabled).
disable: disable the Zero Touch Provision Auto Discovery mode.

Example:
```
>system ztp
ZTP Auto Disc   : Enabled  (ZTP not completed)
>system ztp disable
Invalid command
>system ztp auto disc disable
>system ztp
ZTP Auto Disc   : Disabled (ZTP not completed)
>
```

Zero Touch Provisioning (ZTP) lets you provision new switches in your network automatically, without manual intervention. When you physically connect a switch to the network and boot it with a default configuration, it tries to upgrade the software automatically and auto-install a configuration file from the network. The switch uses information that you configure on a Dynamic Host Control Protocol (DHCP) server to determine whether to perform these actions and to locate the necessary software image and configuration files on the network. DHCP provides a framework for passing configuration information to hosts on a TCP/IP network. Configuration parameters and other control information are carried in tagged data items that are stored in the 'options' field of the DHCP message. The data items themselves are also called "**DHCP options**". For more information on DHCP Options see http://tools.ietf.org/html/rfc2132 Refer to your DHCP server documentation for configuration instructions.

In the example below, ZTP Auto Disc Enabled / Disabled is shown in red and ZTP status is shown in green.

```
>system conf
System Contact    :
System Name       :
System Location   :
ZTP Auto Disc   : Enabled  (ZTP completed)OR(ZTP not completed)
MAC Address     : 12-33-44-34-34-34
Software ID     :
Product ID      : LIB-4400
Serial #        : 334455
Board Rev       : 22
FPGA Version    : v2.3
Board Temp      : 36 C
CPU Temp        : 35 C
Chip ID         : VSC7462 Rev. B
System Time     : 1970-01-01T04:54:57+00:00
System Uptime   : 04:54:57
Software Version:  (standalone) 1.9.4
Software Date   : 2014-03-06T09:13:04-06:00
Previous Restart: Cool
```

Messages:
dhcp option %d length not right\n
Failed to prepare zero touch provision trap
Failed to set snmp for zero touch provision
ZTP not completed

Message: ZTP completed
Meaning: The one-time ZTP auto-discovery is doen.
Recovery: None; information only.

Command: **System Banner MOTD**
Syntax: **system banner motd** [<motd-banner-txt>]
Description: A banner is a message displayed to a user. The type of banner you configure for use determines when this message is shown. With devices at v 1.9 and above you can configure three types of banners: MOTD, Login, and Exec.
The MOTD (Message of the Day) type of logon message has been around for a long time on Unix and mainframe systems. The idea of the MOTD is to display a temporary notice to users, such as issues with system availability. However, since the MOTD displays when a user connects to the device prior to login, most network administrators are now using it to display legal notices regarding switch access, such as "*unauthorized access to this device is prohibited and violators will be prosecuted to the full extent of the law*".

Example:
```
>system banner login ?
Description:
------------
Set Login Banner.

Syntax:
-------
System Banner Login [<login-banner-txt>]

Parameters:
-----------
<login-banner-txt>: Login Banner Text.
>system banner login xxxx
>
```

Limitations: The v 1.9 Banner command limitations include:
1. Banners are onfigurable only via the CLI.
2. Banner text can contain a maximum of 255 characters.
3. No multi-line support. To display the banner in multiple lines, insert # as part of the text. For example: if you enter < **system login banner line1 #line2** > then line2 will be displayed in the next line.
4. Banner commands are supported on the Serial Console and Telnet, but not via SSH.

Command: **System Banner Login**
Syntax: **system banner login** [<login-banner-txt>]
Description: A banner is a message displayed to a user. The type of banner you configure for use determines when this message is shown. With devices at v 1.9 and above you can configure three types of banners: MOTD, Login, and Exec.
The Login banner is displayed before login to the system, but after the MOTD banner is displayed. Typically, this banner is used to display a permanent message to users.

Example:
```
>system banner login ?
Description:
------------
Set Login Banner.

Syntax:
-------
System Banner Login [<login-banner-txt>]

Parameters:
-----------
<login-banner-txt>: Login Banner Text.
>system banner login mysysm
>
```

Limitations: The v 1.9 Banner command limitations include:
1. Banners are onfigurable only via the CLI.
2. Banner text can contain a maximum of 255 characters.
3. No multi-line support. To display the banner in multiple lines, insert # as part of the text. For example: if you enter < **system login banner line1 #line2** > then line2 will be displayed in the next line.
4. Banner commands are supported on the Serial Console and Telnet, but not via SSH.

Command: **System Banner Exec**
Syntax: **system banner exec** [<exec-banner-txt>]
Description: A banner is a message displayed to a user. The type of banner you configure for use determines when this message is shown. With devices at v 1.9 and above you can configure three types of banners: MOTD, Login, and Exec.
The Exec banner displays after the login is complete when the connecting user enters User EXEC mode. While all users who try to connect to the switch see the other banners, only users who successfully log on to the switch see this banner. The Exec banner can be used to display a reminder to the network administrators.

Example:
```
>system banner exec ?
Description:
------------
Set Exec Banner.

Syntax:
-------
System Banner Exec [<exec-banner-txt>]

Parameters:
-----------
<exec-banner-txt>: Exec Banner Text.
>system banner exec mysism login1
Invalid parameter: login1

Syntax:
System Banner Exec [<exec-banner-txt>]
>system banner exec mysism11
>
```

Limitations: The v 1.9 Banner command limitations include:
1. Banners are onfigurable only via the CLI.
2. Banner text can contain a maximum of 255 characters.
3. No multi-line support. To display the banner in multiple lines, insert # as part of the text. For example: if you enter < **system login banner line1 #line2** > then line2 will be displayed in the next line.
4. Banner commands are supported on the Serial Console and Telnet, but not via SSH.

Configuration Management Commands

These Configuration management commands provide LIB-4xxx configuration backup, default reset, and configuration restore functions. The Configuration management commands include:

>**config ?**
Available Commands:

Config Backup Binary <hostname> <file_name>
Config Restore Binary <hostname> <file_name>
Config Default [keep_ip]
>

Note: The **config backup binary** and **config restore binary** commands do not work with SolarWinds TFTP Server version 8.2.7 (September 2005). SolarWinds TFTP Server version 10.4.0.14 works fine for LIB-4xxx binary backups and restores.

The LIB-4xxx Configuration management commands are explained below.

Command: **Restore Config to Default Settings**
Syntax: **config default** [keep_ip]
Description: Restore factory default configuration, where:
keep_ip: Keep the current IP configuration; default: Restore full configuration (do not keep the current IP address). **Note**: If you do not include the [keep_ip] parameter, you must change the LIB-4xxx IP address via the CLI before you can access the LIB-4xxx via the Web interface (GUI).
Example:

```
>config default keep_ip
>config default
>ip setup 192.168.1.110
>
```

Command: **Config Backup Binary**
Syntax: **config backup binary** <hostname> <file_name>
Description: Backup the current binary configuration to a configured and enabled TFTP server. The backup file is sent to the TFTP Server, the LIB-4xxx reboots, and the help screen displays. The parameters are:
<**hostname**> : IP Address or Hostname of the TFTP server.
<**file_name**>: Name of the LIB-4xxx config file to be backed up (must be a .bin file).
The filename should only contain alpha, numeric, underscore "_" and dot "." characters.
Example:

```
>config backup binary 192.168.1.30 LIB-4400cfg.bin
>
```

Messages: *tftp client put failed: 8*

Note: the TFTP server must be configured and running. If the TFTP server is not running and configured, the message "*tftp client put failed: x*" displays. When the transfer successfully completes, the TFTP server displays a confirmation message such as:
Connection received from 192.168.1.110 on port 7800 [27/04 16:46:42.786]
Write request for file <LIB-4400_v1.1.2_conf.bin>. Mode OCTET [27/04 16:46:42.786]
Using local port 2020 [27/04 16:46:42.786]
<LIB-4400_v1.1.2_conf.bin>: rcvd 13 blks, 6348 bytes in 0 s. 0 blk resent [27/04 16:46:42.786]

Command: **Config Restore Binary**

Syntax: **config restore binary** <hostname> <file_name>

Description: Restore binary configuration from a configured and enabled TFTP server. Note that you must log in to the LIB-4xxx again when done. The parameters are:

<**hostname**> : IP Address or Hostname of the TFTP server.

<**file_name**>: Name of the LIB-4xxx config file to be restored (must be a .bin file) .

Example:

```
>config backup binary 192.168.1.30 LIB-4400cfg.bin
>config restore binary 192.168.1.30 LIB-4400cfg.bin
Restore successful
System Restarting...>+M25PXX : Init device with JEDEC ID 0xC22018.
LIB-4400 board detected (VSC7428 Rev. B).

RedBoot(tm) bootstrap and debug environment [ROMRAM]
Non-certified release, version 1_12-TN - built 11:17:43, Apr 20 2012

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source code and full license terms must have been made available to you.
Redboot comes with ABSOLUTELY NO WARRANTY.

Platform: VCore-III (MIPS32 24KEc) LUTON26
RAM: 0x80000000-0x88000000 [0x800211a8-0x87fe1000 available]
FLASH: 0x40000000-0x40ffffff, 256 x 0x10000 blocks
== Executing boot script in 1.000 seconds - enter ^C to abort
RedBoot> fis load -d managed
Image loaded from 0x80040000-0x806edf60
RedBoot> go

Username:
```

Messages: *tftp client get failed: 8*

E misc 00:00:00 26/hpic_spi_init_start#1792: Error: hpic_spi_read_version failed: -2

Note: the TFTP server must be configured and running. if the TFTP server is not running and configured, the message "*tftp client put failed: x*" displays. Note that you must log in to the LIB-4xxx again when done.

TFTP Server Messages:

```
Connection received from 192.168.1.10 on port 7800 [02/05 09:57:50.449]
Write request for file <LIB-4400cfg.bin>. Mode OCTET [02/05 09:57:50.449]
Using local port 1401 [02/05 09:57:50.449]
<LIB-4400cfg.bin>: rcvd 13 blks, 6478 bytes in 0 s. 0 blk resent [02/05 09:57:50.449]
Connection received from 192.168.1.10 on port 7700 [02/05 09:58:40.449]
Read request for file <LIB-4400cfg.bin>. Mode OCTET [02/05 09:58:40.449]
Using local port 1402 [02/05 09:58:40.449]
<LIB-4400cfg.bin>: sent 13 blks, 6478 bytes in 0 s. 0 blk resent [02/05 09:58:40.464]
```

IP Commands

The LIB-4xxx Internet Protocol (IP) group commands provide IPv4 and IPv6 configuration, and ARP, DHCP, DNS, MVLAN, NTP, and Ping functions. The IP commands include:

>**ip ?**
Available Commands:

IP ARP Show
IP Configuration
IP DHCP [enable|disable]
IP Setup [<ip_addr>] [<ip_mask>] [<ip_router>]
IP Ping <ip_addr_string> [(Length <ping_length>)] [(Count <ping_count>)] [(Interval <ping_interval>)]
IP DNS [<ip_addr>]
IP DNS_Proxy [enable|disable]
IP IPv6 AUTOCONFIG [enable|disable]
IP IPv6 Setup [<ipv6_addr>] [<ipv6_prefix>] [<ipv6_router>]
IP IPv6 State <ipv6_addr> [enable|disable]
IP IPv6 Ping6 <ipv6_addr> [(Length <ping_length>)] [(Count <ping_count>)] [(Interval <ping_interval>)]
IP MVlan [<vid>]
IP NTP Configuration
IP NTP Mode [enable|disable]
IP NTP Server Add <server_index> <ip_addr_string>
IP NTP Server Ipv6 Add <server_index> <server_ipv6>
IP NTP Server Delete <server_index>
>

Command: **IP ARP Show**
Syntax: **ip arp show**
Description: Display the current ARP (Address Resolution Protocol) configuration.

Example 1:
```
>ip arp show
ARP Table:

0 entries in total
>
```

Example 2:
```
>ip arp show
ARP Table:

192.168.1.30      (incomplete) on eth0

1 entries in total
>
```

Example 3:
```
>ip arp show
ARP Table:

192.168.1.30      00:04:75:bd:9c:36 on eth0
192.168.1.110     00:c0:f2:56:08:b0 on eth0

2 entries in total
>
```

Command: **Show Current IP Configuration**
Syntax: **ip configuration**
Description: Displays the current LIB-4xxx IP configuration (DHCP Client state, IP address / mask, IP Router address, VLAN ID, and IPv6) information.

Example:

```
>ip config

IP Configuration:
=================

DHCP Client       : Disabled
IP Address        : 192.168.1.26
IP Mask           : 255.255.255.0
IP Router         : 192.168.1.1
DNS Server        : 0.0.0.0
VLAN ID           : 1
DNS Proxy         : Disabled

IPv6 AUTOCONFIG mode   : Enabled  (Fallback in 300 seconds)
IPv6 Link-Local Address: fe80::2c0:f2ff:fe56:b6f
IPv6 Address           : ::192.168.0.1
IPv6 Prefix            : 96
IPv6 Router            : ::

Active Configuration for IPv6: (AUTOCONFIG with Stateless)
IPv6 Address: fe80:2::2c0:f2ff:fe56:b6f/64 Scope:Link
Status:UP/RUNNING(Enabled)/MTU 1500/LinkMTU is 1500
IPv6 Address: ::192.168.0.1/96 Scope:Global
Status:UP/RUNNING(Enabled)/MTU 1500/LinkMTU is 1500
>
```

Messages: *Active Configuration for IPv6: (AUTOCONFIG... xx seconds remaining)*

If a duplicate IPv6 address is discovered, a message displays at the bottom of the config listing; for example:

```
IPv6 Address: ::192.0.2.1/96 Scope:Global
[Duplicate] Status:UP/RUNNING(Enabled)/MTU 1500/LinkMTU is 1500
```

Command: **Set / Show IP DHCP Client Mode**
Syntax: **ip dhcp** [enable|disable]
Description: Set or show the DHCP client mode.
To enable or renew the LIB-4xxx DHCP client mode, type **ip dhcp enable** and press **Enter**.
To disable the LIB-4xxx DHCP client mode, type **ip dhcp disable** and press **Enter**.
To display the current LIB-4xxx DHCP client mode, type **ip dhcp** and press **Enter**.
The default is DHCP client mode disabled.

Example:
```
>ip dhcp
DHCP Client       : Enabled

Active Configuration: (Static)
IP Address        : 192.168.1.10
IP Mask           : 255.255.255.0
IP Router         : 0.0.0.0
DNS Server        : 0.0.0.0
>ip dhcp disable
>ip dhcp
DHCP Client       : Disabled
>
```

Note: The LIB-4424 uses the MAC Address in DHCP option 61 client-identifier. IETF RFC 2132 defines DHCP Options and BOOTP Vendor Extensions. Per RFC section 9.14. Client-identifier: "This option is used by DHCP clients to specify their unique identifier. DHCP servers use this value to index their database of address bindings. This value is expected to be unique for all clients in an administrative domain. Vendors and system administrators are responsible for choosing client-identifiers that meet this requirement for uniqueness. The code for this option is 61, and its minimum length is 2."

Command: **IP Setup**
Syntax: **ip setup** [<ip_addr>] [<ip_mask>] [<ip_router>]
Description: Set or show the IPv4 setup, where:
<**ip_addr**> : IP address (a.b.c.d); default: Show current IP address.
<**ip_mask**> : IP subnet mask (a.b.c.d); default: Show current IP mask.
<**ip_router**>: IP router (a.b.c.d), default: Show IP router.

Example:
```
>ip setup
IP Address        : 192.168.1.26
IP Mask           : 255.255.255.0
IP Router         : 0.0.0.0
DNS Server        : 0.0.0.0
VLAN ID           : 1
>
```

Messages: *The host part of the IP router is zero.* For example:
```
>ip setup 192.168.1.10 255.255.255.0 192.168.1.0
The host part of the IP router is zero
>
```

Command: **IPv6 Setup**
Syntax: **ip>ipv6 setup** [<ipv6_addr>] [<ipv6_prefix>] [<ipv6_router>]
Description: From the IP> menu path, set or show the IPv6 setup, where:
<**ipv6_addr**>: IPv6 address in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon to separate each field (:). For example, four hexadecimal digits with a colon (:) separates each field (e.g., 'fe80::215:c5ff:fe03:4dc7'). The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; however, it can only appear once. It can also be used to precede a valid IPv4 address (e.g., '::192.1.2.34').
<**ipv6_prefix**>: IPv6 subnet mask; the default is 'Show IPv6 prefix'. An IPv6 address prefix is a combination of an IPv6 prefix (address) and a prefix length. The prefix takes the form ipv6-prefix/prefix-length and represents a block of address space (or a network). The ipv6-prefix variable follows general IPv6 addressing rules (see IETF RFC 2373). The /prefix-length variable is a decimal value that indicates the number of contiguous, higher-order bits of the address that make up the network portion of the address. An example of a valid IPv6 prefix is 10FA:6604:8136:6502::/64. (Hexadecimal letters in IPv6 addresses are not case sensitive.)
<**ipv6_router**>: IPv6 router. The default is 'Show IPv6 router'. An IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon to separate each field (:). In the example, 'fe80::215:c5ff:fe03:4dc7', the symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can only appear once. It can also be used to precede a valid IPv4 address (e.g., '::192.1.2.34').

Example 1: Type **ip setup** and press **Enter** to set or show the current IPv6 setup parameters.

```
>ip ipv6 setup

IPv6 AUTOCONFIG mode   : Enabled  (Fallback in 300 seconds)
IPv6 Link-Local Address: fe80::2c0:f2ff:fe56:a40
IPv6 Address           : ::192.0.2.1
IPv6 Prefix            : 96
IPv6 Router            : ::
>
```

Example 2: Type **ip setup, enter a new IPv6 address,** and press **Enter** to set the new IPv6 setup.

```
>ip ipv6 setup ::192.168.1.30 2 fe80::215:c5ff:fe03:4dc7
>ip ipv6 setup

IPv6 AUTOCONFIG mode   : Enabled  (Fallback in 300 seconds)
IPv6 Link-Local Address: fe80::2c0:f2ff:fe56:a40
IPv6 Address           : ::192.168.1.30
IPv6 Prefix            : 2
IPv6 Router            : fe80::215:c5ff:fe03:4dc7
>
```

Command: **IPv4 Ping**
Syntax: **ip ping** <ip_addr_string> [(Length <ping_length>)] [(Count <ping_count>)] [(Interval <ping_interval>)]
Description: From the IP> menu path, Ping an IPv4 address (ICMP echo), where:
<**ip_addr_string**>: IP host address (a.b.c.d) or a host name string.
length : PING Length keyword.
<**ping_length**> : Ping ICMP data length (2-1452; Default is 56), excluding MAC, IP and ICMP headers.
count : PING Count keyword.
<**ping_count**> : Transmit ECHO_REQUEST packet count (1-60; Default is 5).
interval : PING Interval keyword.
<**ping_interval**> : Ping interval (0-30. The default is 0).

Example:
```
>ip ping 192.168.1.10
PING server 192.168.1.10, 56 bytes of data.
64 bytes from 192.168.1.10: icmp_seq=0, time=0ms
64 bytes from 192.168.1.10: icmp_seq=1, time=0ms
64 bytes from 192.168.1.10: icmp_seq=2, time=0ms
64 bytes from 192.168.1.10: icmp_seq=3, time=0ms
64 bytes from 192.168.1.10: icmp_seq=4, time=0ms
Sent 5 packets, received 5 OK, 0 bad
>
```

Command: **IPv6 Ping**
Syntax: **IPv6 Ping6** <ipv6_addr> [<ping_length>] [<ping_count>]
Description: Ping IPv6 address (ICMPv6 echo), where:
<**ipv6_addr**> : IPv6 host address.
IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon separates each field (:). For example, four hexadecimal digits with a colon separates each field (:). For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can only appear once. It also used a following legally IPv4 address.
For example,'::192.1.2.34'.
length : PING Length keyword
<**ping_length**> : Ping ICMP data length (2-1452; Default is 56), excluding MAC, I
P and ICMP headers
count : PING Count keyword
<**ping_count**> : Transmit ECHO_REQUEST packet count (1-60; Default is 5)
interval : PING Interval keyword
<**ping_interval**>: Ping interval (0-30; Default is 0)

Example:
```
>ip ipv6 ping fe80::215:c5ff:fe03:4dc7
PING6 server fe80::215:c5ff:fe03:4dc7, 56 bytes of data.
recvfrom: Operation timed out
recvfrom: Operation timed out
recvfrom: Operation timed out
recvfrom: Operation timed out
recvfrom: Operation timed out
Sent 5 packets, received 0 OK, 0 bad
>
```

Command: **IP IPv6 AUTOCONFIG**
Syntax: **ip ipv6 autoconfig** [enable|disable]
Description: Set or show the IPv6 automatic configuration mode, where:
enable : Enables the IPv6 Autoconfiguration mode.
disable: Disables IPv6 Autoconfiguration mode.

Example:

```
>ip ipv6 auto

IPv6 AUTOCONFIG mode   : Enabled  (Fallback in 300 seconds)
IPv6 Link-Local Address: fe80::2c0:f2ff:fe56:a40
IPv6 Address           : ::192.168.1.30
IPv6 Prefix            : 2
IPv6 Router            : fe80::215:c5ff:fe03:4dc7
>
```

IPv6 Parameter Descriptions:

IPv6 AUTOCONFIG mode - if IPv6 auto-configuration is enabled and it fails, the configured IPv6 address is zero. The router may delay responding to a router solicitation for a few seconds, the total time needed to complete auto-configuration can be significantly longer.

IPv6 Link-Local Address of this LIB-4xxx. One of IPv6 addresses for local link usage. In IPv6, an address having link-only scope that can be used to reach neighboring nodes attached to the same link. All interfaces have a link-local unicast address. An IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon (:) separating each field (e.g., 'fe80::215:c5ff:fe03:4dc7'). The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; however, it can only appear once. The symbol '::' can also represent a valid IPv4 address (e.g., '::192.1.2.34').

IPv6 Address -the IPv4 address preceded by the symbol '::' (e.g., `::192.0.2.1`).

IPv6 Prefix - the IPv6 Prefix of this S320. The valid range is 1 to 128.

IPv6 Router - the IPv6 gateway address of this LIB-4xxx. An IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon (:) separating each field (e.g., 'fe80::215:c5ff:fe03:4dc7'). The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; however, it can only appear once. The symbol '::' can also represent a valid IPv4 address (e.g., '::192.1.2.34').

Command: **IP DNS**
Syntax: **ip dns** [<ip_addr>]
Description: Set or show the DNS server IP address, where:
<**ip_addr**>: IP address (a.b.c.d); default: Show the current DNS server's IP address.

Example:
```
>ip dns
DNS Server        : 0.0.0.0
>ip dns 192.168.1.30
>ip dns
DNS Server        : 192.168.1.30
>
```

Command: **IP DNS_Proxy**
Syntax: **ip dns_proxy** [enable|disable]
Description: Set or show the IP DNS Proxy mode. This command enables or disables the DNS Proxy server function, or displays the current DNS Proxy server configuration. When DNS Proxy is enabled, the LIB-4xxx will relay DNS requests to the currently configured DNS server on the LIB-4xxx, and reply as a DNS resolver to the client device on the network.
Note that setting this function does not provide the full set of IP, BootP, VLAN, DNS server, and Management VLAN / member ports configuration. Note that the underscore (_) character is required. The **ip dns_proxy** command parameters are:
enable: Enable DNS Proxy.
disable: Disable DNS Proxy (default).

Example:
```
>ip dns_proxy
DNS Proxy         : Disabled
>ip dns_proxy enable
>ip dns_proxy
DNS Proxy         : Enabled
>ip dns proxy
Invalid parameter: proxy
```

Command: **IP MVlan**
Syntax: **ip mvlan** [<vid>]
Description: Set or show the Management VLAN. To set the Managemnt VLAN ID, provide the managed VLAN ID in the range of 1-4094. A VLAN ID is a 12-bit field specifying the VLAN to which the frame belongs. The valid range is 1 to 4094 for this Management VLAN ID.
This Management VLAN provides a secure channel for all management traffic to/from the device. **Note**: Be sure to set the Management VLAN configuration before you set the VLAN configuration.The **ip mvlan** command parameters are:
<**vid**>: VLAN ID (1-4094).

Example:
```
>ip mvlan
IP Address        : 192.168.1.26
IP Mask           : 255.255.255.0
IP Router         : 0.0.0.0
DNS Server        : 192.168.1.30
VLAN ID           : 1
>ip mvlan 2
>ip mvlan
IP Address        : 192.168.1.26
IP Mask           : 255.255.255.0
IP Router         : 0.0.0.0
DNS Server        : 192.168.1.30
VLAN ID           : 2
>
```

Command: **IP NTP Configuration**
Syntax: **ip ntp configuration**
Description: Show the current NTP configuration. Network Time Protocol (NTP) is a network protocol for synchronizing the clocks of computer systems. NTP uses UDP (datagrams) as transport layer. The LIB-4xxx uses NTP for real time clock synchronization with the network time server. The NTP is compliant with IETF RFC 5905. The LIB-4xxx takes care of day light saving options where used. The management interfaces provide options to configure NTP and report the network time synchronized. The LIB-4xxx time obtained is used for all LIB-4xxx services that need a timestamp. (Note that NTP does not work with Windows Server 2008.)

Example:

```
>ip ntp config

IP NTP Configuration:
=====================

NTP Mode : Disabled
Idx   Server IP host address (a.b.c.d) or a host name string
---   ----------------------------------------------------
1     192.168.1.30
2
3
4
5
>
```

Command: **IP NTP Mode**
Syntax: **ip ntp mode** [enable|disable]
Description: Set or show the NTP mode, where:
enable : Enable NTP mode.
disable : Disable NTP mode.
(The default is 'Show NTP mode'.)
Type **ip ntp mode** and press **Enter** to display the current NTP mode (Enabled or Disabled).
Type **ip ntp mode enable** and press **Enter** to enable NTP mode. The default is Disabled.
When NTP mode operation is enabled, the agent forwards NTP messages between the clients and the server when they are not on the same subnet domain.

Example:

```
>ip ntp mode
NTP Mode : Disabled
>ip ntp mode enable
>ip ntp mode
NTP Mode : Enabled
>
```

Problem: NTP does not work with Windows Server 2008

Meaning: Microsoft's W32Time service cannot reliably maintain sync time to the range of 1 to 2 seconds needed for high accuracy environments. The W32Time service is not a full-featured NTP solution that meets time-sensitive application needs.

Recovery: See the Microsoft Support site at http://support.microsoft.com/kb/939322.

Command: **Add IPv4 NTP Server**
Syntax: **ip ntp server add** <server_index> <ip_addr_string>
Description: Adds a new IPv4 NTP Server entry to the switch configuration. Up to 5 IPv4 NTP Servers can be configured. Type **ip ntp server add** <server index x> <ip addr string y> and press **Enter** to add an NTP Server, where:
<**server_index**> = the number of this NTP Server (i.e., 1 = the first IPv4 NTP server, 2 = the second, etc.).
<**ip_addr_string**> = the IP address of this IP v4 NTP Server (e.g., 192.168.1.30).

Example:
```
>ip ntp server add 1 192.168.1.30
>ip ntp config

IP NTP Configuration:
=====================

NTP Mode : Enabled
Idx   Server IP host address (a.b.c.d) or a host name string
---   ----------------------------------------------------
1     192.168.1.30
2
3
4
5
>
```

Command: **Add IPv6 NTP Server**
Syntax: **ip ntp server ipv6 add** <server_index> <server_ipv6>
Description: Adds a new IPv6 NTP Server to the LIB-4xxx configuration. Up to 5 IPv6 NTP Servers can be configured.
Type **ip ntp server ipv6 add** <server index x> <ip addr string y> and press **Enter** to add an NTP Server, where:
<**server_index**>: the number of this IPv6 NTP Server (i.e., 1 = the first IPv6 NTP server, 2 = the second IPv6 NTP server, etc.).
<**server_ipv6**>: the IP address of this IPv6 NTP Server (e.g., 192.168.1.30).
An IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon to separate each field (:). For example, 'fe80::215:c5ff:fe03:4dc7'.
The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can only appear once. It also used with a following legal IPv4 address (e.g.,'::192.1.2.34').

Example:
```
>ip ntp server ipv6 add 1 fe80::215:c5ff:fe03:4dc7
>
```

Command: **IP NTP Server Delete**
Syntax: **ip ntp server delete** <server_index>
Description: Deletes an existing IPv4 or IPv6 NTP Server from the LIB-4xxx configuration.
Type **ip ntp server delete** <server_index x>, where:
<**server_index**>: the number of this NTP Server (i.e., 1 = the first NTP server, 2 = the second, etc.).

Example:
```
>ip ntp server delete 2
>ip ntp server delete 1
>
```

Messages: *Doesn't allowed to delete empty server*

Port Commands

These LIB-4xxx Port commands provide port management, statistics, SFP, and related port configuration.

>**port ?**
Available Commands:

Port Configuration [<port_list>] [up|down]
Port SharedPort [internal|external] *(LIB-4424 and only)*
Port Mode [<port_list>] [auto|10hdx|10fdx|100hdx|100fdx|1000fdx|2500fdx|10gfdx|sfp_auto_ams]
Port Flow Control [<port_list>] [enable|disable]
Port State [<port_list>] [enable|disable]
Port MaxFrame [<port_list>] [<max_frame>]
Port Power [<port_list>] [enable|disable|actiphy|dynamic]
Port Excessive [<port_list>] [discard|restart]
Port Statistics [<port_list>] [<command>] [up|down]
Port VeriPHY [<port_list>]
Port SFP [<port_list>]
Port DMI Configuration [<port_list>] [<dmi_rx_pwr_int_thr>]
Port DMI Statistics [<port_list>]
Port Description [<port_list>] [<name>]
>

The Port group commands are explained below.

Command: **Port Configuration**
Syntax: **port configuration** [<port_list>] [up|down]
Description: Displays the current port configuration. Type **port config** and press **Enter** to display the full set of current port parameters, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
up : Show ports which are up.
down : Show ports which are down.

Example:

```
>port config

Port Configuration:
===================


Port  State     Mode          Flow Control    MaxFrame  Power     Excessive    Link

----  --------  -----------   ------------    --------  --------  ---------    ----------
1     Enabled   1Gfdx         Disabled        10056     Disabled   Discard     1Gfdx
2     Enabled   1Gfdx         Disabled        10056     Disabled   Discard     1Gfdx
3     Enabled   10Gfdx        Disabled        10056     Disabled   Discard     Down
4     Enabled   10Gfdx        Disabled        10056     Disabled   Discard     Down
5     Enabled   Auto          Disabled         1522     Disabled    Discard    100fdx

>
>port config up

Port Configuration:
===================

Port   State    Mode         Flow Control      MaxFrame   Power     Excessive  Link
----   -------  -----------  ------------      --------   --------  ---------  ----------
5      Enabled   Auto        Disabled          10056      Disabled  Discard    100fdx

>
```

Command: **Set / Show Port SharedPort Mode**

Syntax: **port sharedPort** [internal|external]

Description: Set or show Shared Port status. The LIB-4424and contain one port that is 'Shared'. The Shared Port (LIB-4424 port 24 or port 12) can be toggled between two modes of operation:

external: This is the default mode. In this mode, the shared port is attached to the SFP interface, and works like the rest of the ports on this switch. The Shared Port mode must be set to 'External' for normal port operation.

internal: This mode disconnects the the Shared Port from the SFP interface and attaches it internally to to an FPGA. No connectivity can be achieved through the Shared Port's SFP interface while in this mode. The FPGA port is "hidden" when the Shared port is set to Internal mode in several LIB-4424 modules (ACL, EPS, ERPS, MEP, NAS, QoS, VLAN, PVLAN, VCL, EVC, MAC, DMI, etc.). Use this mode for EtherSAT Loopback and EtherSAT Test functions.
The Shared Port mode must be set to 'internal' for these features to work:

Ethersat Test
Ethersat > **Loopback**

The FPGA port is set as a C-port by default to allow the Loopback test to work when EVC is configured. See the *EtherSAT User Guide* for specific information.

Example:
```
>port shared
SharedPort(12) Mode: External
>port shared internal
>port shared
SharedPort(12) Mode: Internal
>
```

Messages:
Error: FPGA link ANEG failed
failed to open system sharedport table
GIVEN PORT IS NOT EAST OR WEST
The port is used for the internal for FPGA.
the shared port is not ready
The shared port mode must be internal!
The shared port must be internal mode!
Can't set VLAN config, port=%u
the shared port is not ready sa=%p

Note: this command is not available on the LIB-4400.

Command: **Port Mode**
Syntax: **port mode** [<port_list>] [auto|10hdx|10fdx|100hdx|100fdx|1000fdx|sfp_auto_ams]
Port Mode [<port_list>] [auto|10hdx|10fdx|100hdx|100fdx|1000fdx|2500fdx|10gfdx|sfp_auto_ams]
Description: Set or show the port speed and duplex mode. Type **port mode** and press **Enter** to display the port / mode / link table, where:
<**port_list**>: Port list or 'All'. The default is All ports.
auto : Auto negotiation of speed and duplex.
10hdx : Forces the port to 10 Mbps at Half duplex.
10fdx : Forces the port to 10 Mbps at Full duplex.
100hdx : Forces the port to 100 Mbps at Half duplex .
100fdx : Forces the port to 100 Mbps at Full duplex.
1000fdx : Forces the port to 100 Mbps at Full duplex.
2500fdx : 2.5 Gbps, full duplex (not supported on LIB-4400).
10gfdx : Forces the port to 10Gbps at Full duplex.
sfp_auto_ams: Auto detection of SFP (not supported on LIB-4400).
(The default is 'Show configured and current mode'.)

Example:

```
>port mode

Port  Mode         Link
----  -----------  ----------
1     1Gfdx        1Gfdx
2     1Gfdx        1Gfdx
3     10Gfdx       Down
4     10Gfdx       Down
5     Auto         100fdx
>port mode 3 auto
>port mode

Port  Mode         Link
----  -----------  ----------
1     1Gfdx        1Gfdx
2     1Gfdx        1Gfdx
3     Auto         Down
4     10Gfdx       Down
5     Auto         100fdx
>
```

Messages: An "*Invalid parameter*" message displays if the entered port number does not support the selected mode (e.g., "*Port 1 does not support this mode*" or "*Port 12 does not support this fiber mode*"). Note that each port does not support all of the above modes.

Note: When a twisted-pair port is set to Auto-Negotiation, the end node should also be set to Auto-Negotiation to prevent a duplex mode mismatch. A port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex. To avoid this problem when connecting an end node with a fixed duplex mode of full-duplex to a switch port, disable Auto-Negotiation on the port and set the port's speed and duplex mode manually.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port Flow Control**
Syntax: **port flow control** [<port_list>] [enable|disable]
Description: Set or show the port flow control mode, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable flow control for this port.
disable : Disable flow control for this port.
(The default is 'Show flow control mode'.)
Type **port flow control ?** and press **Enter** to display the port mode command's description and syntax.
Type **port flow control** and press **Enter** to display the current Port / FC / RX/TX Pause configuration settings.

Example:

```
>port flow control
Port  Flow Control  Rx Pause  Tx Pause
----  ------------  --------  --------
1     Disabled      Disabled  Disabled
2     Disabled      Disabled  Disabled
3     Disabled      Disabled  Disabled
4     Disabled      Disabled  Disabled
5     Disabled      Disabled  Disabled
>port flow control 2-4 enable
>port flow control

Port  Flow Control  Rx Pause  Tx Pause
----  ------------  --------  --------
1     Disabled      Disabled  Disabled
2     Enabled       Enabled   Enabled
3     Enabled       Enabled   Enabled
4     Enabled       Enabled   Enabled
5     Disabled      Disabled  Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port State**
Syntax: **port state** [<port_list>] [enable|disable]
Description: Set or show the current LIB-4xxx port administrative state.
Type **port state** and press **Enter** to display the current ports' admin states (Enabled or Disabled). By default all ports admin states are displayed.
Example: Type **port state** and press **Enter** to display the current administrative states of all ports.
Then type **`port state 2-4 enable`** to enable ports 1-4.
Then type **port state** to verify the port admin states.

```
>port state

Port  State
----  --------
1     Enabled
2     Enabled
3     Enabled
4     Enabled
5     Enabled
>port state 2-4 disable
>port state

Port  State
----  --------
1     Enabled
2     Disabled
3     Disabled
4     Disabled
5     Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port MaxFrame**
Syntax: **port maxframe** [<port_list>] [<max_frame>]
Description: Set or show the port maximum frame size, where:
<**port_list**>: Port list or 'All'. The default is 'Show maximum frame size'.
<**max_frame**>: Port maximum frame size (e.g., 1518-9600 packets) including FCS. Note that frame size is unique for each port for each model.
<**port_list**>: Port list or 'All' The default is 'All ports'.
<**max_frame**>: Port maximum frame size (e.g., 1518-10056 bytes). The default is 10056 bytes. Note that frame size is unique for each port for each model.

Example:

```
>port maxframe

Port  MaxFrame
----  --------
1     10056
2     10056
3     10056
4     10056
5     10056
>port maxframe 1518
>port maxframe

Port  MaxFrame
----  --------
1     1518
2     1518
3     1518
4     1518
5     1518
>
```

Messages: An "*Invalid parameter*' message displays if you try to enter a value outside of the valid range of 1518-9600 packets (e.g., *Invalid parameter: 99999* displays). Note that frame size is unique for each port for each model.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port Power**
Syntax: **port power** [<port_list>] [enable|disable|actiphy|dynamic]
Description: Set or show the port PHY power mode, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable all power control. Supported on Ports 5-12.
disable: Disable all power control. Supported on all Ports
actiphy: Enable the ActiPHY power control. ActiPHY™ is an automatic power savings mode when a specific port is in link down or standby operation. Supported on Ports 5-12.
dynamic: Enable Dynamic power control (controls transmit power and reduces power during idle periods). Supported on Ports 5-12.

Example:

```
>port power

Port  Power
----  --------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
5     Disabled
>port power 5 dynamic
>port power

Port  Power
----  --------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
5     Dynamic
>
```

Note that not all ports support all of the command options. If not supported, a message like "*Port 8 does not support this mode*" displays. Note that in the 'show' version of this command, Port 9 displays in the table as 'Disabled'; however, Port 9 can not be assigned a value using the 'set' version of this command. Note that changing the mode may display the message "*Local Area Network Connection x. A network cable is unplugged"*. Actiphy® is a registered trademark owned by Vitesse Semiconductor Corporation.

Port #	Enable	ActiPHY	Dynamic	Disable
1	No	No	No	Yes
2	No	No	No	Yes
3	No	No	No	Yes
4	No	No	No	Yes
5	No	No	No	Yes

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port Excessive Collision Mode**
Syntax: **port excessive** [<port_list>] [discard|restart]
Description: Set or show the port excessive collision mode. The parameters are:
<**port_list**>: Port list or 'All'. The default is 'Show All ports'.
discard : Discard frame after 16 collisions.
restart : Restart backoff algorithm after 16 collisions (only supported on ports that negotiate or are forced to Half duplex mode, e.g., Port 5 only).

Example:

```
>port excessive

Port  Excessive
----  ---------
1     Discard
2     Discard
3     Discard
4     Discard
5     Discard
>port excessive 5 restart
>port excessive 5

Port  Excessive
----  ---------
5     Restart
>port excessive 4 restart
Port 4 does not support this mode
>port excessive 5 restart
>port excessive
Port  Excessive
----  ---------
1     Discard
2     Discard
3     Discard
4     Discard
5     Restart
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port Statistics**
Syntax: **port statistics** [<port_list>] [<command>] [up|down]
Description: Show the current port statistics, where:
<**port_list**>: Port list or 'All'. The default is 'Show All' ports (this can be a long listing).
<**command**> : The command parameter takes the following values:
clear : Clear port statistics.
packets : Show packet statistics.
bytes : Show byte statistics.
errors : Show error statistics.
discards : Show discard statistics.
filtered : Show filtered statistics.
0..7 : Show priority statistics.
(The default is 'Show all port statistics'.)
up : Show ports, which are up.
down : Show ports, which are down.

Example:

```
>port statistics 5
Port 5 Statistics:

Rx Packets:                        2363   Tx Packets:                       39987
Rx Octets:                       472364   Tx Octets:                      5271024
Rx Unicast:                        1488   Tx Unicast:                        1129
Rx Multicast:                         2   Tx Multicast:                     37861
Rx Broadcast:                       873   Tx Broadcast:                       997
Rx Pause:                             0   Tx Pause:                             0

Rx 64:                              849   Tx 64:                             1142
Rx 65-127:                          770   Tx 65-127:                        37893
Rx 128-255:                         109   Tx 128-255:                         400
Rx 256-511:                         462   Tx 256-511:                         268
Rx 512-1023:                        160   Tx 512-1023:                         54
Rx 1024-1526:                        13   Tx 1024-1526:                       230
Rx 1527-    :                         0   Tx 1527-    :                         0

Rx 0:                              2358   Tx 0:                                 0
Rx 1:                                 0   Tx 1:                                 0
Rx 2:                                 0   Tx 2:                                 0
Rx 3:                                 0   Tx 3:                                 0
Rx 4:                                 0   Tx 4:                                 0
Rx 5:                                 0   Tx 5:                                 0
Rx 6:                                 0   Tx 6:                                 0
Rx 7:                                 0   Tx 7:                             39987

Rx Drops:                             5   Tx Drops:                             0
Rx CRC/Alignment:                     0   Tx Late/Exc. Coll.:                   0
Rx Undersize:                         0
Rx Oversize:                          0
Rx Fragments:                         0
Rx Jabbers:                           0
Rx Filtered:                          5
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port VeriPHY**
Syntax: **port veriphy** [<port_list>]
Description: Runs the cable diagnostic test on selected TP port(s)and displays the resulting cable pair test results, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
After the message "*Starting VeriPHY, please wait*" clears, the test data displays.
OK - the pair is operational.
Open - the pair has an open in the circuit.
Short - the pair has a short in the circuit.
Length - the distance to the fault (far end device) in meters.

Example:

```
> port veriphy 1
Starting VeriPHY, please wait
>port veriphy
Starting VeriPHY, please wait
>I2C controller seems stuck: seq 8292557, 1, TAR = 0x18
E tn_monitor 21:14:59 55/tn_monitor_temp#308: Error: Failed to read Power Supply
 info 0
>port ver
Starting VeriPHY, please wait
>
```

The VERIPHY trademark was assigned a serial number by the USPTO June 11, 2002 (Type Of Mark: Service Mark). The current federal status of this trademark filing is Cancelled - Section 8.

Command: **Port SFP**
Syntax: **Port SFP** [<port_list>]
Description: Displays the detected SFP type and MAC interface type, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:

```
>port sfp

Port  SFP type       Vendor name         Vendor PN           Rev  MAC_IF
----  -------------  ------------------  ------------------  ---  ----------
1     None                                                        SERDES
2     1000BASE_SX    Transition          TN-SFP-SX           0000 SERDES
3     1000BASE_SX    Transition          TN-SFP-SX           0000 SERDES
4     1000BASE_SX    Transition          TN-SFP-SXD          0000 SERDES
5     1000BASE_SX    Transition          TN-SFP-SXD          0000 SERDES
6     None                                                        SERDES
7     100FX          Transition          TN-SFP-OC3M         0001 100FX
8     None                                                        SERDES
9     None                                                        SERDES
10    None                                                        SERDES
11    None                                                        SERDES
13    None                                                        XAUI
14    None                                                        XAUI
15    None                                                        SGMII
>
```

Note that the FPGA port (e.g., port 12) is "hidden" when the Shared port is set to Internal mode.

The MAC interface types include:

XAUI is a standard for extending the XGMII (10 Gigabit Media Independent Interface) between the MAC and PHY layer of 10 Gigabit Ethernet (10GbE).

SGMII (Serial Gigabit Media Independent Interface) is a standard interface used to connect an Ethernet MAC-block to a PHY. SGMII is used for GbE and can also carry 10/100 MBit Ethernet.

SERDES (Serializer/Deserializer) is a pair of functional blocks used in LIB-4xxx communications to ompensate for limited input/output.

Command: **Port DMI Configuration**

Syntax: **port dmi config** [<port_list>] [<dmi_rx_pwr_int_thr>]

Description: Displays the DMI (Diagnostic Monitoring Interface) port configuration in terms of Interface Characteristics, Diagnostic Monitoring, and Supported Media Length.

Use the **port dmi config** command to set or show the port DMI: Receive Power Intrusion Threshold, where:

<**port_list**> : Port list or 'All'. The default is 'All ports'.

<**dmi_rx_pwr_int_thr**>: Port DMI receive power intrusion threshold (0-65535). This is a configurable level for Rx Power on the Fiber port. If the DMI read value falls below the set value, an intrusion is detected, and a trap is generated. The default is 0 uW (microWatts). The valid range is 0 – 65,535 µW (microWatts). The default is 0 uW.

This command defines the lowAlarm threshold for RxPowerAlarm. If a non-zero value (in microwatts) is specified, the LIB-4xxx will stop passing traffic when the receive power drops below the new threshold. This feature is sometimes referred to as 'Intrusion Detection', since tapping into a fiber to intercept traffic leads to a reduction in receive power.

Sets the Diagnostic Monitoring Interface (DMI) receive preset power level for a fiber port.

Example 1:

```
>port dmi config

Port  RxPwrIntThr
----  -----------
1     n/a
2     n/a
3     n/a
4     n/a
5     n/a
>
```

Example 1:

```
>port dmi config

Port  RxPwrIntThr
----  -----------
1     10
2     0
3     0
4     0
5     n/a
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Port DMI Statistics**
Syntax: **port dmi statistics** [<port_list>]
Description: Show the current DMI port statistics, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:

```
>port dmi stat 1
Port 1 DMI Statistics:
----------------------
DMI ID:                 SFP transceiver
Connector Type:         LC
Nominal Bit Rate:       10500 Mbps
Wavelength:             850 nm
RX Power uW:            404 uW
RX Power dBm:           -3.94 dBm
RX Power Alarm:         Normal
RX Power Int Thr uW:    0 uW
Temperature C:          38 C
Temperature F:          100 F
Temperature Alarm:      Normal
TX Bias:                6128 uA
TX Bias Alarm:          Normal
TX Power uW:            583 uW
TX Power dBm:           -2.34 dBm
TX Power Alarm:         Normal
Length 9/125:           0 meters
Length 50/125:          80 meters
Length 62.5/125:        30 meters
Length Copper:          0 meters
Vendor Name:            Transition
Vendor OUI:             00-C0-F2
Vendor Part Number:     TN-10GSFP-SR
Vendor Part Rev:        000
Vendor Serial No:       102201101
>
```

The LIB-4xxx supports connectors with DMI (SFF-8472) capability. All DMI events will trigger notification. Intrusion detection based on Rx Power level is available for triggering any drop in the Rx power. The DMI function displays LIB-4xxx diagnostic / maintenance information such as fiber interface characteristics, diagnostic monitoring parameters, and supported fiber media lengths. The LIB-4xxx supports connectors with DMI (SFF-8472) capability. All DMI events will trigger notification. Intrusion detection, based on Rx Power level, is available for triggering any drop in the Rx power. Note that LIB-4xxx DMI support requires an SFP that supports DMI. Note that DMI statistics are cleared whenever an SFP is removed.

Refer to your SFP module data sheet to determine what if any information is supported. Ttwo MSA documents may apply which this command will gather information from. INF-8074 defines static information about the SFP module like connector type, cable distances, wavelength, etc. SFF-8472 further enhances INF-8074 by adding diagnostic monitor for things like TX power, RX power, warnings, etc. SFP modules that support SFF-8472 also (must) support INF-8074.

Note: The DMI commands can only be entered for a fiber port that supports DMI. Not all LIB-4xxx ports support DMI. Net2Edge Ltd. SFPs that support DMI have a "D" at the end of the model number. If you enter a DMI command on a LIB-4xxx port that does not support DMI, the message "*The DMI feature is not supported on current port*." displays.

Note that DMI statistics are cleared whenever an SFP is removed. When an SFP is removed, the command displays *DMI ID: Unknown or unspecified*. When the SFP is replaced, the DMI statistics then re-display.

Note that the FPGA port (e.g., port 12) is "hidden" when the Shared port is set to Internal mode.

The DMI statistics parameters are explained below.

DMI ID: Specifies the physical device from SFF-8472. The valid values are:
Unknown or unspecified.
GBIC (Gigabyte Interface Converter)
Module/connector soldered to motherboard
SFP transceiver
Reserved
Vendor specific

Connector Type: The external optical or electrical cable connector provided as the interface. Valid values are:
MT-RJ: Media Termination - Recommended Jack for Duplex multimode connections.
LC: Lucent Connector or Local Connector for High-density connections, SFP transceivers.
SC: Subscriber Connector for Datacomm and Telecomm.
ST: BFOC Straight Tip / Bayonet Fiber Optic Connector for Multimode - rarely Singlemode (APC not possible).
VF-45: Snap connector for Datacom uses.
Unknown or unspecified: interface connector information not provided.

Nominal Bit Rate (Mbps): The measured Bitrate in units of 100Mbps (e.g., **1300**, or 1.3 Gbps).

Wavelength (nm): The Nominal Fiber Interface transmitter output wavelength at room temperature. The unit of measure is nanometers (e.g., **850** nm measured wavelength).

Rx (µW): Receive power on local fiber measured in microwatts (e.g., **11** µW) (measured power).

Rx Power (dBM): Receive power on local fiber measured in dBM (decibels relative to one milliwatt) which defines signal strength (e.g., **-19.586** dBM).

Rx Power Alarm: Alarm status for receive power on local fiber (measured signal strength). The dmi_alarm_types are **Normal**, **Not Supported**, **Low Warn**, **High Warn**, **No**, **Low Alarm**, and **High Alarm**.

Rx Power Intrusion Threshold: A preset level for Rx Power on the Fiber port. If the DMI read value falls below the preset value, an intrusion is detected, and a trap is generated. The default is **0** µW. The valid range is **0** – **65,535** uW.

Temperature (°C): Temperature of fiber transceiver in degrees C (Celsius) (e.g., **40.1**˚C measured temp.).

Temperature (°F): Temperature of fiber transceiver in degrees F (Fahrenheit) (e.g., **104.2** ˚F measured temp.).

Temperature Alarm: Alarm status for temperature of fiber transceiver. An event is sent when there is a warning or alarm on DMI temperature. The dmi_alarm_types are **Normal**, **Not Supported**, **Low Warn**, **High Warn**, **No**, **Low Alarm**, and **High Alarm**.

Tx Bias: Transmit bias current on local fiber interface, in µA (microamperes) (e.g., **14768** uA (microamps) measured current).

Tx Bias Alarm: Alarm status for transmit bias current on local fiber interface. The alarm types are **Normal**, **Not Supported**, **Low Warn**, **High Warn**, **No**, **Low Alarm**, and **High Alarm**.

Tx Power (µW): Transmit power on local fiber measured in microwatts (e.g., **240** µW (microwatts) measured power).

Tx Power (dBM): Transmit power on local fiber measured in dBM (decibels relative to one milliwatt) which defines signal strength (e.g., **-6.126** dBM measured power).

Tx Power Alarm: Alarm status for transmit power on local fiber. The dmi_alarm_types are **Normal**, **Not Supported**, **Low Warn**, **High Warn**, **No**, **Low Alarm**, and **High Alarm**.

Length 9/125: Specifies the link length that is supported by the transceiver while operating over single mode (SM) fiber. The unit of measure is meters (m). Displays **N/A** if the media is not applicable.

Length 50/125: Specifies the link length that is supported by the transceiver while operating over 50 micron Multimode (MM) fiber. The value is in meters (m) (e.g., **500** meters as the supported media length).

Length 62.5/125: Specifies the link length that is supported by the transceiver while operating over 62.5 micron Multimode (MM) fiber. The value is in meters (m) (e.g., **300** meters as the supported media length).

Length Copper: Specifies the link length that is supported by the transceiver while operating over copper cable. The value is in meters (m). Displays **N/A** to indicate the media is not applicable.

Vendor Name: The name of the SFP device's manufacturer (e.g., Transition).

Vendor OUI: The SFP device vendor's Organizationally Unique Identifier (OUI) (e.g., 00-C0-F2).

Vendor Part Number: The SFP device manufacturer's part number (model number) (e.g., TN-SFP-SXD).

Vendor Part Rev: The SFP device part number's version or revision level (e.g., 000).

Vendor Serial No: The SFP device's serial number (e.g., 8672105).

Note that these DMI statistics are cleared whenever an SFP is removed.

Command: **Port Description**
Syntax: **port description** [<port_list>] [<name>]
Description: Set or show the port descriptive text, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**name**> : Port description name of up to 31 characters. Use "" (open and closing quote characters) to reset. The description "n/s" displays to indicate that no string name has been assigned.

Example:

```
>port descr

Port  Description
----  -----------
1     n/s
2     n/s
3     n/s
4     n/s
5     n/s
>
>port descr 1 first_port
>port descr

Port  Description
----  -----------
1     first_port
2     n/s
3     n/s
4     n/s
5     n/s
>port descr 1 ''
>port descr

Port  Description
----  -----------
1     ''
2     n/s
3     n/s
4     n/s
5     n/s
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

MAC Commands

Ethernet switches save the source address (SMAC) from a recived frame into a lookup database along with the port number the frame arrived at. The switch will then use this database to look up the destination address (DMAC) contained in the arriving frame to determine which port the frame should be forwarded to.

This database contains both static and dynamic entries. Static entries can be manually entered into the database by a network administrator if desired. These entries are not subject to the aging timer described below.

The 'Agetime' is the period of time a dynamic entry will remain in the database before being purged. This timer is refreshed each time a frame arrives with the corresponding SMAC.

These LIB-4xxx commands provide MAC address table configuration functions.

>**mac ?**
Available Commands:

MAC Configuration [<port_list>]
MAC Add <mac_addr> <port_list> [<vid>]
MAC Delete <mac_addr> [<vid>]
MAC Lookup <mac_addr> [<vid>]
MAC Agetime [<age_time>]
MAC Learning [<port_list>] [auto|disable|secure]
MAC Dump [<mac_max>] [<mac_addr>] [<vid>]
MAC Statistics [<port_list>]
MAC Flush
>

The LIB-4xxx MAC address table configuration commands are explained below.

Command: **MAC Configuration**
Syntax: **mac configuration** [<port_list>]
Description: Displays the current LIB-4xxx MAC address table configuration for a specified port or for all ports.
Example:

```
>mac config

MAC Configuration:
==================

MAC Address : 00-c0-f2-56-0b-6f
MAC Age Time: 300

Port  Learning
----  --------
1     Auto
2     Auto
3     Auto
4     Auto
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **MAC Add**
Syntax: **mac add** <mac_addr> <port_list> [<vid>]
Description: Adds (creates) a new MAC address entry to the LIB-4xxx MAC Addresses table, where:
<**mac_addr**> : MAC address (xx-xx-xx-xx-xx-xx)
<**port_list**>: Port list or 'all' or 'none'.
<**vid**> : VLAN ID (1-4094); the default is VLAN ID 1.

Example:

```
>mac add 11-11-11-11-11-11 all 1
>mac con

MAC Configuration:
==================

MAC Address : 00-c0-f2-56-0b-6f
MAC Age Time: 300

Port  Learning
----  --------
1     Auto
2     Auto
3     Auto
4     Auto

Non-volatile static:
VID  MAC Address        Ports
---  -----------------  -----
1    11-11-11-11-11-11  1-4
Total 1 addresses
>
```

Note: Use the **mac config** command to display the current MAC addresses.

Command: **MAC Delete**
Syntax: **mac delete** <mac_addr> [<vid>]
Description: Deletes the specified (existing) MAC address from the MAC Addresses table, where:
<**mac_addr**>: MAC address (xx-xx-xx-xx-xx-xx).
<**vid**> : The VLAN ID (1-4094) to delete. The default is VID 1.

Example:

```
>mac con

MAC Configuration:
==================

MAC Address : 00-c0-f2-56-0b-6f
MAC Age Time: 300

Port  Learning
----  --------
1     Auto
2     Auto
3     Auto
4     Auto

Non-volatile static:
VID  MAC Address        Ports
---  -----------------  -----
1    11-11-11-11-11-11  1-4
Total 1 addresses
>mac delete 11-11-11-11-11-11 1
>mac con

MAC Configuration:
==================

MAC Address : 00-c0-f2-56-0b-6f
MAC Age Time: 300

Port  Learning
----  --------
1     Auto
2     Auto
3     Auto
4     Auto
>
```

If the specified MAC address or VLAN ID has already been deleted or has not yet been created, the message "*mac table del operation failed*" displays.

Command: **MAC Lookup**
Syntax: **mac lookup** <mac_addr> [<vid>]
Description: Displays a MAC address entry, where:
<**mac_addr**>: MAC address (xx-xx-xx-xx-xx-xx).
<**vid**> : VLAN ID (1-4094), default: 1.

Example:
```
>mac lookup 11-11-11-11-11-11
Type    VID  MAC Address        Ports
------  ---  -----------------  -----
Static  1    11-11-11-11-11-11  1-4
>
```

If the specified MAC address or VLAN ID has already been deleted or has not yet been created, the message "*MAC address not found*" displays.

Command: **MAC Agetime**
Syntax: **mac agetime** [<age_time>]
Description: Set or show the MAC Address table Aging Configuration. By default, dynamic entries are removed from the MAC table after 300 seconds. This removal is also called 'aging'. Configure the aging time by entering a value here in seconds. The valid range is 10 to 1000000 seconds (11.57 days). A value of 0 disables the MAC aging time. Note that when aging is disabled, the FDB size can grow to a maximum of 32,768 entries. After the maximum limit of the MAC limit is reached, the new MAC entries are added and the older dynamic MAC entries are removed from the database.
The parameters are:
<**age_time**>: MAC address age time (0, 10 - 1,000,000).

Example:
```
>mac agetime
MAC Age Time: 300
>mac agetime 600
>mac agetime
MAC Age Time: 600
>
```

Command: **MAC Learning**
Syntax: **mac learning** [<port_list>] [auto|disable|secure]
Description: Sets (defines) or shows (displays) the current MAC Table Learning Mode.
If the learning mode for a given port is grayed out, another module is in control of the mode, so that it cannot be changed by a user. An example of such a module is the MAC-Based Authentication under 802.1X.
The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All ports'.

Each port can do learning based on the following settings:
auto - Learning is done automatically as soon as a frame with unknown SMAC is received.
disable - No learning is done.
secure - Only static MAC entries are learned, all other frames are dropped.

Note: Make sure that the link used for managing the LIB-4xxx is added to the Static Mac Table before changing to secure learning mode, otherwise the management link is lost and can only be restored by using another non-secure port or by connecting to the LIB-4xxx via the serial interface.

Example:

```
>mac learning

Port  Learning
----  --------
1     Auto
2     Auto
3     Auto
4     Auto
>mac learning 1-2 secure
>mac learning

Port  Learning
----  --------
1     Secure
2     Secure
3     Auto
4     Auto
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **MAC Dump**
Syntax: **mac dump** [<mac_max>] [<mac_addr>] [<vid>]
Description: Displays a sorted list of MAC address entries, where:
<**mac_max**> : Maximum number of MAC addresses. The default is 'Show all' MAC addresses.
<**mac_addr**>: First MAC address (xx-xx-xx-xx-xx-xx). The default is MAC address is all zeros.
<**vid**> : First VLAN ID (1-4094). The default is VLAN ID 1 (VID 1)

Example:
```
>mac dump
Type    VID  MAC Address        Ports
------  ---  -----------------  -----
Dynamic 1    00-04-75-bd-9c-36  5
Static  1    00-c0-f2-56-0b-40  None,CPU
Static  1    33-33-00-00-00-01  1-4,CPU
Static  1    33-33-00-00-00-02  1-5,CPU
Static  1    33-33-ff-56-0b-40  1-5,CPU
Static  1    33-33-ff-a8-00-01  1-5,CPU
Static  1    ff-ff-ff-ff-ff-ff  1-5,CPU
>
```

Command: **MAC Statistics**
Syntax: **mac statistics** [<port_list>]
Description: Displays the MAC address table statistics for a specified LIB-4xxx port or for all ports, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:
```
>mac statistics
Port  Dynamic Addresses
----  -----------------
1     0
2     0
3     0
4     0

Total Dynamic Addresses: 1
Total Static Addresses : 6
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **MAC Flush**
Syntax: **mac flush**
Description: Flush (delete) all learned entries from the MAC address table.

Example:
```
>mac flush
>mac statistics
Port  Dynamic Addresses
----  -----------------
1     0
2     0
3     0
4     0

Total Dynamic Addresses: 0
Total Static Addresses : 6
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

VLAN Commands

VLAN (Virtual LAN) is a method used to restrict communication between LIB-4xxx ports. VLANs can be used with:

VLAN unaware switching is the default configuration. All ports are VLAN unaware with Port VLAN ID 1 and members of VLAN 1. This means that MAC addresses are learned in VLAN 1, and the LIB-4xxx does not remove or insert VLAN tags.

VLAN aware switching is based on the IEEE 802.1Q standard. All ports are VLAN aware. Ports connected to VLAN aware switches are members of multiple VLANs and transmit tagged frames. Other ports are members of one VLAN, set up with this Port VLAN ID, and transmit untagged frames.

Provider switching is also known as Q-in-Q switching. Ports connected to subscribers are VLAN unaware, members of one VLAN, and set up with this unique Port VLAN ID. Ports connected to the service provider are VLAN aware, members of multiple VLANs, and set up to tag all frames. Untagged frames received on a subscriber port are forwarded to the provider port with a single VLAN tag. Tagged frames received on a subscriber port are forwarded to the provider port with a double VLAN tag.

These LIB-4xxx commands provide Virtual LAN (VLAN) functions:

>**vlan ?**
Available Commands:

VLAN Configuration [<port_list>]
VLAN Translation Add <group_id> <vid> <trans_vid>
VLAN PVID [<port_list>] [<vid>|none]
VLAN Translation Delete <group_id> <vid>
VLAN FrameType [<port_list>] [all|tagged|untagged]
VLAN Translation Group [<port_list>] [<group_id>]
VLAN IngressFilter [<port_list>] [enable|disable]
VLAN tx_tag [<port_list>] [untag_pvid|untag_all|tag_all]
VLAN PortType [<port_list>] [unaware|c-port|s-port|s-custom-port]
VLAN MPort PortType [unaware|c-port|s-port|s-custom-port]
VLAN remove <vid>|<name> [<port_list>]
VLAN EtypeCustomSport [<etype>]
VLAN Add <vid>|<name> [<ports_list>]
VLAN Forbidden Add <vid>|<name> [<port_list>]
VLAN Delete <vid>|<name>
VLAN Forbidden Delete <vid>|<name>
VLAN Forbidden Lookup [<vid>] [(name <name>)]
VLAN Lookup [<vid>] [(name <name>)] [combined|static|nas|mvr|evc|all]
VLAN Name Add <name> <vid>
VLAN Name Delete <name>
VLAN Name Lookup [<name>]
VLAN Status [<port_list>] [combined|static|nas|mvr|mstp|erps|mep|vcl|all|conflicts]
>

Note: Be sure to set the Management VLAN configuration (previous section) before you set the VLAN configuration (this section).

Command: **VLAN Configuration**
Syntax: **vlan configuration** [<port_list>]
Description: Displays the current VLAN configuration, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.

The VLAN Configuration example below shows the LIB-4xxx default VLAN configuration.

Example 1:

```
>vlan config

VLAN Configuration:
===================


Port  PVID  Frame Type  Ingress Filter  Tx Tag      Port Type
----  ----  ----------  --------------  ----------  -------------
1     1     All         Disabled        Untag PVID  Unaware
2     1     All         Disabled        Untag PVID  Unaware
3     1     All         Disabled        Untag PVID  Unaware
4     1     All         Disabled        Untag PVID  Unaware

VID   VLAN Name                         Ports
----  --------------------------------  -----
1     default                           1-5

VID   VLAN Name                         Ports
----  --------------------------------  -----
VLAN forbidden table is empty
>
```

The VLAN Configuration example below shows a more complex VLAN configuration with multiple VLANs configured with various Frame Types, TX Tagging, Port Types, and Forbidden Port settings.

Example 2:

```
>vlan config

VLAN Configuration:
===================


Port  PVID  Frame Type  Ingress Filter  Tx Tag      Port Type
----  ----  ----------  --------------  ----------  -------------
1     1     Tagged      Enabled         Tag All     C-Port
2     1     All         Enabled         Tag All     C-Port
3     1     All         Enabled         Untag All   S-Port
4     1     Untagged    Enabled         Untag PVID  S-Custom-Port

VID   VLAN Name                         Ports
----  --------------------------------  -----
1     default                           1-5
444   Engineering                       1-3
445   Marketing                         2,4
446   Sales                             2,4
447   Manufacturing                     1,3,4

VLAN forbidden port list:
=========================

VID   VLAN Name                         Ports
----  --------------------------------  -----
445   Marketing                         3
446   Sales                             1
>
```

Command: **Add VLAN Translation Entry**
Syntax: **vlan translation add** <group_id> <vid> <trans_vid>
Description: Add a VLAN translation entry into a group. The parameters are:
<**group_id**> : Group ID (1 - 4) to which this entry will be added.
<**vid**> : VLAN ID (1-4094) to which this entry will be added.
<**trans_vid**>: Translation VLAN ID to which this entry will be added. Must be different than VID.
Example:

```
>VLAN Translation Add 1 2 3
>vlan translation group
Group ID  VID   Trans_VID
--------  ----  ---------
1         2     3
Ports                                                    Group ID
-----                                                    ---------
1                                                        1
2                                                        2
3                                                        3
4                                                        4
>
```

Messages: *VLAN ID and Translated VLAN ID cannot be same*
Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Delete VLAN Translation Group Entry**
Syntax: **vlan translation delete** [<port_list>] [<group_id>]
Description: Delete an existing VLAN translation entry from a group, where:
<**port_list>:** Port list or 'all', default: All ports
<**group_id**> : Group Id: 1 -4.
Example:

```
>vlan translation group
Group ID  VID   Trans_VID
--------  ----  ---------
1         2     3
Ports                                                    Group ID
-----                                                    ---------
1                                                        1
2                                                        2
3                                                        3
4                                                        4
>VLAN Translation Delete 1 2
>vlan translation group
Ports                                                    Group ID
-----                                                    ---------
1                                                        1
2                                                        2
3                                                        3
4                                                        4
>
```

Messages:
Deletion of VLAN Translation entry failed
No port members for VLAN "vid". Please check the delete button to delete VLAN from the list or add the members.
Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Display VLAN Translation Group**
Syntax: **vlan translation group** [<port_list>] [<group_id>]
Description: Display or map VLAN Translation Group configuration.
If only **port_list** is entered, displays the Port-to-Group mapping for each port.
If only **group_id** is entered, displays the VLAN Translations of that group.
If both **port_list** and **group_id** are entered, maps the ports in **port_list** to the **group** specified.
The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**group_id**> : Group ID (1 to 5).

Example:
```
>vlan translation group
Ports                                                    Group ID
-----                                                    ---------
1                                                        1
2                                                        2
3                                                        3
4                                                        4
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **VLAN PVID**
Syntax: **vlan pvid** [<port_list>] [<vid>|none]
Description: Set or show the Port VLAN ID (PVID) , where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**vid**>|**none]** : Port VLAN ID (1-4094) or 'none'. The default is 'Show port VLAN ID'.
This command configures the VLAN identifier for the port. The valid values are 1 - 4094.
The default is 1. Note that the port must be a member of the same VLAN as the Port VLAN ID.

Example:
```
>vlan pvid

Port  PVID
----  ----
1     1
2     1
3     1
4     1
>vlan pvid 2 2
>vlan pvid

Port  PVID
----  ----
1     1
2     2
3     1
4     1
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **VLAN FrameType**
Syntax: **vlan frametype** [<port_list>] [all|tagged|untagged]
Description: Set or show the port VLAN frame type, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
all : Allow tagged and untagged frames.
tagged : Allow tagged frames only.
untagged : Allow untagged frames only.
(The default is 'Show accepted frame types'.)

This command tells the port to accept all frames or only tagged frames or only untagged frames. This command affects VLAN ingress processing. If the port only accepts tagged frames, then untagged frames received on the port are discarded. The default is allow **all** tagged and untagged frames.

Example:

```
>vlan frametype

Port  Frame Type
----  ----------
1     Tagged
2     All
3     All
4     Untagged
>vlan frametype 2 all
>vlan frametype 3 untagged
>vlan frametype

Port  Frame Type
----  ----------
1     Tagged
2     All
3     Untagged
4     Untagged
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **VLAN Ingress Filter**
Syntax: **vlan ingressfilter** [<port_list>] [enable|disable]
Description: Set or show the port VLAN ingress filter, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable VLAN ingress filtering.
disable : Disable VLAN ingress filtering.
(The default is 'Show VLAN ingress filtering'.)
This command affects VLAN ingress processing. If ingress filtering is enabled and the ingress port is not a member of the classified VLAN of the frame, the frame is discarded.
By default, ingress filtering is disabled.

Example:

```
>vlan ingressfilter

Port  Ingress Filter
----  --------------
1     Enabled
2     Enabled
3     Enabled
4     Enabled
>vlan ingressfilter 3-4 disable
>vlan ingressfilter

Port  Ingress Filter
----  --------------
1     Enabled
2     Enabled
3     Disabled
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **VLAN TX Tagging**
Syntax: **vlan tx_tag** [<port_list>] [untag_pvid|untag_all|tag_all]
Description: Set or show the port egress tagging, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
Tx tag : (Egress tagging):
untag_pvid : All VLANs except PVID will be tagged. **Note**: the underscore is required.
untag_all : All VLANs will be untagged. **Note**: the underscore is required.
tag_all : All VLANs will be tagged. **Note**: the underscore is required.

Example:

```
>vlan tx_tag

Port  Tx Tag
----  ----------
1     Tag All
2     Tag All
3     Untag All
4     Untag PVID
>vlan tx_tag 1 untag all
Invalid parameter: untag

Syntax:
VLAN tx_tag [<port_list>] [untag_pvid|untag_all|tag_all]
>vlan tx_tag 1 untag_all
>vlan tx_tag

Port  Tx Tag
----  ----------
1     Untag All
2     Tag All
3     Untag All
4     Untag PVID
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **VLAN Port Type**
Syntax: **vlan porttype** [<port_list>] [unaware|c-port|s-port|s-custom-port]
Description: Set or show the VLAN Port Type, where:
<**port_list**>: Port list or 'all', default: All ports.
Port Type:

unaware: the port does not recognize VLANs. All frames are classified to the Port VLAN ID and tags are not removed. This means that MAC addresses are learned in VLAN 1, and the LIB-4xxx does not remove or insert VLAN tags. This is the default.

c-port: the port is a Customer port (C-port) with Customer tags (C-Tags), which use TPID 0x8100. **Note**: the dash is required.

s-port: the port is a Service port (S-port) with Service tags (S-Tags), which use TPID 0x88A8 (IEEE 802.1ad). **Note**: the dash is required.

s-custom-port: the port is a Custom Service port (S-custom-port) with Service tags (S-Tags), which use a custom TPID assigned in the LIB-4xxx firmware. **Note**: the dashes are required.

Example:

```
>vlan porttype

Port  Port Type
----  -------------
1     C-Port
2     C-Port
3     S-Port
4     S-Custom-Port
>vlan porttype 1 unaware
>vlan porttype 2 S-Port
>vlan porttype 3 C-Port
>vlan porttype

Port  Port Type
----  -------------
1     Unaware
2     S-Port
3     C-Port
4     S-Custom-Port
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set/Show VLAN MPort PortType**
Syntax: **vlan mport porttype** [unaware|c-port|s-port|s-custom-port]
Description: Set or show the VLAN Management port (Mport) PortType.
Example:

```
>VLAN MPort PortType

Management Port PortType : S-Custom-Port

>VLAN MPort PortType unaware
>VLAN MPort PortType

Management Port PortType : Unaware

>VLAN MPort PortType c-port
>VLAN MPort PortType

Management Port PortType : C-Port

>
```

Command: **Remove** a **VLAN Entry**
Syntax: **vlan remove** <vid>|<name> [<port_list>]
Description: Remove ports in VLAN entry, where:
<**vid**>|<**name**>: VLAN ID (1-4094) or VLAN Name.
<**port_list**> : Port list or 'All'; the default is 'All' ports.
Example:

```
>vlan remove 1 1
>vlan porttype

Port  Port Type
----  -------------
1     Unaware
2     S-Port
3     C-Port
4     S-Custom-Port
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **VLAN Etype Custom S-port**
Syntax: **vlan etypecustomsport** [<etype>]
Description: Set or show the Custom S-port EtherType, where:
[<**etype**>]: enter a valid Ether Type in the range of 0x0600 - 0xFFFF.
This parameter specifies the Ether type used for Custom S-ports. This is a global setting for all of the Custom S-ports. Some well-known examples are:
0x88A8 = Provider Bridging (IEEE 802.1ad).
0x9000 = Loopback (Configuration test protocol).
0x9100 = VLAN Tag Protocol Identifier (Q-in-Q).

Example:
```
>vlan etypecustomsport
TPID is 0x88a8
>vlan etypecustomsport 0x0900
>vlan etypecustomsport
TPID is 0x900
>
```

Command: **VLAN Add**
Syntax: **vlan add** <vid>|<name> [<port_list>]
Description: Add or modify VLAN entry, where:
<**vid**>|<**name**>: VLAN ID (1-4094) or VLAN Name.
<**port_list**> : Port list or 'All'. The default is All ports.

Example:
```
>vlan add 1
>vlan lookup

VID   VLAN Name                        Ports
----  --------------------------------  -----
1     default                           None
2     vid2                              2,3
3     vid3                              4,5
>vlan add Vid11
VLAN name Vid11 not found
>
```

Command: **VLAN Delete**
Syntax: **vlan delete** <vid>|<name>
Description: Delete an existing VLAN entry, where:
<**vid**>|<**name**>: VLAN ID (1-4094) or VLAN Name.

Example:

```
>vlan lookup

VID   VLAN Name                        Ports
----  --------------------------------  -----
1     default                           1
2     PM3to6                            3-5
3     PM9to12                           2-4
>vlan add vid100
VLAN name vid100 not found
>vlan delete 3
>vlan lookup

VID   VLAN Name                        Ports
----  --------------------------------  -----
1     default                           1-2
2     PM3to6                            3-5
>
```

Note: you can not delete the default vlan (VID 1). The message "*VLAN deletion failure*" displays if you try.

Command: **VLAN Lookup**
Syntax: **vlan lookup** [<vid>] [(name <name>)] [combined|static|nas|mvr||evc|all]
Description: Lookup an existing VLAN entry, where:
<**vid**> : VLAN ID (1-4094), default: Show all VLANs.
name : VLAN name string.
<**name**>: VLAN name - Maximum of 32 characters. The VLAN Name can only contain alpha or numeric characters, including at least one alphabetic character.
combined : Shows All the Combined VLAN database entries.
static : Shows the VLAN entries configured by the administrator.
nas : Shows the VLANs configured by NAS (network access server).
mvr : Shows the VLANs configured by MVR (Multicast VLAN Registration).
evc : Shows the VLANs configured by EVCs.
all : Shows all VLANs configuration.
(The default is 'combined' VLAN Users configuration.)

Example:

```
>vlan add 20
>vlan lookup

VID   VLAN Name                        Ports
----  --------------------------------  -----
1     default                           1-2
2     PM3to6                            3-4
10                                      2-4
20                                      2-3
>
```

Command: **VLAN Forbidden Add**
Syntax: **vlan forbidden add** <vid>|<name> [<port_list>]
Description: Add a new or modify an existing VLAN entry in the forbidden table. The **vlan forbidden add** command modifies the list of forbidden ports assigned to a VLAN. Ports in this forbidden list will be forbidden (blocked) from using this VLAN. The parameters are:
<**vid**>|<**name**>: VLAN ID (1-4094) or VLAN Name.
<**port_list**> : Port list or 'all'. The default is 'All' ports.

Example:

```
>vlan forbidden lookup

VID   VLAN Name                          Ports
----  --------------------------------  -----
VLAN forbidden table is empty
>vlan forbidden add 3 3
>vlan forbidden lookup

VLAN forbidden port list:
=========================

VID   VLAN Name                          Ports
----  --------------------------------  -----
3     vid3                              3
>
```

Command: **VLAN Forbidden Delete**
Syntax: **vlan forbidden delete** <vid>|<name>
Description: Delete an existing VLAN entry from the forbidden table. The parameters are:
<**vid**>|<**name**>: VLAN ID (1-4094) or VLAN Name to be deleted.

Example:

```
>vlan forbidden lookup

VLAN forbidden port list:
=========================

VID   VLAN Name                          Ports
----  --------------------------------  -----
3                                       3
>vlan forbidden delete 3
>vlan forbidden lookup

VID   VLAN Name                          Ports
----  --------------------------------  -----
VLAN forbidden table is empty
>
```

Command: **VLAN Forbidden Lookup**
Syntax: **vlan forbidden lookup** [<vid>] [(name <name>)]
Description: Display the existing VLAN Forbidden port table. The message "*VLAN forbidden table is empty*" displays if there are no existing entries. The parameters are:
<**vid**> : VLAN ID (1-4094). The default is 'Show all VLANs'.
name : VLAN name string
<**name**>: VLAN name - up to 32 characters. The VLAN Name can only contain alpha or numeric characters. The VLAN name should contain at least one alpha character.

Example 1:
```
>vlan forbidden lookup

VLAN forbidden port list:
=========================

VID   VLAN Name                         Ports
----  --------------------------------  -----
3                                       3
>
```

Example 2:
```
>vlan forbidden lookup

VLAN forbidden port list:
=========================

VID   VLAN Name                         Ports
----  --------------------------------  -----
445   Marketing                         3
446   Sales                             1
>vlan forbidden lookup

VLAN forbidden port list:
=========================

VID   VLAN Name                         Ports
----  --------------------------------  -----
445   Marketing                         3
446   Sales                             1
>
```

Command: **VLAN Name Add**
Syntax: **vlan name add** <name> <vid>
Description: Add a new VLAN Name to an existing VLAN ID mapping, where:
<**name**>: Enter a new VLAN name with a maximum of 32 characters. The 'VLAN Name' can only contain alpha or numeric characters, and must include at least one alphabetic character.
<**vid**> : VLAN ID (1-4094) to be added.

Example:
```
>vlan name add vid 22
>vlan name add vid 11
Error: VLAN Name is already used for different VID
>vlan name lookup
VLAN NAME                       vid
------------------------------  ---
default                         1
vid                             22
PM3to6                          2
>
```

Command: **VLAN Name Delete**
Syntax: **vlan name delete** <name>
Description: Delete a VLAN Name from VLAN ID Mapping, where:
<**name**>: Enter the VLAN name.

Example:

```
>vlan name lookup
VLAN NAME                       vid
------------------------------  ---
default                         1
vid                             22
PM3to6                          2
>vlan name delete vid
>vlan name lookup
VLAN NAME                       vid
------------------------------  ---
default                         1
PM3to6                          2
>vlan name delete default
>vlan name lookup
VLAN NAME                       vid
------------------------------  ---
PM3to6                          2
>
```

Command: **VLAN Name Lookup**
Syntax: **vlan name lookup** [<name>]
Description: Show (display) the current VLAN Name table, where:
<**name**>: Enter the VLAN name or leave blank to display all VLANs.

Example:

```
>vlan name add smoke 3
>vlan name lookup
VLAN NAME                       vid
------------------------------  ---
default                         1
smoke                           3
PM3to6                          2
>
```

Command: **VLAN Status**
Syntax: **vlan status** [<port_list>] [combined|static|nas|mvr|mstp|erps|mep|vcl|all|conflicts]
Description: Display the current VLAN Port Configuration status, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
combined : show all VLAN User configurations.
static : show just static port configuration. With a Static VLAN ("port-based" VLAN), assignments are created by assigning ports to a VLAN. Frames arriving on a port are automatically tagged with that static VLAN ID for internal switch routing. On egress this tag can remain or be removed.
nas : show just NAS port configuration (network access server).
mvr : show just MVR port configuration (Multicast VLAN Registration).
mstp : show just MSTP port configuration.
erps : show just ERPS port configuration.
mep : show just MEP port configuration.
vcl : show just VCL (VLAN Control List) port configuration.
all : show All VLAN Users configuration (default: all VLAN Users configuration).

Example:

```
>vlan status vcl
Port  PortType       PVID  Frame Type  Ing Filter   Tx Tag       UVID   Conflicts
----  -------------  ----  ----------  -----------  -----------  -----  ---------
1                                                   Untag All    4096   Yes
2                                                   Untag All    4096   Yes
3                                                   Untag All    4096   No
4                                                   Untag All    4096   No
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

The reported fields are:

Port: The logical port for the settings contained in the same row.

Port Type: Shows the Port Type. Port type can be any of Unaware, C-port, S-port, Custom S-port.
If Port Type is Unaware, all frames are classified to the Port VLAN ID and tags are not removed.
C-port is Customer Port. S-port is Service port. Custom S-port is an S-port with a Custom TPID.

PVID: Shows the VLAN identifier for that port. The allowed values are 1 through 4094. The default value is 1.

Frame Type: Shows whether the port accepts all frames or only tagged frames. This parameter affects VLAN ingress processing. If the port only accepts tagged frames, untagged frames received on that port are discarded.

Ing Filter: Shows the ingress filtering on a port. This parameter affects VLAN ingress processing. If ingress filtering is enabled and the ingress port is not a member of the classified VLAN, the frame is discarded.

Tx Tag: Shows egress filtering frame status whether tagged or untagged.

UVID: Shows the UVID (untagged VLAN ID). A Port's UVID determines the packet's behaviour at the egress side. Frames transmitted from this port are untagged. Each port can be an untagged member of just one VLAN. By default, all ports are an untagged member of VLAN 1.

Conflicts: Shows whether Conflicts exists or not. When a Volatile VLAN User requests to set VLAN membership or VLAN port configuration, these conflicts can occur:

- Functional conflicts between features.
- Conflicts due to hardware limitation
- Direct conflict between user modules.

VID (VLAN ID) Range Summary

Some modules accept VID range 0 – 4094 and some modules only accept VID range 1 - 4094.
A VID of 0 is only for modules where untagged/priority tag makes sense. LLDP and LOAM are untagged.
The valid VID ranges are summarized below.

Module	Valid VID Range
ACL	(1-4094)
ARP Inspection	(1-4094)
ERPS	(1-4094)
EVC	
1. EVC parameters:	1) VID (1-4094), 2) IVID(1-4094) Inner Tag-->VLAN ID (0-4094) Outer Tag-->VLAN ID (0-4094)
2. ECEs > UNI Matching > VLAN ID Value (0-4095)	
3. ECEs > UNI Matching > VLAN ID Range (4-5 or 5-7)	
IP (Management VLAN)	(1 -4094)
IP Source Guard	(1 - 4094)
IPMC	(1-4094) (only up to VLANs)
LLDP	(none)
MAC	(1-4094)
MEP UP	(1-4094) (depends on the VLANs)
MEP Down	(0-4094)
MVR	(1-4094)
PTP	(0-4094)
QOS (QCL)	(1-4094)
VCL	(1-4094)
VLAN translation	(1-4094)

Note: when you edit the "Inner Tag VLAN ID Range" and you select the "Range" in the Inner VLAN ID Filter, you can apply the ECE entry with a valid VLAN range of 0-2047.

PVLAN Commands

An LIB-4xxx VLAN can be configured as a Private VLAN (PVLAN). In a private VLAN, PVLANs provide layer 2 isolation between ports within the same broadcast domain. Isolated ports configured as part of PVLAN cannot communicate with each other. Member ports of a PVLAN can communicate with each other.

PVLAN commands let you:

- Configure, modify, and view Private VLAN membership configurations,
- Add or delete Private VLANs, and
- Add or remove Port members of each Private VLAN.

Private VLANs are based on the source port mask, and they have no connections to VLANs. This means that VLAN IDs and Private VLAN IDs can be identical.

A port must be a member of both a VLAN and a Private VLAN to be able to forward packets. By default, all ports are VLAN unaware and members of VLAN 1 and Private VLAN 1. A VLAN unaware port can only be a member of one VLAN, but it can be a member of multiple Private VLANs.

These LIB-4xxx commands provide Private Virtual LAN (PVLAN) functions:

>**pvlan ?**
Available Commands:

PVLAN Configuration [<port_list>]
PVLAN Add <pvlan_id> [<port_list>]
PVLAN Delete <pvlan_id>
PVLAN Lookup [<pvlan_id>]
PVLAN Isolate [<port_list>] [enable|disable]
>

The LIB-4xxx PVLAN commands are explained below.

Command: **Configure PVLAN**
Syntax: **pvlan configuration** [<port_list>]
Description: Show the current Private VLAN configuration, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example: >**pvlan config**

```
Private VLAN Configuration:
===========================


Port  Isolation
----  ---------
1     Disabled
2     Disabled
3     Disabled
4     Disabled

PVLAN ID  Ports
--------  -----
1         1,2,4
2         2
3         3
4         4>
```

Command: **Lookup PVLAN Entries**
Syntax: **pvlan lookup** [<pvlan_id>]
Description: Lookup Private VLAN entry, where:
<**pvlan_id**>: Private VLAN ID. The default is 'Show all PVLANs'. The valid range for a Private VLAN ID is the same as the product port number range (e.g., 1-4 for the LIB-4400).

Example:

```
>pvlan lookup

PVLAN ID  Ports
--------  -----
1         1,2,4
2         2
3         3
4         4
>pvlan add 1 2
>pvlan add 2 3-5
Invalid parameter: 3-5

Syntax:
PVLAN Add <pvlan_id> [<port_list>]
>pvlan add 2 3-4
>pvlan lookup

PVLAN ID  Ports
--------  -----
1         2
2         3,4
3         3
4         4
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Add PVLAN**
Syntax: **pvlan add** <pvlan_id> [<port_list>]
Description: Add a new or modify an existing Private VLAN entry, where:
<**pvlan_id**> : Private VLAN ID. The valid range for a Private VLAN ID is the same as the product port number range (e.g., 1-4 for the LIB-4400).
<**port_list**>: Port list or 'All'. The default is 'All' ports.

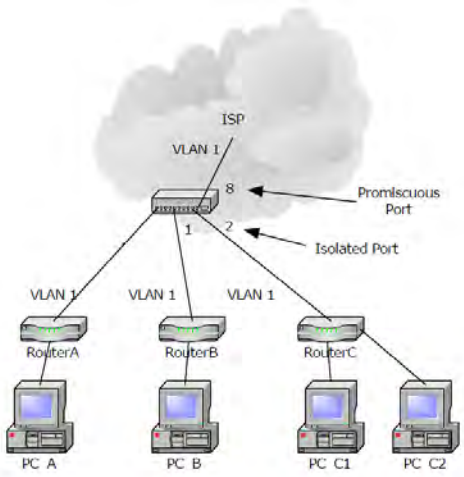
Example:

```
>pvlan lookup
Private VLAN table is empty
>pvlan add 1 1,2
>pvlan lookup

PVLAN ID  Ports
--------  -----
1         1,2
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Isolate PVLAN**
Syntax: **pvlan isolate** [<port_list>] [enable|disable]
Description: Set or show the port isolation mode. Port isolation offers isolation of that Port from the VLAN forwarding on the VLAN that it is a member of. Isolated ports configured as part of a PVLAN can not communicate with each other. Member ports of a PVLAN are not isolated and can communicate with each other. The default is 'Show all". The parameters are:
<**port_list**>: Port list or 'All'. The default is All ports.
enable : Enable port isolation.
disable : Disable port isolation.



VLAN Table

VID	Ports In Mask	Private
1	0, 1, 2, 8	1

ISOLATED_PORTS
(Isolated ports set to 0)

Bit	Value
0	1
1	1
2	0
8	1

Isolated ports can only receive traffic from promiscuous ports and can send only to promiscuous ports that are part of the PVLAN. 'Community' ports are not supported. If ports 2 and 3 are both isolated and members of the same PVLAN then they should not be able to communicate. For Private VLANs to be applied, the switch must be configured for standard VLAN operation. When this is done,one or more of the configured VLANs can be configured as private VLANs. Ports in a Private VLAN can be either ***Promiscuous ports*** (from which traffic can be forwarded or received from to all ports in the Private VLAN) or ***Isolated ports*** (ports from which traffic can only be forwarded to or received from promiscuous ports in the Private VLAN.
The configuration of promiscuous and isolated VLANs applies to all private VLANs.
The forwarding of frames classified to a private VLAN happens a) when traffic comes in on a promiscuous port in a private VLAN, the VLAN mask from the VLAN table is applied;
b) when traffic comes in on an isolated port, the Isolated_Port mask is applied in addition to the VLAN mask from the VLAN table.

Example:

```
>pvlan isolate

Port  Isolation
----  ---------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>pvlan isolate 2,3 enable
>pvlan isolate

Port  Isolation
----  ---------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>
```

Command: **Delete PVLAN**
Syntax: **pvlan delete** <pvlan_id>
Description: Delete an existing Private VLAN entry, where:
<**pvlan_id**>: Private VLAN ID. The allowed range for a Private VLAN ID is the same as the product port number range (e.g., 1-4 on the LIB-4400).

Example:

```
>pvlan lookup

PVLAN ID  Ports
--------  -----
1         2
2         3-4
>pvlan delete 1
>pvlan lookup

PVLAN ID  Ports
--------  -----
2         3-4
>pvlan delete 2
>pvlan lookup
Private VLAN table is empty
>
```

Security Commands

These LIB-4xxx commands provide a wide range of Security management functions, including Switch, Network, and AAA (Authentication, Authorization and Accounting) subgroups. The Security command group includes these sub-groups:

>**security ?**

Command Groups:

Switch : Switch security
Network : Network security
AAA : Authentication, Authorization and Accounting

Each of these sub-groups contains underlying commands and/or command groups.

Security Switch Commands

The **Security Switch** group commands include these command subgroups:

>**security switch ?**

Command Groups:

Security Switch Users : User management
Security Switch Privilege: Privilege level
Security Switch Auth : Authentication
Security Switch SSH : Secure Shell
Security Switch HTTPS : Hypertext Transfer Protocol over Secure Socket Layer
Security Switch Access : Access management
Security Switch SNMP : Simple Network Management Protocol
Security Switch RMON : Remote Network Monitoring

These subgroups' commands are explained in the following sections.

Security Switch Users Group Commands

Command: **Security Switch Users Configuration**
Syntax: **security switch users config**
Description: Show current users configuration. The default users config is shown below.
Example:

```
>security switch users config

Users Configuration:
====================

User Name                       Privilege Level
------------------------------- ---------------
admin                                        15
>
```

Command: **Add Security Switch Users**
Syntax: **security switch users add** <user_name> <password> <privilege_level>
Description: Add a new user or modify an existing user's name, password or privilege level, where:
<**user_name**> : A string identifying the user name that this entry should belong to. The allowed string length is (1-32). The valid user name is a combination of letters, numbers and underscores. The change is immediately effective, and you do not need to know the old password. Note that a level 1 user can view the full set of help commands, but if you enter "security", an 'invalid command' message is returned.
<**password**> : The password for this user name. The allowed string length is (0-32). Use 'clear' or "" as null string.
<**privilege_level**>: User privilege level (1-15). See the "security switch privilege level config" command for details.

Example:

```
>security switch users config

Users Configuration:
====================

User Name                        Privilege Level
-------------------------------- ---------------
admin                                         15
>security switch users add jeffs Duffrey1 2
>security switch users config

Users Configuration:
====================

User Name                        Privilege Level
-------------------------------- ---------------
admin                                         15
jeffs                                          2
>
```

Command: **Delete Security Switch Users**
Syntax: **security switch users delete** <user_name>
Description: Delete users entry, where:
<user_name>: A string identifying the user name that this entry should belong to. The allowed string length is (1-32). The valid user name is a combination of letters, numbers and underscores.

Example:

```
>security switch users config

Users Configuration:
====================

User Name                        Privilege Level
-------------------------------- ---------------
admin                                         15
jeffs                                          2
>security switch users delete jeffs
>security switch users config

Users Configuration:
====================

User Name                        Privilege Level
-------------------------------- ---------------
admin                                         15
>
```

Security Switch Privilege Group Commands
These commands let you display and configure the user privilege levels. The valid range is 1 to 15. Privilege level value 15 is the highest access and is granted full control of the device. User privilege should be same or greater than the group privilege level in order to have the access of that group. By default, most groups have privilege level 5 with read-only access; privilege level 10 has read-write access. The system maintenance functions (software upload, factory defaults and etc.) require user privilege level 15.

Generally, the user privilege levels are:

- Privilege Level 15 can be used for an Administrator account,
- Privilege Level 10 for a Standard (basic) user account, and
- Privilege Level 5 for a Guest account.

Warning: Care must be taken when changing the priviledge level to a lower setting as this may disable the ability to access certain functions.

Notes on Security Switch Privilege Levels

1. Commands are grouped by function/module. Each command group is assigned to a privilege level for Config RO, Config RW, Status RO, Status RW.
2. Levels 1 – 4 display the same help information and support only 7 commands. These are all inquiry actions that cannot change the LIB-4xxx in any way. While more detailed help levels show only these commands available, the main help screen is unchanged and shows all of the main command groups that the other levels show. Level 1 users can do only these commands according to help: Help, Logout, Port Configuration, Port DMI Statistics, Port SFP, Port Statistics, and Up. Levels 5 – 9 display the same help information and support 392 commands. Levels 10 and 12 - 14 display the same help information and support 490 commands. Level 11 displays the same information as levels 1 – 4. Level 15 supports 656 commands. Level 15 adds Firmware commands and the Security Switch Privilege Level Configuration / Current, Security Switch Users Add / Configuration / Delete, and System Reboot command support. Only a level 15 user can display the current security level.
3. Usually, entering a single letter followed by question mark should list all the commands that start with that letter. At level 1, entering “s ?” yields output which looks inconsistent with related privilege level commands.

The Security Switch Privilege Group Commands are listed below.

>**security switch priv ?**
Available Commands:
Security Switch Privilege Level Configuration
Security Switch Privilege Level Group <group_name> [<cro>] [<crw>] [<sro>] [<srw>]
Security Switch Privilege Level Current

The Security Switch Privilege Group Commands are described below.

Command: **Show Current Privilege Level**
Syntax: **security switch priv level current**
Description: Displays the current privilege level.
Example:

```
>security switch priv level current
Privilege Current Level: 15
```

Command: **Show Current Privilege Level Configuration**

Syntax: **security switch privilege level config**

Description: Displays the current privilege configuration, where:

<**group_name**>: Privilege group name
<**cro**> : Configuration read-only privilege level (1-15).
<**crw**> : Configuration/Execute read-write privilege level (1-15).
<**sro**> : Status/Statistics read-only privilege level (1-15).
<**srw**> : Status/Statistics read-write privilege level (1-15).

Example:

```
>security switch privilege level config

Privilege Level Configuration:
==============================

Privilege Current Level: 15
Group Name,          MODULE_ID,  Privilege Level
                     MODULE_ID   CRO CRW SRO SRW
-------------------------------- --- --- --- ---
Aggregation                       19   5  10   5  10
Diagnostics                       27   5  10   5  10
EPS                               45   5  10   5  10
ERPS                              72   5  10   5  10
ETHER_SAT                        194   5  10   5  10
ETH_LINK_OAM                      73   5  10   5  10
EVC                               62   5  10   5  10
IP                                18   5  10   5  10
IPMC_LIB                          94   5  10   5  10
IPMC_Snooping                     82   5  10   5  10
LACP                              35   5  10   5  10
LLDP                              34   5  10   5  10
Loop_Protect                      91   5  10   5  10
MAC_Table                         12   5  10   5  10
MEP                               46   5  10   5  10
MVR                               69   5  10   5  10
Maintenance                       16  15  15  15  15
Mirroring                         15   5  10   5  10
PHY                               97   5  10   5  10
PTP                               65   5  10   5  10
Port_Security                     66   5  10   5  10
Ports                             11   5  10   1  10
Private_VLANs                     23   5  10   5  10
QoS                               14   5  10   5  10
SNMP                              36   5  10   5  10
Security                          60   5  10   5  10
Spanning_Tree                     20   5  10   5  10
System                            24   5  10   1  10
Timer                             93   5  10   5  10
VCL                               79   5  10   5  10
VLAN_Translation                  85   5  10   5  10
VLANs                             13   5  10   5  10
>
```

Command: **Configure Privilege Level Group**
Syntax: **security switch privilege level group** <group_name> [<cro>] [<crw>] [<sro>] [<srw>]
Description: Configure a privilege level group, where:
<**group_name**>: Privilege group name.
<**cro**> : Configuration read-only privilege level (1-15).
<**crw**> : Configuration/Execute read-write privilege level (1-15).
<**sro**> : Status/Statistics read-only privilege level (1-15).
<**srw**> : Status/Statistics read-write privilege level (1-15).

Example:
```
>security switch privilege level group QOS
Group Name                       Privilege Level
                                 CRO CRW SRO SRW
-------------------------------- --- --- --- ---
QoS                                5  10   5  10
>security switch privilege level group QOS 6
>security switch privilege level group QOS
Group Name                       Privilege Level
                                 CRO CRW SRO SRW
-------------------------------- --- --- --- ---
QoS                                6  10   5  10
>
```

Messages:
Invalid <group_name> parameter: grp1
The privilege level of 'Read-only' should be less than or equal to 'Read-write'

Security Switch Auth Group Commands

Command: **Show Current Authentication Configuration**
Syntax: **security switch auth config**
Description: Show the current Authentication configuration.

Example:
```
>security switch auth config

Auth Configuration:
===================

Client   Authentication Method   Local Authentication Fallback
-------  ----------------------  -----------------------------
console  local                   Disabled
telnet   local                   Disabled
ssh      local                   Disabled
web      local                   Disabled
>
```

Command: **Set Authentication Method**

Syntax: **security switch auth method** [console|telnet|ssh|web] [none|local|radius|tacacs+] [enable|disable]

Description: This command defines how a user is authenticated when they log into the LIB-4xxx via one of the management client interfaces. Set or show the LIB-4xxx Authentication method.
The default is 'Show Auth method'. The valid parameters are:

console : Setting for CONSOLE port access to the LIB-4xxx.
telnet : Setting for telnet access to the LIB-4xxx.
ssh : Setting for ssh (secure shell) access to the LIB-4xxx.
web : Settings for web access to the LIB-4xxx.
(The default is 'Show the specific client authentication method'.)

none : Authentication disabled; login is not possible.
local : Use local authentication; use the local LIB-4xxx user database for authentication.
radius : Use remote RADIUS authentication.
tacacs+ : Use remote TACACS+ authentication.
(The default is 'Show client authentication method'.)

enable : Enable local authentication if remote authentication fails.
disable : Disable local authentication if remote authentication fails.
(***Note***: this parameter is effective as soon as it is typed.)

Example:

```
Security/Switch>auth method ssh none disable
Security/Switch>auth config

Auth Configuration:
===================

Client   Authentication Method
-------  ---------------------
console  local
telnet   local
ssh      none
web      local
Security/Switch>
```

Security Switch SSH Group

Command: **Show Current SSH Configuration**
Syntax: **security switch ssh configuration**
Description: Show the current SSH (secure shell) configuration.

Example:
```
Security/Switch>ssh config

SSH Configuration:
==================

SSH Mode : Enabled
Security/Switch>
```

Command: **Set / Show SSH Mode**
Syntax: **security switch ssh mode** [enable|disable]
Description: Set or show the current SSH (secure shell) mode, where:
enable : Enable SSH mode operation.
disable: Disable SSH mode operation.
(default: Show SSH mode)

Example:
```
Security/Switch>ssh mode disable
Security/Switch>ssh mode
SSH Mode : Disabled
Security/Switch>
```

Security Switch HTTPS Group

Command: **Show Current HTTPS Configuration**
Syntax: **security switch https configuration** [enable|disable]
Description: Show the current HTTPS configuration.

Example:
```
>security switch https config

HTTPS Configuration:
====================

HTTPS Mode          : Disabled
HTTPS Redirect Mode : Disabled
>
```

Command: **Set / Show HTTPS Mode**
Syntax: **security switch https mode** [enable|disable]
Description: Set or show the HTTPS mode, where:
enable : Enable HTTPS mode operation.
disable: Disable HTTPS mode operation.
(default: Show HTTPS mode)

Example:
```
>Security Switch https mode enable
>Security Switch https mode
HTTPS Mode          : Enabled
>
```

Command: **Set / Show HTTPS Redirect**
Syntax: **security switch https redirect** [enable|disable]
Description: Set or show the HTTPS redirect mode. When enabled, the LIB-4xxx automatically redirects the web browser to HTTPS when the HTTP prefix is entered The parameters are:
enable : Enable HTTPS redirect
disable: Disable HTTPS redirect
(default: Show current HTTPS redirect mode)

Example:
```
Security Switch https redirect disable
Security Switch https redirect
HTTPS Redirect Mode : Disabled
Security/Switch>
```

Command: **Show HTTPS Certificate**
Syntax: **security switch https cert show**
Description: Displays the current HTTPS certificate information. The HTTPS Certificate validity period is from Jan. 1, 2010 to Dec. 31, 2029.

Example:
```
>security switch https cert show
Certificate Information: (length: 1072)
Certificate:
    Data:
        Version: 3 (0x2)
        Serial Number: 10 (0xa)
        Signature Algorithm: sha1WithRSAEncryption
        Issuer: CN=LIB-4400
        Validity
            Not Before: Jan  1 00:00:00 2010 GMT
            Not After : Dec 31 00:00:00 2029 GMT
        Subject: CN=LIB-4400
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
            RSA Public Key: (512 bit)
                Modulus (512 bit):
                    00:cd:5e:9f:9e:c9:82:73:a6:6a:c1:69:2b:2c:43:
                    b6:5e:66:db:fb:9f:60:08:e8:16:3e:bc:56:c5:19:
                    d7:e4:a7:25:7d:2c:76:22:71:ae:38:28:18:ad:c8:
                    a9:6d:35:94:40:97:44:95:93:8e:0c:5c:9a:84:49:
                    7e:20:0e:d9:25
                Exponent: 65537 (0x10001)
    Signature Algorithm: sha1WithRSAEncryption
        74:2c:c4:b6:76:f1:06:f5:c7:e3:45:9e:d3:64:99:50:4e:b9:
        fe:ba:b3:c6:2b:30:fe:e3:ce:80:6e:8b:77:7c:c7:09:15:63:
        97:f3:55:7f:25:0c:09:c3:a5:19:26:0f:6b:8c:1c:38:0b:d5:
        3e:06:87:59:ab:51:b8:8c:3d:0e
>
```

Messages:
>W web 08:14:26 53/handler_config_https_cert_load#258: Warning: SSL Certificate PEM file size too big

Command: **Generate HTTPS Certificate**
Syntax: **security switch https certificate generate** [rsa|dsa]
Description: Generate a new HTTPS certificate. You must disable HTTPS mode before using this command (see the "**Security Switch HTTPS Mode**" command). The parameters are:
rsa : An algorithm which stands for Rivest, Shamir and Adleman who first publicly described it.
dsa: Digital Signature Algorithm.
(default: RSA)

Example:
```
>security switch https certificate generate
Error: Please disable HTTPS mode first
>Security Switch HTTPS Mode disable
>security switch https certificate generate
>security switch https certificate generate dsa
>
```

Messages: *Error: Please disable HTTPS mode first*

Command: **Load Security Switch HTTPS Certificate**
Syntax: **security switch https certificate load** <hostname> <file_name>
Description: Load a new HTTPS certificate from a TFTP server. The TFTP server must be configured and running in order to use this command. Also, you must disable HTTPS mode before running this command (see the **security switch https mode** command).
The parameters are:
<**hostname**> : IP Address or Hostname.
<**file_name**>: certificate file name (e.g., *LIB-4400-cacert-key.pem*).
The certificate generated for use with the LIB-4xxx should be a ***.pem*** (Privacy Enhanced Mail) file containing both the certificate and the private key. The private key must be generated using rsa_keygen_bits:512.

Example:
```
>security switch https certificate load 192.168.1.30 LIB-4400-cacert-key.pem
Error: Please disable HTTPS mode first
>security switch https mode
HTTPS Mode          : Enabled
>security switch https mode disable
>security switch https mode
HTTPS Mode          : Disabled
>security switch https certificate load 192.168.1.30 LIB-4400-cacert-key.pem
>
```

Messages:
Error: File LIB-4400-cacert-key.pem was not found
Error: Please disable HTTPS mode first

Generate a Self-signed Certificate

A self signed certificate can be generated using openssl. The extension is *.pem* by convention.

1. Type **openssl genpkey -algorithm RSA -pkeyopt rsa_keygen_bits:512 -out LIB-4400-key.pem**.
2. Type **openssl req -key LIB-4400-key.pem -x509 -new -set_serial 2 -days 3650 -out LIB-4400-cacert.pem**.
3. Type **cat LIB-4400-cacert.pem LIB-4400-key.pem > LIB-4400-cacert-key.pem**.

Load a Certificate from the CLI

1. Start and configure the TFTP Server.
2. Place the certificate to load in your tftpboot root (e.g., *C:\TFTP-Root*) and run:

   Security Switch HTTPS Certificate Load <ip-of-tftp-server> <cacert-key.pem>

Note: HTTPS Certificate Backup and Restore via the Web interface is different than via the CLI. The Web interface uses 'Form' upload and HTTP download, and the CLI uses TFTP.

Security Switch Access Group

Command: **Show Security Switch Access Configuration**
Syntax: **security switch access configuration**
Description: Display the current access management configuration.
Example:

```
>security switch access config

Access Mgmt Configuration:
==========================

System Access Mode : Disabled
W: WEB/HTTPS
S: SNMP
T: TELNET/SSH

Idx Start IP Address                End IP Address                W S T
--- ------------------------------- ----------------------------- - - -
>
```

Command: **Set / Show Access Mode**
Syntax: **security switch access mode** [enable|disable]
Description: Set or show the access management mode, where:
enable : Enable access management.
disable: Disable access management.
(default: Show access management mode)
Example:

```
>security switch access mode
System Access Mode : Disabled
>security switch access mode enable
>security switch access mode
System Access Mode : Enabled
>
```

Command: **Add Access Entry**
Syntax: **security switch access add** <access_id><start_ip_addr><end_ip_addr>[web][snmp][telnet]
Description: Add LIB-4xxx access management entry, default: Add all supported protocols, where:
<**access_id**> : entry index (1-16).
<**start_ip_addr**>: Starting IP address (a.b.c.d).
<**end_ip_addr**> : Ending IP address (a.b.c.d).
web : Indicates that the host can access the LIB-4xxx from HTTP/HTTPS.
snmp : Indicates that the host can access the LIB-4xxx from SNMP.
telnet : Indicates that the host can access the LIB-4xxx from TELNET/SSH.
Example:

```
>security switch access add 1 192.168.1.20 192.168.1.30 web snmp telnet
>
```

Note: use the **security switch access lookup** command to display the new entry.

Command: **Add Ipv6 Access Entry**
Syntax: **security switch access ipv6 add** <access_id> <start_ipv6_addr> <end_ipv6_addr> [web] [snmp] [telnet]
Description: Add a new IPv6 access management entry. The default is add all supported protocols.
The parameters are:
<**access_id**> : entry index (1-16).
<**start_ipv6_addr**>: Starting IPv6 address.
IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon to separate each field (:).
For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can only appear once.
It also used a following a legal IPv4 address (e.g., '::192.1.2.34').
<**end_ipv6_addr**> : Ending IPv6 address.
IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon to separate each field (:).
For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can only appear once.
It also used a following a legal IPv4 address (e.g., ,'::192.1.2.34').
web : Indicates that the host can access the switch from HTTP/HTTPS.
snmp : Indicates that the host can access the switch from SNMP.
telnet : Indicates that the host can access the switch from TELNET/SSH.
Example:

```
>security switch access ipv6 add 1 fe80::215:c5ff:fe03:4dc7 fe80::215:c5ff:fe03:4fff web snmp telnet
>
```

Command: **Delete Access Entry**
Syntax: **security switch access delete** <access_id>
Description: Delete an existing access management entry, where:
<**access_id**>: entry index (1-16).
Example:

```
>security switch access delete 2
Non-existing entry ID 2
>security switch access delete 1
>
```

Command: **Lookup (Display) Access Entry**
Syntax: **security switch access lookup** [<access_id>]
Description: Lookup an existing access management entry, where:
<**access_id**>: entry index (1-16).
Example:

```
>security switch access lookup
W: WEB/HTTPS
S: SNMP
T: TELNET/SSH

Idx Start IP Address                End IP Address                  W S T
--- ------------------------------- ------------------------------- - - -
1   fe80::215:c5ff:fe03:4dc7        fe80::215:c5ff:fe03:4dc7        Y Y Y
>
```

Command: **Clear Access Entry**
Syntax: **security switch access clear**
Description: Clear access management entry.

Example:

```
>security switch access clear
>security switch access lookup
W: WEB/HTTPS
S: SNMP
T: TELNET/SSH

Idx Start IP Address                End IP Address                W S T
--- ------------------------------- ----------------------------- - - -
>
```

Command: **Show / Clear Access Statistics**
Syntax: **security switch access statistics** [clear]
Description: Show or clear access management statistics, where:
clear: Clear the access management statistics.

Example:

```
>security switch access statistics clear
>security switch access statistics

Access Management Statistics:
-----------------------------
HTTP     Receive:          0    Allow:          0    Discard:      0
HTTPS    Receive:          0    Allow:          0    Discard:      0
SNMP     Receive:          0    Allow:          0    Discard:      0
TELNET   Receive:          0    Allow:          0    Discard:      0
SSH      Receive:          0    Allow:          0    Discard:      0
>
```

Security Switch RMON Group Commands

The LIB-4xxx Security Switch RMON (Remote Network Monitoring) commands let you add, delete or look up RMON statistics, history, alarms, and/or events.

The Security Switch RMON Group commands are explained below.

Command: **Add RMON Statistics Entry**
Syntax: **security switch rmon statistics add** <stats_id> <data_source>
Description: Add or modify an RMON Statistics entry. The entry index key is <stats_id>. Parameters are:
<**stats_id**> : Statistics ID (1-65535).
<**data_source**>: The OID (Object IDentifier) that indicates that the ifIndex in ifEntry. The value should be something like .1.3.6.1.2.1.2.2.1.1.xxx.

Example:
```
>security switch rmon statistics add 1 .1.3.6.1.2.1.2.2.1.1.123
>
```

Messages: *<data_source> dosen't exit*

Command: **Delete RMON Statistics Entry**
Syntax: **security switch rmon statistics delete** <stats_id>
Description: Delete RMON Statistics entry. The entry index key is <stats_id>. The parameters are:
<**stats_id**>: Statistics ID (1-65535).

Example:
```
>security switch rmon statistics delete 1
module_id=92, code=-6
>
```

Command: **Lookup RMON Statistics Entries**
Syntax: **security switch rmon statistics lookup** [<stats_id>]
Description: Show existing RMON Statistics entries, where:
<**stats_id**>: Statistics ID (1-65535).

Example:
```
>security switch rmon statistics lookup 1
Entry Index                   : 1
Data Source                   : .1.3.6.1.2.1.2.2.1.1.1
etherStatsDropEvents          : 0
etherStatsOctets              : 0
etherStatsPkts                : 0
etherStatsBroadcastPkts       : 0
etherStatsMulticastPkts       : 0
etherStatsCRCAlignErrors      : 0
etherStatsUndersizePkts       : 0
etherStatsOversizePkts        : 0
etherStatsFragments           : 0
etherStatsJabbers             : 0
etherStatsCollisions          : 0
etherStatsPkts64Octets        : 0
etherStatsPkts65to127Octets   : 0
etherStatsPkts128to255Octets  : 0
etherStatsPkts256to511Octets  : 0
etherStatsPkts512to1023Octets : 0
etherStatsPkts1024to1518Octets: 0
>
```

Command: **Add RMON History Entry**

Syntax: **security switch rmon history add** <history_id> <data_source> [<interval>] [<buckets>]

Description: Add or modify RMON History entry. The entry index key is <history_id>.The parameters are:

<**history_id**> : History ID (1-65535).

<**data_source**>: The OID that indicates the ifIndex in ifEntry. The value should be something like .1.3.6.1.2.1.2.2.1.1.xxx.

<**interval**> : Sampling interval (1-3600) (default: 1800).

<**buckets**> : The maximum data entries associated with this History control entry stored in RMON (1-65535) (default: 50).

Example:
```
>security switch rmon history add 2 .1.3.6.1.2.1.2.2.1.1.2 1800 50
>
```

Messages: *<data_source> dosen't exit*

Command: **Delete RMON History Entry**

Syntax: **security switch rmon history delete** <history_id>

Description: Delete an RMON History entry. The entry index key is <history_id>. The parameters are:

<**history_id**>: History ID (1-65535).

Example:
```
security switch rmon history add 2 .1.3.6.1.2.1.2.2.1.1.2 1800 50
>security switch rmon history delete 2
>
```

Messages: *Invalid <history_id> parameter: 0*
module_id=92, code=-7

Command: **Lookup RMON History Entries**

Syntax: **security switch rmon history lookup** [<history_id>]

Description: Show RMON History entries. The parameters are:
<**history_id**>: The RMON History ID (1-65535) to display.

Example:

```
>security switch rmon history lookup 1
Entry Index                   : 1
Data Source                   : .1.3.6.1.2.1.2.2.1.1.1
Data Bucket Request           : 50
Data Bucket Granted           : 50
Data Interval                 : 1800
etherHistorySampleIndex       : 1
    etherHistoryIntervalStart :   0d 00:01:02(62)
    etherHistoryDropEvents    : 0
    etherHistoryOctets        : 359293
    etherHistoryPkts          : 1740
    etherHistoryBroadcastPkts : 90
    etherHistoryMulticastPkts : 1324
    etherHistoryCRCAlignErrors: 0
    etherHistoryUndersizePkts : 0
    etherHistoryOversizePkts  : 0
    etherHistoryFragments     : 0
    etherHistoryJabbers       : 0
    etherHistoryCollisions    : 0
    etherHistoryUtilization   : 0
:     :     :     :     :     :
:     :     :     :     :     :
etherHistorySampleIndex       : 34
    etherHistoryIntervalStart :   0d 16:30:00(59400)
    etherHistoryDropEvents    : 0
    etherHistoryOctets        : 210439
    etherHistoryPkts          : 1372
    etherHistoryBroadcastPkts : 23
    etherHistoryMulticastPkts : 1312
    etherHistoryCRCAlignErrors: 0
    etherHistoryUndersizePkts : 0
    etherHistoryOversizePkts  : 0
    etherHistoryFragments     : 0
    etherHistoryJabbers       : 0
    etherHistoryCollisions    : 0
    etherHistoryUtilization   : 0
>
```

Command: **Add / Modify RMON Alarm Entry**

Syntax: **security switch rmon alarm add** <alarm_id> <interval> <alarm_vairable> [absolute|delta] <rising_threshold> <rising_event_index> <falling_threshold> <falling_event_index> [rising|falling|both]

Description: Add or modify an RMON Alarm entry. The entry index key is <alarm_id>. The parameters are:

<**alarm_id**> : Alarm ID (1-65535).

<**interval**> : Sampling interval (1-2147483647) (the default is 30).

<**alarm_variable**> : The MIB OID that must be referenced. Enter a variable value in the format ***xxx.yyy***, where ***xxx*** is 10-21, and ***yyy*** is 1-65,535. Indicates the particular variable to be sampled. The valid variables are:

.1.3.6.1.2.1.2.2.1.10.xxx ¡V InOctets: The total number of octets received on the interface, including framing characters.

.1.3.6.1.2.1.2.2.1.11.xxx ¡V InUcastPkts: The number of uni-cast packets delivered to a higher-layer protocol.

.1.3.6.1.2.1.2.2.1.12.xxx ¡V InNUcastPkts: The number of broadcast and multi-cast packets delivered to a higher-layer protocol.

.1.3.6.1.2.1.2.2.1.13.xxx ¡V InDiscards: The number of inbound packets that are discarded even if the packets are normal.

.1.3.6.1.2.1.2.2.1.14.xxx ¡V InErrors: The number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol.

.1.3.6.1.2.1.2.2.1.15.xxx ¡V InUnknownProtos: the number of the inbound packets that were discarded because of the unknown or un-support protocol.

.1.3.6.1.2.1.2.2.1.16.xxx ¡V OutOctets: The number of octets transmitted out of the interface, including framing characters.

.1.3.6.1.2.1.2.2.1.17.xxx ¡V OutUcastPkts: The number of unicast packets that request to transmit.

.1.3.6.1.2.1.2.2.1.18.xxx ¡V OutNUcastPkts: The number of broadcast and multi-cast packets that request to transmit.

.1.3.6.1.2.1.2.2.1.19.xxx ¡V OutDiscards: The number of outbound packets that are discarded in the event the packet is normal.

.1.3.6.1.2.1.2.2.1.20.xxx ¡V OutErrors: The number of outbound packets that could not be transmitted because of errors.

.1.3.6.1.2.1.2.2.1.21.xxx ¡V OutQLen: The length of the output packet queue (in packets).

"**xxx**" means the interface identified by a particular value of this index is the same interface as identified by the same value of OID 'ifIndex'.

absolute : Get the sample directly.

delta : Calculate the difference between samples (the default).

<**rising_threshold**> : Rising threshold value (-2147483648¡V2147483647).

<**rising_event_index**> : Rising event index (1-65535).

<**falling_threshold**> : Falling threshold value (-2147483648¡V2147483647).

<**falling_event_index**>: Falling event index (1-65535).

rising : Trigger alarm when the first value is larger than the rising threshold.

falling : Trigger alarm when the first value is less than the falling threshold.

both : Trigger alarm when the first value is larger than the rising threshold or less than the falling threshold (default).

Example:
```
>security switch rmon alarm add 1 30 .1.3.6.1.2.1.2.2.1.14.123 -2 2 -2
>
```

Messages: *<data_source> dosen't exit*

Invalid <rising_threshold> parameter: -2

Command: **Delete RMON Alarm Entry**
Syntax: **security switch rmon alarm delete** <alarm_id>
Description: Delete an existing RMON Alarm entry. The entry index key is <alarm_id>. The parameters are:
<**alarm_id**>: Alarm ID (1-65535).
Example:
```
>security switch rmon alarm delete 1
>
```
Messages: *module_id=92, code=-8*

Command: **Lookup RMON Alarm Entries**
Syntax: **security switch rmon alarm lookup** [<alarm_id>]
Description: Show existing RMON Alarm entries. The parameters are:
<**alarm_id**>: Alarm ID (1-65535).
Example:
```
>security switch rmon event lookup
Id     Description  Type       Community   LastSent
----- ------------  -----      ----------- ---------
1      A            logandtrap public      Never
2      B            snmptrap   public      Never
3      C            log        public      Never

Number of entries: 3
>
```

Command: **Add / Modify RMON Event Entry**
Syntax: **security switch rmon event add** <event_id> [none|log|trap|log_trap] [<community>] [<description>]
Description: Add or modify an RMON Event entry. The entry index key is <event_id>. The parameters are:
<**event_id**> : Event ID (1-65535).
none : Get the sample directly.
log : Get the sample directly.
trap : Get the sample directly.
log_trap : Calculate the difference between samples (default).
<**community**> : Specify the community when trap is sent (the string length is 0~127) (default: public).
<**description**>: The string for describing this event (the string length is 0~127).
(default: null string).
Example:
```
>security switch rmon event add 1
>
```

Command: **Delete RMON Event Entry**
Syntax: **security switch rmon event delete** <event_id>
Description: Delete RMON Event entry. The entry index key is <event_id>. The parameters are:
<**event_id**>: RMON Event ID (1-65535).

Example:

```
>security switch rmon event lookup
Id     Description  Type        Community    LastSent
-----  -----------  -----       -----------  ---------
1      A            logandtrap   public      Never
2      B            snmptrap     public      Never
3      C            log          public      Never

Number of entries: 3
>security switch rmon event delete 2
>security switch rmon event lookup
Id     Description  Type        Community    LastSent
-----  -----------  -----       -----------  ---------
1      A            logandtrap  public       Never
3      C            log         public       Never

Number of entries: 2
>
```

Messages: *module_id=92, code=-8*

Command: **Lookup RMON Event Entries**
Syntax: **security switch rmon event lookup** [<event_id>]
Description: Show RMON Event entries, where:
<**event_id**>: Event ID (1-65535).

Example:

```
>security switch rmon event add 1
>security switch rmon event lookup
Id     Description  Type    Community     LastSent
-----  -----------  -----   -----------   ---------
1             none  public  13259d 18:11:

Number of entries: 1
>
```

Security Switch SNMP Group

The LIB-4xxx Security Switch SNMP commands let you add, delete or look up SNMP configuration, mode, community, traps, users, groups views and/or access.

Simple Network Management Protocol (SNMP) is part of the TCP/IP protocol for network management. SNMP allows diverse network objects to participate in a network management architecture. It enables network management systems to learn network problems by receiving traps or change notices from network devices running SNMP.

The SNMP agent embedded in the LIB-4xxx is capable of version 1, 2c, or 3 support to access all management information from the device. The community strings for v1 and v2c and the USM/VACM for SNMPv3 are supported. The SNMP agent can support IPv4 and IPv6 trap destinations. It also supports the INFORM PDU for notification along with traps.

Traps are generated when a condition has been met on the SNMP agent. These conditions are defined in the Management Information Base (MIB). The administrator then defines thresholds, or limits to the conditions, that are to generate a trap. Conditions range from preset thresholds to a restart.

All of the values that SNMP reports are dynamic. The information needed to get the specified values that SNMP reports is stored in the MIB. This information includes Object IDs (OIDs), Protocol Data Units (PDUs), etc. The MIBs must be located at both the agent and the manager to work effectively.

Additional SNMP traps notes:

- The Last Gasp can be in the form of IEEE802.3 2008 Clause 57 Dying gasp event and/or an SNMP trap to NMS system.
- The Y.1731 AIS and LCK faults for fault monitoring and isolation raise SNMP traps.
- All CCM errors such as remoteCCM, RDI, MACStatus, errorCCM, crossConnect, etc. are reported in MEP status and SNMP traps are raised for errors.
- SNMP traps are generated for various Threshold events (Errored Symbol Period, Errored Frame Event, Errored Frame Period Event and Errored Frame Seconds summary events) and Non-threshold events (dying gasp and critical events).
- The Link Fault, Dying Gasp, Critical Event, and other LOAM details for transmit and receive on each port are displayed at the **Monitor** > **Link OAM** > **Statistics** menu path.
- Trap Primary or Secondary Power Supply: with both primary (slot 1) and seconary (slot 2) connected, LED S2 is green and primary (slot 1) is Primary. If primary (slot 1) is removed, LED S2 becomes AMBER indicating that the LIB-4xxx is operating with a Secondary power supply and will send out the trap as "entConfigChange".

The Security Switch SNMP Group commands available are listed below.

>security switch snmp ?
Available Commands:

Security Switch SNMP Configuration
Security Switch SNMP Mode [enable|disable]
Security Switch SNMP Version [1|2c|3]
Security Switch SNMP Read Community [<community>]
Security Switch SNMP Write Community [<community>]
Security Switch SNMP Trap Mode [enable|disable]
Security Switch SNMP Trap Version [1|2c|3]
Security Switch SNMP Trap Community [<community>]
Security Switch SNMP Trap Destination [<ip_addr_string>]
Security Switch SNMP Trap IPv6 Destination [<ipv6_addr>]
Security Switch SNMP Trap Authentication Failure [enable|disable]
Security Switch SNMP Trap Link-up [enable|disable]
Security Switch SNMP Trap Inform Mode [enable|disable]
Security Switch SNMP Trap Inform Timeout [<timeout>]
Security Switch SNMP Trap Inform Timeout [<timeout>]
Security Switch SNMP Trap Probe Security Engine ID [enable|disable]
Security Switch SNMP Trap Security Engine ID [<engineid>]
Security Switch SNMP Trap Security Name [<security_name>]
Security Switch SNMP Engine ID [<engineid>]
Security Switch SNMP Community Add <community> [<ip_addr>] [<ip_mask>]
Security Switch SNMP Community Delete <index>
Security Switch SNMP Community Lookup [<index>]
Security Switch SNMP User Add <engineid> <user_name> [MD5|SHA] [<auth_password>] [DES]
[<priv_password>]
Security Switch SNMP User Delete <index>
Security Switch SNMP User Changekey <engineid> <user_name> <auth_password> [<priv_password>]
Security Switch SNMP User Lookup [<index>]
Security Switch SNMP Group Add <security_model> <security_name> <group_name>
Security Switch SNMP Group Delete <index>
Security Switch SNMP Group Lookup [<index>]
Security Switch SNMP View Add <view_name> [included|excluded] <oid_subtree>
Security Switch SNMP View Delete <index>
Security Switch SNMP View Lookup [<index>]
Security Switch SNMP Access Add <group_name> <security_model> <security_level>
[<read_view_name>] [<write_view_name>]
Security Switch SNMP Access Delete <index>
Security Switch SNMP Access Lookup [<index>]
>

The Security Switch SNMP Group commands are explained below.

Command: **Show Current SNMP Configuration**
Syntax: **security switch snmp configuration**
Description: Show the current SNMP configuration.
Example:

```
>security switch snmp config

SNMP Configuration:
===================

SNMP Mode                     : Enabled
SNMP Version                  : 2c
Read Community                : public
Write Community               : private
Trap Mode                     : Disabled
Trap Version                  : 1
Trap Community                : public
Trap Destination              :
Trap IPv6 Destination         : ::
Trap Authentication Failure   : Enabled
Trap Link-up and Link-down    : Enabled
Trap Inform Mode              : Enabled
Trap Inform Timeout (seconds) : 1
Trap Inform Retry Times       : 5
Trap Probe Security Engine ID : Enabled
Trap Security Engine ID       :
Trap Security Name            : None

SNMPv3 Engine ID : 800007e5017f000001

SNMPv3 Communities Table:
Idx Community                       Source IP        Source Mask
--- ------------------------------- ---------------- ---------------
1   public                          0.0.0.0          0.0.0.0
2   private                         0.0.0.0          0.0.0.0

Number of entries: 2

SNMPv3 Users Table:
Idx Engine ID User Name                          Level          Auth Priv
--- --------- ---------------------------------- -------------- ---- ----
1   Local     default_user                       NoAuth, NoPriv None None

Number of entries: 1

SNMPv3 Groups Table;
Idx Model Security Name                    Group Name
--- ----- ---------------------------------- --------------------------------
1   v1    public                           default_ro_group
2   v1    private                          default_rw_group
3   v2c   public                           default_ro_group
4   v2c   private                          default_rw_group
5   usm   default_user                     default_rw_group

Number of entries: 5

SNMPv3 Views Table:
Idx View Name                       View Type OID Subtree
--- ------------------------------- --------- --------------------------------
1   default_view                    included  .1

Number of entries: 1
```

```
SNMPv3 Accesses Table:
Idx Group Name                      Model Level
--- ------------------------------- ----- --------------
1   default_ro_group                any   NoAuth, NoPriv
2   default_rw_group                any   NoAuth, NoPriv

Number of entries: 2
>
```

Command: **Enable or Disable SNMP Mode**
Syntax: **security switch snmp mode** [enable|disable]
Description: Set or show the SNMP mode, where:
enable : Enable SNMP.
disable: Disable SNMP.
(default: Show SNMP mode)

Example:
```
>security switch snmp mode
SNMP Mode                       : Enabled
>security switch snmp mode disable
>security switch snmp mode
SNMP Mode                       : Disabled
>security switch snmp mode enable
>security switch snmp mode
SNMP Mode                       : Enabled
>
```

Command: **Set or Show SNMP Version**
Syntax: **security switch snmp version** [1|2c|3]
Description: Set or show the SNMP protocol version, where:
1 : SNMP version 1.
2c: SNMP version 2c.
3 : SNMP version 3.
(default: Show SNMP version)

Example:
```
>security switch snmp version
SNMP Version                    : 2c
>security switch snmp version 3
>security switch snmp version
SNMP Version                    : 3
>
```

Command: **Set or Show SNMP Read Community**
Syntax: **security switch snmp read community** [<community>]
Description: Set or show the community string for SNMP read access, where:
<**community**>: Community string. Use 'clear' or "" to clear the string. The maximum string length is 256 characters. (The default is 'Show SNMP read community'). Indicates the community access string to permit access to SNMPv3 agent. The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126. The community string will be treated as security name and map a SNMPv1 or SNMPv2c community string.

Example:
```
>security switch snmp read community
Read Community                  : public
>
```

Command: **Set or Show SNMP Write Community**
Syntax: **security switch snmp write community** [<community>]
Description: Set or show the community string for SNMP write access, where:
<**community**>: Community string. Use 'clear' or "" to clear the string. The maximum string length is 256 characters. (The default is 'Show SNMP write community'.) The allowed string length is 1 to 32, and the allowed content is ASCII characters from 33 to 126. The community string will be treated as security name and map a SNMPv1 or SNMPv2c community string.

Example:
```
>security switch snmp write community
Write Community                : private
>
```

Command: **Set or Show SNMP Trap Mode**
Syntax: **security switch snmp trap mode** [enable|disable]
Description: Set or show the SNMP trap mode, where:
enable : Enable SNMP traps.
disable: Disable SNMP traps.
(The default is 'Show SNMP trap mode'.)

Example:
```
>security switch snmp trap mode
Trap Mode                      : Disabled
>security switch snmp trap mode enable
>security switch snmp trap mode
Trap Mode                      : Enabled
>
```

Command: **Set or Show SNMP Trap Version**
Syntax: **security switch snmp trap version** [1|2c|3]
Description: Set or show the SNMP trap protocol version, where:
1 : SNMP version 1
2c: SNMP version 2c
3 : SNMP version 3
(The default is 'Show SNMP trap version'.)

Example:
```
>security switch snmp trap version
Trap Version                   : 1
>security switch snmp trap version 2c
>security switch snmp trap version
Trap Version                   : 2c
>
```

Command: **Security Switch SNMP Trap Community**
Syntax: **security switch snmp trap community** [<community>]
Description: Set or show the community string for SNMP traps, where:
<**community**>: Community string. Use 'clear' or "" to clear the string. The maximum string length is 256 characters. (The default is 'Show SNMP trap community'.)

Example:
```
>security switch snmp trap community
Trap Community                 : public
>
```

Command: **Set or Show SNMP Trap Destination**
Syntax: **security switch snmp trap destination** [<ip_addr_string>]
Description: Set or show the SNMP trap destination address, where:
<**ip_addr_string**>: IP host address (a.b.c.d)

Example:
```
>security switch snmp trap destination
Trap Destination              :
>security switch snmp trap destination 192.168.1.30
>security switch snmp trap destination
Trap Destination              : 192.168.1.30
>
```

Command: **Set or Show SNMP Trap IPv6 Destination**
Syntax: **security switch snmp trap ipv6 destination** [<ipv6_addr>]
Description: Set or show the SNMP trap destination IPv6 address, where:
<**ipv6_addr**>: IPv6 address is in 128-bit records represented as eight fields of up to four hexadecimal digits with a colon to separate each field (:). For example, 'fe80::215:c5ff:fe03:4dc7'. The symbol '::' is a special syntax that can be used as a shorthand way of representing multiple 16-bit groups of contiguous zeros; but it can only appear once. It also used a following legal IPv4 address (e.g., '::192.1.2.34').

Example:
```
>security switch snmp trap ipv6 destination
Trap IPv6 Destination         : ::
>security switch snmp trap ipv6 destination fe80::215:c5ff:fe03:4dc7
>security switch snmp trap ipv6 destination
Trap IPv6 Destination         : fe80::215:c5ff:fe03:4dc7
>
```

Command: **Set or Show SNMP Trap Authentication Failure**
Syntax: **security switch snmp trap authentication failure** [enable|disable]
Description: Set or show the SNMP authentication failure trap mode, where:
enable : Enable SNMP trap authentication failure.
disable: Disable SNMP trap authentication failure.
(The default is 'Show SNMP trap authentication failure mode'.)

Example:
```
>security switch snmp trap authentication failure
Trap Authentication Failure   : Enabled
>security switch snmp trap authentication failure disable
>security switch snmp trap authentication failure
Trap Authentication Failure   : Disabled
>
```

Command: **Set or Show SNMP Trap Link-up**
Syntax: **security switch snmp trap link-up** [enable|disable]
Description: Set or show the port link-up and link-down trap mode, where:
enable : Enable SNMP trap link-up and link-down.
disable: Disable SNMP trap link-up and link-down.
(The default is 'Show SNMP trap link-up and link-down mode'.)

Example:
```
>security switch snmp trap link-up
Trap Link-up and Link-down    : Enabled
>security switch snmp trap link-up disable
>security switch snmp trap link-up
Trap Link-up and Link-down    : Disabled
>security switch snmp trap link-up enable
>security switch snmp trap link-up
Trap Link-up and Link-down    : Enabled
>
```

Command: **Set or Show SNMP Trap Inform Mode**
Syntax: **security switch snmp trap inform mode** [enable|disable]
Description: Set or show the SNMP trap inform mode, where:
enable : Enable SNMP trap inform
disable: Disable SNMP trap inform
(The default is 'Show SNMP inform mode'.)

Example:
```
>security switch snmp trap inform mode
Trap Inform Mode              : Enabled
>security switch snmp trap inform mode disable
>security switch snmp trap inform mode enable
>security switch snmp trap inform mode
Trap Inform Mode              : Enabled
>
```

Command: **Set or Show SNMP Trap Inform Timeout**
Syntax: **security switch snmp trap inform timeout** [<timeout>]
Description: Set or show the SNMP trap inform timeout (usecs), where:
<**timeout**>: SNMP trap inform timeout in the range of 0-2147 seconds (0-35.66 minutes).
(The default is 'Show SNMP trap inform timeout'.)

Example:
```
>security switch snmp trap inform timeout 300
>security switch snmp trap inform timeout
Trap Inform Timeout (seconds) : 300
>
```

Command: **Set or Show SNMP Trap Inform Retry Times**
Syntax: **security switch snmp trap inform retry times** [<retries>]
Description: Set or show the SNMP trap inform retry times. The default is 5. The parameters are:
<**retries**>: SNMP trap inform retransmitted times (0-255).
(The default is 'Show SNMP trap inform retry times'.)

Example:
```
>security switch snmp trap inform retry times 25
>security switch snmp trap inform retry times
Trap Inform Retry Times       : 25
>security switch snmp trap inform retry times
Trap Inform Retry Times       : 5
>security switch snmp trap inform retry times 25
>security switch snmp trap inform retry times
Trap Inform Retry Times       : 25
>
```

Command: **Set or Show SNMP Trap Probe Security Engine ID**
Syntax: **security switch snmp trap probe security engine id** [enable|disable]
Description: Set or show SNMP trap security engine ID probe mode. Note that you must disable the trap security engine ID probe (using this command) before entering the **security switch snmp trap security engine id** command. The parameters are:
enable : Enable SNMP trap security engine ID probe.
disable: Disable SNMP trap security engine ID probe.
(The default is 'Show SNMP trap security engine ID probe mode'.)

Example:
```
>security switch snmp trap probe security engine id
Trap Probe Security Engine ID : Enabled
>security switch snmp trap probe security engine id disable
>security switch snmp trap probe security engine id
Trap Probe Security Engine ID : Disabled
>
```

Command: **Set or Show SNMP Trap Security Engine ID**
Syntax: **security switch snmp trap security engine id** [<engineid>]
Description: Set or show SNMP trap security engine ID. Note that you must disable the trap security engine ID probe (see above) before using this command. The parameters are:
<**engineid**>: Engine ID; the format may not be all zeros or all 'ff'H and is restricted to 5 - 32 bytes.

Example:
```
>security switch snmp trap security engine id 1122334455
>security switch snmp trap security engine id
Trap Security Engine ID       : 1122334455
>
```

Messages: *Please disable trap security engine ID probe first*
Recovery: Use the "**security switch snmp trap probe security engine id disable**" command (see above).

Command: **Set or Show SNMP Trap Security Name**
Syntax: **security switch snmp trap security name** [<security_name>]
Description: Set or show SNMP trap security name, where:
<**security_name**>: A string representing the security name for a principal (default: Show SNMP trap security name). The allowed string length is 5-32 bytes, and the allowed content is ASCII characters from 33 to 126.
Example:
```
>security switch snmp trap security name
Trap Security Name            : None
>security switch snmp trap security name moniker
Trap security engine ID should not NULL
>security switch snmp trap security name moniker827
Trap security engine ID should not NULL
>
```
Messages: *Cann't find entry 'ddddddddddd, bob' in SNMPv3 users table*

Command: **Set or Show SNMP Engine ID**
Syntax: **security switch snmp engine id** [<engineid>]
Description: Set or show SNMPv3 local engine ID, where:
<**engineid**>: Engine ID, the format may not be all zeros or all 'ff'H and is restricted to 5 - 32 octet string.
Example:
```
>security switch snmp engine id
SNMPv3 Engine ID : 800007e5017f000001
>
```

Command: **Add SNMP Community Entry**
Syntax: **security switch snmp community add** <community> [<ip_addr>] [<ip_mask>]
Description: Add a new or modify an existing SNMPv3 community entry. The entry index key is <community>, where:
<**community**>: Community string.
<**ip_addr**> : IP address (a.b.c.d), default: Show IP address.
<**ip_mask**> : IP subnet mask (a.b.c.d); default: Show IP mask.
Example:
```
>security switch snmp community add 192.168.1.30 255.255.255.0
>
```

Command: **Delete SNMP Community Entry**
Syntax: **security switch snmp community delete** <index>
Description: Delete an existing SNMPv3 community entry, where:
<**index**>: entry index (1-64).
Example:
```
>security switch snmp community delete 1
>
```

Command: **Lookup SNMP Community Entry**
Syntax: **security switch snmp community lookup** [<index>]
Description: Lookup the existing SNMPv3 community entry, where:
<**index**>: entry index (1-64).

Example 1: The default community information is shown below:

```
>security switch snmp community lookup
Idx Community                       Source IP        Source Mask
--- ------------------------------- ---------------- ---------------
1   public                          0.0.0.0          0.0.0.0
2   private                         0.0.0.0          0.0.0.0

Number of entries: 2
>
```

Example 2:

```
>security switch snmp community lookup
Idx Community                       Source IP        Source Mask
--- ------------------------------- ---------------- ---------------
2   private                         0.0.0.0          0.0.0.0
3   192.168.1.30                    0.0.0.0          0.0.0.0
4   viewonly                        192.168.1.30     255.255.255.0

Number of entries: 3
>
```

Command: **Add SNMP User**
Syntax: **security switch snmp user add** <engineid> <user_name> [MD5|SHA] <auth_password>] [DES] [<priv_password>]
Description: Add SNMPv3 user entry. The entry index keys are <engineid> and <user_name> and it doesn't allow modifying. The parameters are:

<**engineid**> : Engine ID, the format may not be all zeros or all 'ff'H and is restricted to 5 - 32 bytes (e.g., **1122334455**).
<**user_name**> : A string identifying the user name that this entry should belong to. The name of "None" is reserved. The allowed string length is (1-32), and the allowed content is ASCII characters from 33 to 126.
md5 : An optional flag to indicate that this user using MD5 authentication protocol. The allowed length is (8-32), and the allowed content is ASCII characters from 33 to 126.
sha : An optional flag to indicate that this user using SHA authentication protocol. The allowed length is (8-40), and the allowed content is ASCII characters from 33 to 126.
<**auth_password**>: A string identifying the authentication pass phrase (8 - 40 characters).
des : An optional flag to indicate that this user is using the DES privacy protocol. The allowed string length is (8-32), and the allowed content is ASCII characters from 33 to 126.
<**priv_password**>: A string identifying the privacy pass phrase. The allowed string length is 8-40 characters, and the allowed content is ASCII characters from 33 to 126.

Example:

```
>security switch snmp user add 800007e5017f000001 JeffS md5 Buffrey1 des Buffrey1
>
```

Messages:
Invalid <engineid> parameter: 123456789
Invalid parameter: sha
The format of 'Engine ID' may not be all zeros or all 'ff'H and is restricted to 5 - 32 octet string
The length is restricted to 8 - 40
The length is restricted to 8 - 40

Command: **Delete SNMP User**
Syntax: **security switch snmp user delete** <index>
Description: Delete an existing SNMPv3 user entry, where:
<**index**>: entry index (1-64).

Example:

```
>security switch snmp user lookup
Idx Engine ID User Name                          Level          Auth Priv
--- --------- ------------------------------- -------------- ---- ----
1   Local     default_user                    NoAuth, NoPriv None None
2   Local     JeffS                           Auth, Priv     MD5  DES

Number of entries: 2
>security switch snmp user delete 2
>security switch snmp user lookup
Idx Engine ID User Name                          Level          Auth Priv
--- --------- ------------------------------- -------------- ---- ----
1   Local     default_user                    NoAuth, NoPriv None None

Number of entries: 1
>
```

Command: **Change SNMP User Changekey**
Syntax: **security switch snmp user changekey** <engineid> <user_name> <auth_password> [<priv_password>]
Description: Change an existing SNMPv3 user's password, where:
<**engineid**> : Engine ID, the format may not be all zeros or all 'ff'H and is restricted to 5 - 32 byte string.
<**user_name**> : A string identifying the user name that this entry should belong to. The name of "None" is reserved. The allowed string length is (1-32), and the allowed content is ASCII characters from 33 to 126.
<**auth_password**>: A string identifying the authentication pass phrase.
<**priv_password**>: A string identifying the privacy pass phrase. The allowed string length is 8-40 characters, and the allowed content is ASCII characters from 33 to 126.
Example:

```
>security switch snmp user changekey 800007e5017f000001 JeffS Duffrey1 Duffrey1
>
```

Messages: *The entry '800007e5017f000001, JeffS' is not exist*

Command: **Lookup SNMP User**
Syntax: **security switch snmp user lookup** [<index>]
Description: Lookup an existing SNMPv3 user entry, where:
<**index**>: entry index (1-64).
Example:

```
>security switch snmp user lookup 1
Entry Index             : 1
Engine ID               : 800007e5017f000001
User Name               : default_user
Security Level          : NoAuth, NoPriv
Authentication Protocol : None
Privacy Protocol        : None
>security switch snmp user lookup
Idx Engine ID User Name                         Level          Auth Priv
--- --------- --------------------------------- -------------- ---- ----
1   Local     default_user                      NoAuth, NoPriv None None
2   Local     JeffS                             Auth, Priv     MD5  DES

Number of entries: 2
>
```

Command: **Add SNMP Group**
Syntax: **security switch snmp group add** <security_model> <security_name> <group_name>
Description: Add a new or modify an existing SNMPv3 group entry. The entry index keys are <security_model> and <security_name>. The parameters are:
<**security_model**>:
v1 - Reserved for SNMPv1.
v2c - Reserved for SNMPv2c.
usm - User-based Security Model (USM).
<**security_name**> : A string identifying the security name that this entry should belong to. The allowed string length is (1-32), and the allowed content is ASCII characters from 33 to 126.
<**group_name**> : A string identifying the group name that this entry should belong to. The allowed string length is 1-32 characters, and the allowed content is ASCII characters from 33 to 126.

Example:
```
>security switch snmp group add usm secgr11 gr11
>
```

Messages: *The security name '800007e5017f000001, secgr11' is not exist*

Command: **Delete SNMP Group**
Syntax: **security switch snmp group delete** <index>
Description: Delete an existing SNMPv3 group entry, where:
<**index**>: entry index (1-64).

Example:
```
>security switch snmp group delete 1
>security switch snmp group delete 1
Non-existing entry
>
```

Command: **Lookup SNMP Group**
Syntax: **security switch snmp group lookup** [<index>]
Description: Lookup an existing SNMPv3 group entry, where:
<**index**>: entry index (1-64).

Example:
```
>security switch snmp group lookup
Idx Model Security Name                    Group Name
--- ----- -------------------------------- --------------------------
1   v1    public                           default_ro_group
2   v1    private                          default_rw_group
3   v2c   public                           default_ro_group
4   v2c   private                          default_rw_group
5   usm   default_user                     default_rw_group

Number of entries: 5
>
```

Messages: *Non-existing entry*

Command: **Add SNMP View**
Syntax: **security switch snmp view add** <view_name> [included|excluded] <oid_subtree>
Description: Add or modify an SNMPv3 view entry. The entry index key are <view_name> and <oid_subtree>. The parameters are:
<**view_name**> : A string identifying the view name that this entry should belong to. The allowed string length is 1-32 characters, and the allowed content is ASCII characters from 33 to 126.
included : An optional flag to indicate that this view subtree should be included.
excluded : An optional flag to indicate that this view subtree should be excluded.
<**oid_subtree**>: The OID defining the root of the subtree to add to the named view.

Example:
```
>security switch snmp view add view1 included .1
>security switch snmp view lookup
Idx View Name                       View Type OID Subtree
--- ------------------------------- --------- ----------------------
1   default_view                    included  .1
2   view1                           included  .1

Number of entries: 2
>
```

Messages: *Invalid <oid_subtree> parameter: 2345*

Command: **Delete SNMP View**
Syntax: **security switch snmp view delete** <index>
Description: Delete an existing SNMPv3 view entry, where:
<**index**>: entry index (1-64).

Example:
```
>security switch snmp view delete 1
>
```

Command: **Lookup SNMP View**
Syntax: **security switch snmp view lookup** [<index>]
Description: Lookup an existing SNMPv3 view entry, where:
<**index**>: entry index (1-64).

Example:
```
>security switch snmp view lookup
Idx View Name                       View Type OID Subtree
--- ------------------------------- --------- ----------------------
1   default_view                    included  .1
2   view1                           included  .1

Number of entries: 2
>
```

Messages: *Non-existing entry*

Command: **Add or Change SNMP Access**
Syntax: **security switch snmp access add** <group_name> <security_model> <security_level> [<read_view_name>] [<write_view_name>]
Description: Add or modify SNMPv3 access entry. The entry index key are <group_name>, <security_model> and <security_level>. The parameters are:

<**group_name**> : A string identifying the group name that this entry should belong to. The allowed string length is (1-32), and the allowed content is ASCII characters from 33 to 126.

<**security_model**> : The desired SNMP model:
any - Accept any security model (v1|v2c|usm).
v1 - Reserved for SNMPv1.
v2c - Reserved for SNMPv2c.
usm - User-based Security Model (USM).

<**security_level**> : noAuthNoPriv - None authentication and none privacy.
AuthNoPriv - Authentication and none privacy.
AuthPriv - Authentication and privacy.

<**read_view_name**> : The name of the MIB view defining the MIB objects for which this request may request the current values. The name of "None" is reserved. The allowed string length is (1-32), and the allowed content is ASCII characters from 33 to 126.

<**write_view_name**>: The name of the MIB view defining the MIB objects for which this request may potentially SET new values. The name of "None" is reserved. The allowed string length is (1-32), and the allowed content is ASCII characters from 33 to 126.

Example:

```
>security switch snmp access add grp1 usm AuthPriv read write
>security switch snmp access add default_ro_group usm AuthPriv read write
>
```

Messages: *The group name 'grp1' is not exist*

Note: use the '**security switch snmp group lookup'** command to view / verify the addition or change.

Command: **Delete SNMP Access**
Syntax: **security switch snmp access delete** <index>
Description: Delete an existing SNMPv3 access entry, where:
<**index**>: entry index (1-64)

Example:

```
>security switch snmp access delete 1
>security switch snmp access delete 2
>security switch snmp access delete 1
Non-existing entry
>
```

Command: **Lookup SNMP Access**
Syntax: **security switch snmp access lookup** [<index>]
Description: Lookup an existing SNMPv3 access entry or all entries, where:
<**index**>: entry index (1-64).

Example:

```
>security switch snmp access lookup 2
Non-existing entry
>security switch snmp access lookup 1
Entry Index      : 1
Group Name       : default_ro_group
Security Model   : any
Security Level   : NoAuth, NoPriv
Read View Name   : default_view
Write View Name  : None
>security switch snmp access lookup
Idx Group Name                       Model Level
--- -------------------------------- ----- --------------
1   default_ro_group                 any   NoAuth, NoPriv
2   default_rw_group                 any   NoAuth, NoPriv
3   default_ro_group                 usm   Auth, Priv

Number of entries: 3
>
```

Security > Network Commands

The LIB-4xxx supports these security network command sub-groups:

>**security network ?**

Command Groups:

Security Network Psec : Port Security Status
Security Network Limit : Port Security Limit Control
Security Network NAS : Network Access Server (IEEE 802.1X)
Security Network ACL : Access Control List
Security Network DHCP : Dynamic Host Configuration Protocol
Security Network IP : IP Source Guard
Security Network ARP : Address Resolution Protocol

The LIB-4xxx security network sub-group commands are explained below.

Security Network Psec Group

Command: **Show Current Port Security Status**
Syntax: **security network psec switch** [<port_list>]
Description: Show the current Port Security status, where:
<**port_list**>: Port list or 'All'. The default is 'All ports.

Example:

```
>security network psec switch
Users:
L = Limit Control
8 = 802.1X
D = DHCP Snooping

Port  Users  State          MAC Cnt
----  -----  -------------  -------
1     L--    Ready                0
2     L--    Ready                0
3     L--    Ready                0
4     L--    Ready                0

>
```

Command: **Show Port Security Addresses**
Syntax: **security network psec port** [<port_list>]
Description: Show the MAC Addresses learned by Port Security, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
Example:

```
>security network psec port 1,2

Port 1:
-------

MAC Address        VID   State       Added                     Age/Hold Time
-----------------  ----  ----------  ------------------------  -------------
<none>

Port 2:
-------

MAC Address        VID   State       Added                     Age/Hold Time
-----------------  ----  ----------  ------------------------  -------------
<none>
```

Security Network Limit Group

Command: **Show Current Limit Configuration**
Syntax: **security network limit configuration** [<port_list>]
Description: Show existing Limit Control configuration, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
Example:

```
>security network limit configuration 1,2

Port Security Limit Control Configuration:
==========================================

Mode      : Disabled
Aging     : Disabled
Age Period: 3600

Port  Mode      Limit  Action           State
----  --------  -----  ---------------  -------------
   1  Disabled      4  None             Disabled
   2  Disabled      4  None             Disabled
>
```

Command: **Set / Show Limit Mode**
Syntax: **security network limit mode** [enable|disable]
Description: Set or show global enabled port security state, where:
enable : Globally enable port security.
disable : Globally disable port security (default).
(The default is 'Show current global enabled state of port security limit control'.)

Example:
```
>security network limit mode
Mode      : Enabled
>security network limit mode disable
>security network limit mode
Mode      : Disabled
>
```

Command: **Set / Show MAC Address Aging**
Syntax: **security network limit aging** [enable|disable]
Description: Set or show the MAC address aging enabled state, where:
enable : Enable aging.
disable : Disable aging (default).
(The default is 'Show the current state of aging'.)

Example:
```
>security network limit aging
Aging     : Enabled
>security network limit aging disable
>security network limit aging
Aging     : Disabled
>
```

Command: **Set / Show MAC Address Agetime Limit**
Syntax: **security network limit agetime** [<age_time>]
Description: Set or show the time in seconds between checks for activity on learned MAC addresses.
The parameters are:
<**age_time**>: Time in seconds between checks for activity on a MAC address. The valid range is 10-10000000 seconds. The default is 'Show current age time'.

Example:
```
>security network limit agetime
Age Period: 360
>security network limit agetime 600
>security network limit agetime
Age Period: 600
>
```

Command: **Set / Show Limit Port State**
Syntax: **security network limit port** [<port_list>] [enable|disable]
Description: Set or show the per-port enabled state, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable port security on this port.
disable : Disable port security on this port.
(The default is 'Show current port enabled state of port security limit control'.)

Example:

```
>security network limit port

Port  Mode      Limit  Action           State
----  --------  -----  ---------------  -------------
   1  Disabled      4  None             Disabled
   2  Disabled      4  None             Disabled
   3  Disabled      4  None             Disabled
   4  Disabled      4  None             Disabled
>security network limit port 1-3 enable
>security network limit port

Port  Mode      Limit  Action           State
----  --------  -----  ---------------  -------------
   1  Enabled       4  None             Disabled
   2  Enabled       4  None             Disabled
   3  Enabled       4  None             Disabled
   4  Disabled      4  None             Disabled
>
```

Command: **Set / Show Learned Port Limit**
Syntax: **security network limit limit** [<port_list>] [<limit>]
Description: Set or show the maximum number of MAC addresses that can be learned on this set of ports. The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**limit**> : The maximum number of MAC addresses on this port
(The default is 'Show current limit'.)

Example:

```
>security network limit limit

Port  Mode      Limit  Action           State
----  --------  -----  ---------------  -------------
   1  Enabled       2  None             Disabled
   2  Enabled       2  None             Disabled
   3  Enabled       2  None             Disabled
   4  Disabled      4  None             Disabled
>security network limit limit 2,3 33
>security network limit limit

Port  Mode      Limit  Action           State
----  --------  -----  ---------------  -------------
   1  Enabled       2  None             Disabled
   2  Enabled      33  None             Disabled
   3  Enabled      33  None             Disabled
   4  Disabled      4  None             Disabled
>
```

Command: **Set / Show Exceeded Limit Action**
Syntax: **security network limit action** [<port_list>] [none|trap|shut|trap_shut]
Description: Set or show the action involved with exceeding the limit, where:
<**port_list**> : Port list or 'all', default: All ports
none|**trap**|**shut**|**trap_shut**: Action to take if the number of MAC addresses exceeds the limit.
none : Don't do anything when the limit is exceeded.
trap : Send an SNMP trap when the limit is exceeded.
shut : Shutdown the port when the limit is exceeded.
trap_shut: Send an SNMP trap and shutdown the port (the underscore is required).
(The default is 'Show current action'.)

Example:

```
>security network limit action

Port  Mode      Limit  Action           State
----  --------  -----  ---------------  -------------
   1  Enabled       2  None             Disabled
   2  Enabled      33  None             Disabled
   3  Enabled      33  None             Disabled
   4  Disabled      4  None             Disabled
>security network limit action 1,2,3 trap_shut
>security network limit action

Port  Mode      Limit  Action           State
----  --------  -----  ---------------  -------------
   1  Enabled       2  Trap & Shutdown  Disabled
   2  Enabled      33  Trap & Shutdown  Disabled
   3  Enabled      33  Trap & Shutdown  Disabled
   4  Disabled      4  None             Disabled
>
```

Command: **Reopen Port with Limit Exceeded**
Syntax: **security network limit reopen** [<port_list>]
Description: Reopen one or more ports whose limit is exceeded and shut down. The parameters are:
<**port_list**>: Port list or 'all'. The default is 'All' ports.

Example:

```
>security network limit reopen
>
```

Security Network NAS Group

These commands let you configure the IEEE 802.1X and MAC-based authentication system and port settings.

The IEEE 802.1X standard defines a port-based access control procedure that prevents unauthorized access to a network by requiring users to first submit credentials for authentication. One or more central servers, the 'backend' servers, determine whether the user is allowed access to the network. These backend (RADIUS) servers are configured with the AAA menu commands. The IEEE802.1X standard defines port-based operation, but non-standard variants overcome security limitations as explained below.

MAC-based authentication allows for authentication of more than one user on the same port, and doesn't require the user to have special 802.1X supplicant software installed on his system. A device uses the user's MAC address to authenticate against the backend server. Intruders can create counterfeit MAC addresses, which makes MAC-based authentication less secure than 802.1X authentication.

IEEE 802.1X Port-based Network Access Control provides a standard for authenticating and authorizing devices attached to a LAN port. Generally, IEEE 802.1X is port-based; however, the LIB-4xxx also supports MAC-based network access control.

The NAS configuration consists of system-level and port-level NAS configuration.

The available Security Network NAS group commands are listed below.

>**security network nas ?**
Available Commands:

Security Network NAS Configuration [<port_list>]
Security Network NAS Mode [enable|disable]
Security Network NAS State [<port_list>] [auto|authorized|unauthorized|single|multi|macbased]
Security Network NAS Reauthentication [enable|disable]
Security Network NAS ReauthPeriod [<reauth_period>]
Security Network NAS EapolTimeout [<eapol_timeout>]
Security Network NAS Agetime [<age_time>]
Security Network NAS Holdtime [<hold_time>]
Security Network NAS RADIUS_QoS [global|<port_list>] [enable|disable]
Security Network NAS RADIUS_VLAN [global|<port_list>] [enable|disable]
Security Network NAS Guest_VLAN [global|<port_list>] [enable|disable] [<vid>] [<reauth_max>] [<allow_if_eapol_seen>]
Security Network NAS Authenticate [<port_list>] [now]
Security Network NAS Statistics [<port_list>] [clear|eapol|radius]
>

The available Security Network NAS group commands are explained below.

Command: **Show Current NAS Configuration**
Syntax: **security network nas configuration** [<port_list>]
Description: Show 802.1X configuration, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
Example:

```
>security network nas config

802.1X Configuration:
=====================

Mode             : Disabled
Reauth.          : Disabled
Reauth. Period   : 3600
EAPOL Timeout    : 30
Age Period       : 300
Hold Time        : 10
RADIUS QoS       : Disabled
RADIUS VLAN      : Disabled
Guest VLAN       : Disabled
Guest VLAN ID    : 1
Max. Reauth Count: 2
Allow Guest VLAN if EAPOL Frame Seen: Disabled

Port  Admin State         Port State             Last Source        Last ID

----  ------------------  ---------------------  -----------------  ------------
1     Force Authorized    Link Down              -                  -
2     Port-based 802.1X   Link Down              -                  -
3     Single 802.1X       Link Down              -                  -
4     MAC-Based Auth      Link Down              -                  -
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set or Show Global NAS Mode**
Syntax: **security network nas mode** [enable|disable]
Description: Set or show the global NAS state, where:
enable : Globally enable 802.1X.
disable: Globally disable 802.1X (default).
(default: Show current 802.1X global state)
Example:

```
>security network nas mode
Mode             : Disabled
>security network nas mode enable
>security network nas mode
Mode             : Enabled
>
```

Command: **Set or Show NAS Security State**
Syntax: **security network nas state** [<port_list>] [auto|authorized|unauthorized|single|multi|macbased]
Description: Set or show the port security state, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
auto : Port-based 802.1X Authentication.
authorized : Port access is allowed.
unauthorized: Port access is not allowed.
single : Single Host 802.1X Authentication.
multi : Multiple Host 802.1X Authentication.
macbased : Switch authenticates on behalf of the client.
(The default is 'Show 802.1X state'.)

Example:

```
>security network nas state

Port  Admin State         Port State             Last Source        Last ID

----  ------------------  ---------------------  -----------------  ------------
1     Force Authorized    Link Down              -                  -
2     Force Authorized    Link Down              -                  -
3     Force Authorized    Link Down              -                  -
4     Force Authorized    Link Down              -                  -
>security network nas state 1,2,3 authorized
>security network nas state 4-6 single
Invalid parameter: 4-6
Syntax:
Security Network NAS State [<port_list>] [auto|authorized|unauthorized|single|multi
|macbased]
>security network nas state 4 single
Error: The 802.1X Admin State must be set to Authorized for ports that are enabled for
Spanning Tree
>security network nas state

Port  Admin State         Port State             Last Source        Last ID

----  ------------------  ---------------------  -----------------  ------------
1     Force Authorized    Link Down              -                  -
2     Port-based 802.1X   Link Down              -                  -
3     Single 802.1X       Link Down              -                  -
4     MAC-Based Auth      Link Down              -                  -
>
```

Messages:
Error: The 802.1X Admin State must be set to Authorized for ports that are enabled for Spanning Tree
Port LLAG1: The 802.1X Admin State must be set to Authorized for ports that are enabled for Spanning Tree

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set or Show NAS Reauthentication State**
Syntax: **security network nas reauthentication** [enable|disable]
Description: Set or show Reauthentication state, where:
enable : Enable reauthentication.
disable: Disable reauthentication (default).
(The default is 'Show current reauthentication mode'.)

Example:
```
>security network nas reauthentication
Reauth.          : Disabled
>security network nas reauthentication enable
>security network nas reauthentication
Reauth.          : Enabled
>
```

Command: **Set or Show NAS Reauthentication Period**
Syntax: **security network nas reauthperiod** [<reauth_period>]
Description: Set or show the period between reauthentications. The parameters are:
<**reauth_period**>: The Period between reauthentications (1-3600 seconds).
(The default is 'Show current reauthentication period'.)

Example:
```
>security network nas reauthperiod
Reauth. Period   : 3600
>security network nas reauthperiod 600
>security network nas reauthperiod
Reauth. Period   : 600
>
```

Command: **Set or Show NAS EAPOL Timeout**
Syntax: **security network nas eapoltimeout** [<eapol_timeout>]
Description: Set or show the time between EAPOL retransmissions. Extensible Authentication Protocol (EAP) over IEEE 802 is known as "EAP over LAN" or EAPOL. The parameters are:
<**eapol_timeout**>: This is the time between EAPOL retransmissions (1-65535 seconds).
(The default is 'Show current EAPOL retransmission timeout'.)

Example:
```
>security network nas eapoltimeout
EAPOL Timeout    : 30
>security network nas eapoltimeout 45
>security network nas eapoltimeout
EAPOL Timeout    : 45
>
```

Command: **Set or Show NAS Agetime**
Syntax: **security network nas agetime** [<age_time>]
Description: Set or show the Time in seconds between check for activity on successfully authenticated MAC addresses. The parameters are:
<**age_time**>: Time between checks (10-1000000 seconds).
(The default is 'Show current age time'.)

Example:
```
>security network nas agetime
Age Period       : 300
>security network nas agetime 600
>security network nas agetime
Age Period       : 600
>
```

Command: **Set or Show NAS Holdtime**
Syntax: **security network nas holdtime** [<hold_time>]
Description: Set or show the Time in seconds before a MAC-address that failed authentication gets a new authentication chance. The parameters are:
<**hold_time**>: Time on hold (10-1,000,000 seconds).
(The default is 'Show current hold time'.)

Example:
```
>security network nas holdtime
Hold Time        : 10
>security network nas holdtime 60
>security network nas holdtime
Hold Time        : 60
>
```

Command: **Set or Show NAS RADIUS_QoS**
Syntax: **security network nas radius_qos** [global|<port_list>] [enable|disable]
Description: Set or show either global state (use the global keyword) or per-port state of RADIUS-assigned QoS. The parameters are:
global : Select the global RADIUS-assigned QoS setting.
<**port_list**>: Select the per-port RADIUS-assigned QoS setting.
(The default is 'Show current per-port RADIUS-assigned QoS state'.)
enable : Enable RADIUS-assigned QoS either globally or on one or more ports.
disable: Disable RADIUS-assigned QoS either globally or on one or more ports.
(The default is 'Show current RADIUS-assigned QoS state'.)

Example 1:
```
>security network nas radius_qos

      RADIUS
Port  QoS      Current
----  -------  -------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>security network nas radius_qos 2,3,4 enable
>security network nas radius_qos

      RADIUS
Port  QoS      Current
----  -------  -------
1     Disabled
2     Enabled
3     Enabled
4     Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set or Show NAS RADIUS_VLAN**
Syntax: **security network nas radius _vlan** [global|<port_list>] [enable|disable]
Description: Set or show either global state (use the global keyword) or per-port state of RADIUS-assigned VLAN. The parameters are:
global : Select the global RADIUS-assigned VLAN setting.
<**port_list**>: Select the per-port RADIUS-assigned VLAN setting.
(The default is 'Show current per-port RADIUS-assigned VLAN state'.)
enable : Enable RADIUS-assigned VLAN either globally or on one or more ports
disable: Disable RADIUS-assigned VLAN either globally or on one or more ports
(The default is 'Show current RADIUS-assigned VLAN state'.)

Example:

```
>security network nas radius_vlan

      RADIUS
Port  VLAN     Current
----  -------  -------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>security network nas radius_vlan 1,2 enable
>security network nas radius_vlan

      RADIUS
Port  VLAN     Current
----  -------  -------
1     Enabled
2     Enabled
3     Disabled
4     Disabled
>
```

Command: **Set or Show NAS Guest_VLAN**

Syntax: **security network nas guest_vlan** [global|<port_list>] [enable|disable] [<vid>] [<reauth_max>] [<allow_if_eapol_seen>]

Description: Set or show either global state and parameters (use the global keyword) or per-port state of Guest VLAN. Unless the 'global' keyword is used, the <*reauth_max*> and <*allow_if_eapol_seen*> parameters will not be unused. The parameters are:

global : Select the global Guest VLAN setting.

<**port_list**>: Select the per-port Guest VLAN setting.

(default: Show current per-port Guest VLAN state)

enable|disable : enable : Enable Guest VLAN either globally or on one or more ports.

disable: Disable Guest VLAN either globally or on one or more ports.

(The default is 'Show current Guest VLAN state'.)

<**vid**> : Guest VLAN ID used when entering the Guest VLAN. Use the 'global' keyword to change it.

(The default is 'Show current Guest VLAN ID'.)

<**reauth_max**> : The value can only be set if you use the 'global' keyword in the beginning of the command. This is the number of times a Request Identity EAPOL frame is sent without response before considering entering the Guest VLAN.

(The default is 'Show current Maximum Reauth Count value'.)

<**allow_if_eapol_seen**>: The value can only be set if you use the 'global' keyword in the beginning of the command.

disable:The Guest VLAN can only be entered if no EAPOL frames have been received on a port for the lifetime of the port.

enable :The Guest VLAN can be entered even if an EAPOL frame has been received during the lifetime of the port.

(The default is 'Show current setting'.)

Example 1:

```
>security network nas guest_vlan

      Guest
Port  VLAN     Current
----  -------  -------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>security network nas guest_vlan 1-4 enable
>security network nas guest_vlan

      Guest
Port  VLAN     Current
----  -------  -------
1     Enabled
2     Enabled
3     Enabled
4     Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Restart NAS Authentication Process**
Syntax: **security network nas authenticate** [<port_list>] [now]
Description: Refresh (restart) the 802.1X authentication process. The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
now : Force reauthentication immediately.
(The default is 'Schedule a reauthentication'.)
Example:

```
>security network nas authenticate 1 now
>security network nas authenticate 2 now
>security network nas authenticate 3-4
>
```

Command: **Show / Clear NAS Statistics**
Syntax: **security network nas statistics** [<port_list>] [clear|eapol|radius]
Description: Show or clear 802.1X statistics, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
clear : Clear statistics.
eapol : Show EAPOL statistics.
radius : Show Backend Server statistics.
Example:

```
>security network nas statistics 1

Port 1 EAPOL Statistics:

Rx Total:                           0   Tx Total:                           0
Rx Response/Id:                     0   Tx Request/Id:                      0
Rx Response:                        0   Tx Request:                         0
Rx Start:                           0
Rx Logoff:                          0
Rx Logoff:                          0
Rx Invalid Length:                  0

Port 1 Backend Server Statistics:

Rx Access Challenges:               0   Tx Responses:                       0
Rx Other Requests:                  0
Rx Auth. Successes:                 0
Rx Auth. Failures:                  0
>security network nas statistics 1 eapol

      Rx      Tx      Rx      Tx      Rx      Tx      Rx      Rx      Rx
Port  Total   Total   RespId  ReqId   Resp    Req     Start   Logoff  Error
----  ------  ------  ------  ------  ------  ------  ------  ------  -----
1     0       0       0       0       0       0       0       0       0
>security network nas statistics 1 radius

      Rx Access   Rx Other    Rx Auth.    Rx Auth.    Tx          MAC
Port  Challenges  Requests    Successes   Failures    Responses   Address

----  ----------  ----------  ----------  ----------  ----------  --------------
1     0           0           0           0           0           -
>security network nas statistics 1 clear
>
```

Security Network ACL Group

These commands let you configure the ACL parameters (ACE) of each LIB-4xxx port. The parameters will affect frames received on a port unless the frame matches a specific ACE. Each ACE (Access Control Entry) describes the access permission associated with a particular ACE ID.

Using ACLs (Access Controls Lists), the LIB-4xxx can 'peek' into the frames at line rate and is capable of deep packet inspection; this ability gives a whole range of access controls. The rules or the access control lists can look at any field in the Layer 2 to Layer 4 headers to make the decision to allow / discard / mirror / log or even shutdown the port that the frame came through.

The ACL rule created can be associated with any port as well when created as a policy. Apart from the ACL, there is a device level option to do storm prevention for the unicast, multicast and broadcast frames.

The reserved ACEs used for internal protocol cannot be edited or deleted, the order sequence cannot be changed, and the priority is highest. Each ACE describes access permissions associated with a particular ACE ID. There are three ACE frame types (Ethernet Type, ARP, and IPv4) and two ACE actions (permit and deny). The ACE also contains many detailed, varied parameter options that are available for individual application. An ACE consists of several parameters. These parameters vary according to the frame type that you select. First select the ingress port for the ACE, and then select the frame type. Different parameter options are displayed depending on the frame type selected. A frame that hits this ACE matches the configuration that is defined here.

The available Security Network ACL (Access Control List) group commands are listed below.

>**security network acl ?**
Available Commands:

Security Network ACL Configuration [<port_list>]
Security Network ACL Action [<port_list>] [permit|deny] [<rate_limiter>]
    [<evc_policer>] [<port_redirect>] [<mirror>] [<logging>] [<shutdown>]
Security Network ACL Policy [<port_list>] [<policy>]
Security Network ACL Rate [<rate_limiter_list>] [<rate_unit>] [<rate>]
Security Network ACL Add [<ace_id>] [<ace_id_next>]
    [(port <port_list>)] [(policy <policy> <policy_bitmask>)]
    [<tagged>] [<vid>] [<tag_prio>] [<dmac_type>]
    [(etype [<etype>] [<smac>] [<dmac>]) |
     (arp [<sip>] [<dip>] [<smac>] [<arp_opcode>] [<arp_flags>]) |
     (ip   [<sip>] [<dip>] [<protocol>] [<ip_flags>]) |
     (icmp [<sip>] [<dip>] [<icmp_type>] [<icmp_code>] [<ip_flags>]) |
     (udp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>]) |
     (tcp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>] [<tcp_flags>])]
    [permit|deny] [<rate_limiter>] [<evc_policer>] [<port_redirect>] [<mirror>]
    [<logging>] [<shutdown>]
Security Network ACL Delete <ace_id>
Security Network ACL Lookup [<ace_id>]
Security Network ACL Clear
Security Network ACL Status [combined|static|link_oam|loop_protect|dhcp|ptp|
    arp_inspection|mep|ipmc|ip_source_guard|conflicts]
Security Network ACL Port State [<port_list>] [enable|disable]
>

The available Security Network ACL Group commands are explained below.

Command: **Display Current ACL Configuration**
Syntax: **security network acl configuration** [<port_list>]
Description: Show the current ACL Configuration, where:
<**port_list**>: Port list or 'all'. the default is 'All' ports.
Example:

```
>security network acl config

ACL Configuration:
==================


Port  Policy  Action  Rate L.  Port C.  Logging   Shutdown  Counter
----  ------  ------  -------  -------  --------  --------  -------
1     1       Deny    1        1        Enabled   Disabled  0
2     2       Deny    2        2        Enabled   Enabled   0
3     3       Permit  1        Disabled Enabled   Enabled   0
4     4       Deny    2        4        Disabled  Enabled   0

Rate Limiter  Rate (PPS)
------------  ----------
1             1
2             1
3             1
4             1
5             1
6             1
7             1
8             1
9             1
10            1
11            1
12            1
13            1
14            1
15            1
16            1

Number of ACEs: 0
>
```

Note: The 'show' version of the command uses these abbreviations:

Rate L. = Rate Limiter
EVC P. = EVC Policer
Port C. = Port Copy (redirect)

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show ACL Port Default Action**
Syntax: **security network acl action** [<port_list>] [permit|deny] [<rate_limiter>] [<port_redirect>] [<logging>] [<shutdown>]
Description: Set or show the ACL port default action. Note that an ACL policer and an EVC policer can not both be enabled at the same time. The parameters are:
<**port_list**> : Port list or 'All'. The default is 'All' ports.
permit : Permit forwarding (default)
deny : Deny forwarding
<**rate_limiter**> : Rate limiter number (1-15) or 'disable'
<**port_redirect**>: Port number for redirect of frames or 'disable'. Notice: If the value is a specific port number, it can't be set when action is permitted
<**logging**> : System logging of frames: log|log_disable
<**shutdown**> : Shut down ingress port: shut|shut_disable

Example:

```
>security network acl action

Port  Action  Rate L.  Port C.  Logging   Shutdown  Counter
----  ------  -------  -------  --------  --------  -------
1     Permit  Disabled Disabled Disabled  Disabled  0
2     Permit  Disabled Disabled Disabled  Disabled  0
3     Permit  Disabled Disabled Disabled  Disabled  0
4     Permit  Disabled Disabled Disabled  Disabled  0
>security network acl action 1,2,3 deny 5 5 log shut
>security network acl action

Port  Action  Rate L.  Port C.  Logging   Shutdown  Counter
----  ------  -------  -------  --------  --------  -------
1     Deny    5        5        Enabled   Enabled   0
2     Deny    5        5        Enabled   Enabled   0
3     Deny    5        5        Enabled   Enabled   0
4     Permit  Disabled Disabled Disabled  Disabled  0
>
```

Messages:

```
>security network acl action 1,2,3 deny 5 7 5 enable log shut
>E api/cil 03:44:05 31/l26_action_check#5964: Error: ACL policer and EVC policer
 can not both be enabled
>security network acl action 1,2,3 deny 5 disable 6,7 enable log shut
>E api/cil 03:46:32 31/l26_acl_policer_free#5997: Error: policer 0 already free
>E api/cil 00:00:01 28/l26_action_check#5522: Error: ACL policer and EVC policer
can not both be enabled
```

Note: The 'show' version of the command uses these abbreviations:

Rate L. = Rate Limiter
Port C. = Port Copy (redirect)

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show ACL Port Policy**
Syntax: **security network acl policy** [<port_list>] [<policy>]
Description: Set or show the current ACL port policy, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**policy**> : Policy number (0-255).

Example:

```
>security network acl policy

Port  Policy
----  ------
1     1
2     2
3     3
4     4
>security network acl policy 1 2
>security network acl policy 4 26
>security network acl policy

Port  Policy
----  ------
1     2
2     2
3     3
4     26
>
```

Messages:

E api/cil 03:02:07 28/l26_acl_policer_free#5517: Error: policer 0 already free

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show ACL Rate**
Syntax: **security network acl rate** [<rate_limiter_list>] [<rate_unit>] [<rate>]
Description: Set or show the ACL rate limiter, where:
<**rate_limiter_list**>: Rate limiter list (1-16). The default is All rate limiters.
<**rate**> : Rate in pps (0-131071 packets per second).

Example:

```
>security network acl rate

Rate Limiter  Rate (PPS)
------------  ----------
1             1
2             1
3             1
4             1
5             1
6             1
7             1
8             1
9             1
10            1
11            1
12            1
13            1
14            1
15            1
16            1
>security network acl rate 1 4000
>security network acl rate 2 99999
>security network acl rate

Rate Limiter  Rate (PPS)
------------  ----------
1             4000
2             99999
3             1
4             1
5             1
6             1
7             1
8             1
9             1
10            1
11            1
12            1
13            1
14            1
15            1
16            1
>
```

Command: **Add / Modify ACE**

Syntax: **security network acl add** [<ace_id>] [<ace_id_next>]
[(port <port>)] [(policy <policy> <policy_bitmask>)]
[<vid>] [<tag_prio>] [<dmac_type>]
[(etype [<etype>] [<smac>] [<dmac>]) |
(arp [<sip>] [<dip>] [<smac>] [<arp_opcode>] [<arp_flags>]) |
(ip [<sip>] [<dip>] [<protocol>] [<ip_flags>]) |
(icmp [<sip>] [<dip>] [<icmp_type>] [<icmp_code>] [<ip_flags>]) |
(udp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>]) |
(tcp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>] [<tcp_flags>])]
[permit|deny] [<rate_limiter>] [<port_redirect>] [<logging>] [<shutdown>]

Description: Add a new or modify an existing Access Control Entry (ACE).

If the ACE ID parameter <ace_id> is specified and an entry with this ACE ID already exists, the ACE will be modified. Otherwise, a new ACE will be added.
If the ACE ID is not specified, the next available ACE ID will be used.
If the next ACE ID parameter <ace_id_next> is specified, the ACE is placed before this ACE in the list.
If the next ACE ID is not specified, the ACE will be placed last in the list.
If the Switch keyword is used, the rule applies to all ports.
If the Port keyword is used, the rule applies to the specified port only.
If the Policy keyword is used, the rule applies to all ports configured with the specified policy.
The default is that the rule applies to all ports.
The parameters are:

<**ace_id**> : ACE ID (1-256), default: Next available ID
<**ace_id_next**> : Next ACE ID (1-256), default: Add ACE last
port : Port ACE keyword
<**port_list**> : Port list or 'all', default: All ports
policy : Policy ACE keyword
<**policy**> : Policy number (0-255)
<**policy_bitmask**>: Policy number bitmask (0x0-0xFF)
<**tagged**> : Tagged of frames: any|enable|disable
<**vid**> : VLAN ID (1-4094) or 'any'
<**tag_prio**> : VLAN tag priority (0-7) or 'any'
<**dmac_type**> : DMAC type: any|unicast|multicast|broadcast
etype : Ethernet Type keyword
<**etype**> : Ethernet Type: 0x600 - 0xFFFF or 'any' but excluding 0x800(IPv4) 0x806(ARP) and 0x86DD(IPv6)
<**smac**> : Source MAC address ('xx-xx-xx-xx-xx-xx' or 'xx.xx.xx.xx.xx.xx' or 'xxxxxxxxxxxx', x is a hexadecimal digit) or 'any'
<**dmac**> : Destination MAC address ('xx-xx-xx-xx-xx-xx' or 'xx.xx.xx.xx.xx.xx' or 'xxxxxxxxxxxx', x is a hexadecimal digit) or 'any'
arp : ARP keyword
<**sip**> : Source IP address (a.b.c.d/n) or 'any'
<**dip**> : Destination IP address (a.b.c.d/n) or 'any'
<**arp_opcode**> : ARP operation code: any|arp|rarp|other
<**arp_flags**> : ARP flags: request|smac|tmac|len|ip|ether [0|1|any]
ip : IP keyword
<**protocol**> : IP protocol number (0-255) or 'any'
<**ip_flags**> : IP flags: ttl|options|fragment [0|1|any]
icmp : ICMP keyword
<**icmp_type**> : ICMP type number (0-255) or 'any'
<**icmp_code**> : ICMP code number (0-255) or 'any'
udp : UDP keyword

<**sport**> : Source UDP/TCP port range (0-65535) or 'any'
<**dport**> : Destination UDP/TCP port range (0-65535) or 'any'
tcp : TCP keyword
<**tcp_flags**> : TCP flags: fin|syn|rst|psh|ack|urg [0|1|any]
permit : Permit forwarding (default)
deny : Deny forwarding
<**rate_limiter**> : Rate limiter number (1-15) or 'disable'
<**port_redirect**> : Port list for copy of frames or 'disable'
<**logging**> : System logging of frames: log|log_disable
<**shutdown**> : Shut down ingress port: shut|shut_disable

Example:
```
>security network acl add 1 2 3 4 5 6 7 8 9
>
>security network acl add 1 2 3 4 5 6 7 log shut
>security network acl add
ACE ID 1 added last
>security network acl add
ACE ID 2 added last
>
```

Messages:
ACL Add failed
Invalid parameter: 8

Command: **Lookup ACL ACE(s)**
Syntax: **security network acl lookup** [<ace_id>]
Description: Show all or specified existing ACE(s). Default: All ACEs. The parameters are:
<**ace_id**>: ACE ID (1-256).

Example:
```
>security network acl add
ACE ID 1 added last
>security network acl add
ACE ID 2 added last
>security network acl lookup
ID   Type     Port    Policy   Frame  Action Rate L.  Port C.  Counter
--   -------  ------- -------- -----  ------ -------- -------- -------
1    User     All     Any      Any    Permit Disabled Disabled       1
2    User     All     Any      Any    Permit Disabled Disabled       0

Number of ACEs: 2
>
```

Command: **Clear ACL Counters**
Syntax: **security network acl clear**
Description: Clear all ACL counters.
Example:
```
>security network acl clear
>
```

Command: **Delete Existing ACL Entry**
Syntax: **security network acl delete** <ace_id>
Description: Deletes (removes) an existing ACL entry from the table, where:
<**ace_id**>: ACE ID (1-256)

Example:

```
>security network acl delete 1
ACL Delete failed
>security network acl delete 0
Invalid <ace_id> parameter: 0
security network acl delete 1
>security network acl lookup
ID   Type     Port    Policy   Frame  Action Rate L.  Port C.  Counter
--   ------- -------- -------- -----  ------ -------- -------- -------
2    User     All     Any      Any    Permit Disabled Disabled       0

Number of ACEs: 1
>
```

Command: **Set / Show ACL Port State**
Syntax: **security network acl port state** [<port_list>] [enable|disable]
Description: Set or show the ACL port state, where:
<**port_list**> : Port list or 'All'. The default is 'All' ports.
enable|**disable**: ACL port state enable or disable. The default is 'Enabled'.

Example:

```
>security network acl port state

Port  State
----  -----
1     Enabled
2     Enabled
3     Enabled
4     Enabled
>security network acl port state 2 disable
>security network acl port state

Port  State
----  -----
1     Enabled
2     Disabled
3     Enabled
4     Enabled
>
```

Command: **Show Current ACL Status**
Syntax: **security network acl status**
[combined|static|link_oam|dhcp|ptp|arp_inspection|mep|ipmc|ip_source_guard|conflicts]
Description: Show current ACL status, where:
combined : Show combined status.
static : Show static user configured status.
link_oam : Show Link OAM status.
dhcp : Show DHCP status.
ptp : Show PTP status.
arp_inspection : Show ARP Inspection status.
mep : Show MEP status.
ipmc : Show IPMC status.
ip_source_guard : Show IP Source Guard status.
conflicts : Show conflict status.
(The default is 'Show combined status'.)

Example:

```
>sec net acl status

User
----
S   : Static
IPSG: IP Source Guard
IPMC: IPMC
MEP : MEP
ARPI: ARP Inspection
PTP : PTP
DHCP: DHCP
LOOP: Loop Protect
?   : (null)
LOAM: Link OAM

User ID   Port    Frame  Action Rate L.  Port C.  CPU    Counter Confl.
---- --   ------- -----  ------ -------- -------- ------ ------- ------
LOOP 1    All     EType  Deny   Disabled Disabled Yes          0 No
PTP  1    All     EType  Deny   Disabled Disabled Yes          0 No
ARPI 1    All     ARP    Deny   Disabled Disabled Yes          0 No
MEP  3    1       EType  Deny   Disabled Disabled No (O)       0 No
MEP  2    1       EType  Deny   Disabled Disabled No (O)       0 No
MEP  1    All     EType  Permit Disabled Disabled Yes          0 No
IPSG 1    1       IP     Deny   Disabled Disabled No           0 No
IPSG 2    2       IP     Deny   Disabled Disabled No           0 No
IPSG 4    4       IP     Deny   Disabled Disabled No           0 No
S    2    All     Any    Permit Disabled Disabled No           6 No

Number of ACEs: 10
>
```

Security Network DHCP Group

DHCP (Dynamic Host Configuration Protocol) is a used for assigning dynamic IP addresses to devices on a network. DHCP is used by networked computers (clients) to obtain IP addresses and other parameters such as the default gateway, subnet mask, and IP addresses of DNS servers from a DHCP server.

The DHCP server ensures that all IP addresses are unique, for example, no IP address is assigned to a second client while the first client's assignment is valid (its lease has not expired). Therefore, IP address pool management is done by the server and not by a human network administrator.

Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. This means that a new computer can be added to a network without the hassle of manually assigning it a unique IP address.

DHCP Snooping is used to block intruder on the untrusted ports of the switch device when it tries to intervene by injecting a 'bogus' DHCP reply packet to a legitimate conversation between the DHCP client and server.

DHCP Relay is used to forward and to transfer DHCP messages between the clients and the server when they are not on the same subnet domain. The DHCP option 82 enables a DHCP relay agent to insert specific information into a DHCP request packets when forwarding client DHCP packets to a DHCP server and remove the specific information from a DHCP reply packets when forwarding server DHCP packets to a DHCP client. The DHCP server can use this information to implement IP address or other assignment policies. Specifically the option works by setting two sub-options: Circuit ID (option 1) and Remote ID (option2). The Circuit ID sub-option is supposed to include information specific to which circuit the request came in on. The Remote ID sub-option was designed to carry information relating to the remote host end of the circuit. The definition of Circuit ID in the switch is 4 bytes long and the format is "vlan_id" "module_id" "port_no". The parameter of "vlan_id" is the first two bytes represent the VLAN ID. The "module_id" parameter is the third byte for the module ID (in standalone switch it always equal 0). The "port_no" parameter is the fourth byte and it means the port number.
The Remote ID is 6 bytes long, and the value is equal to the DHCP relay agents MAC address.

This group includes the following DHCP Relay and DHCP Snooping commands.

>**security network dhcp ?**
Available Commands:

Security Network DHCP Relay Configuration
Security Network DHCP Relay Mode [enable|disable]
Security Network DHCP Relay Server [<ip_addr>]
Security Network DHCP Relay Information Mode [enable|disable]
Security Network DHCP Relay Information Policy [replace|keep|drop]
Security Network DHCP Relay Statistics [clear]
Security Network DHCP Snooping Configuration
Security Network DHCP Snooping Mode [enable|disable]
Security Network DHCP Snooping Port Mode [<port_list>] [trusted|untrusted]
Security Network DHCP Snooping Statistics [<port_list>] [clear]
>

Each of these commands is explained below.

Command: **Show Current DHCP Relay Configuration**
Syntax: **security network dhcp relay config**
Description: Show the current DHCP relay configuration.
DHCP Relay is used to forward and to transfer DHCP messages between the clients and the server when they are not on the same subnet domain.
The DHCP option 82 enables a DHCP relay agent to insert specific information into a DHCP request packets when forwarding client DHCP packets to a DHCP server and remove the specific information from a DHCP reply packets when forwarding server DHCP packets to a DHCP client. The DHCP server can use this information to implement IP address or other assignment policies. Specifically the option works by setting two sub-options: Circuit ID (option 1) and Remote ID (option2). The Circuit ID sub-option is supposed to include information specific to which circuit the request came in on. The Remote ID sub-option was designed to carry information relating to the remote host end of the circuit.
The definition of Circuit ID in the switch is 4 bytes in length and the format is "vlan_id" "module_id" "port_no". The parameter of "vlan_id" is the first two bytes represent the VLAN ID. The parameter of "module_id" is the third byte for the module ID (in a standalone device it is always 0). The parameter of "port_no" is the fourth byte and it means the port number.
The Remote ID is 6 bytes in length, and the value equals the DHCP relay agents MAC address.

Example:
```
>security network dhcp relay config

DHCP Relay Configuration:
=========================

DHCP Relay Mode               : Disabled
DHCP Relay Server             : NULL
DHCP Relay Information Mode   : Enabled
DHCP Relay Information Policy : Replace
>
```

Command: **Set / Show DHCP Relay Mode**
Syntax: **security network dhcp relay mode** [enable|disable]
Description: Set or show the DHCP relay mode. Per IETF RFC 3046: “DHCP servers unaware of the Relay Agent Information option will ignore the option upon receive and will not echo it back on responses. This is the specified server behavior for unknown options. DHCP servers claiming to support the Relay Agent Information option echo the entire contents of the Relay Agent Information option in all replies.” The parameters are:
enable : Enable DHCP relay mode. When DHCP relay mode operation is enabled, the agent forwards and transfers DHCP messages between the clients and the server when they are not in the same subnet domain. This ensures that the DHCP broadcast message won't be flooded for security considerations. At least one DHCP server must be enabled, configured and running.
disable: Disable DHCP relay mode.
(The default is ‘Show flow DHCP relay mode’.)

Example:
```
>security network dhcp relay mode
DHCP Relay Mode               : Disabled
>security network dhcp relay mode enable
We need at least one server
>
```

Command: **Set / Show DHCP Relay Server**
Syntax: **security network dhcp relay server** [<ip_addr>]
Description: Show or set DHCP relay server, where:
<**ip_addr**>: IP address (a.b.c.d) of the DHCP relay server. The default is 'Show IP address' of the currently configured and enabled DHCP relay server (if any).
Displays 'NULL' if no DHCP relay server is currently configured.
A DHCP relay agent is used to forward and to transfer DHCP messages between the clients and the server when they are not in the same subnet domain.

Example:
```
>security network dhcp relay server
DHCP Relay Server              : NULL
>security network dhcp relay server 192.168.1.30
>security network dhcp relay server
DHCP Relay Server              : 192.168.1.30
>
```

Command: **Set / Show DHCP Relay Agent Information Option Mode**
Syntax: **security network dhcp relay information mode** [enable|disable]
Description: Set or show DHCP relay agent information option mode.
When you enable DHCP relay information mode operation, the agent inserts specific information (option 82) into a DHCP message when forwarding to DHCP server and remote it from a DHCP message when transferring to DHCP client. It only works under DHCP relay operation mode enabled.
The option 82 circuit ID format is "[vlan_id][module_id][port_no]". The first four characters represent the VLAN ID, the fifth and sixth characters are the module ID (in a standalone device it always 0, in stackable device it means switch ID), and the last two characters are the port number. For example, "00030108" means the DHCP message receive form VLAN ID 3, switch ID 1, port No 8. The option 82 remote ID value is equal the switch MAC address.
The parameters are:
enable : Enable DHCP relay agent information option mode. When DHCP relay information mode operation is enabled, the agent inserts specific information (option 82) into a DHCP message when forwarding to DHCP server and removes it from a DHCP message when transferring to DHCP client. It only works when DHCP relay operation mode is enabled.
disable: Disable DHCP relay agent information option mode.
(The default is: 'Show DHCP relay agent information option mode'.)

Example:
```
>security network dhcp relay information mode
DHCP Relay Information Mode    : Disabled
>security network dhcp relay information mode enable
>security network dhcp relay information mode
DHCP Relay Information Mode    : Enabled
>
```

Note: The LIB-4424 uses the MAC Address in DHCP option 61 client-identifier. IETF RFC 2132 defines DHCP Options and BOOTP Vendor Extensions at http://www.ietf.org/rfc/rfc2132.txt. Per RFC section 9.14. Client-identifier: "This option is used by DHCP clients to specify their unique identifier. DHCP servers use this value to index their database of address bindings. This value is expected to be unique for all clients in an administrative domain. Vendors and system administrators are responsible for choosing client-identifiers that meet this requirement for uniqueness. The code for this option is 61, and its minimum length is 2."

Command: **Set / Show DHCP Relay Information Policy**
Syntax: **security network dhcp relay information policy** [replace|keep|drop]
Description: Set or show the DHCP relay mode. When you enable DHCP relay information mode operation, if the agent receives a DHCP message that already contains relay agent information, it will enforce the policy. The parameters are:
replace : Replace the original relay information when receive a DHCP message that already contains it.
keep : Keep the original relay information when receive a DHCP message that already contains it.
drop : Drop the package when receive a DHCP message that already contains relay information.
(default: Show DHCP relay information policy)

Example:
```
>security network dhcp relay information policy
DHCP Relay Information Policy : replace
>security network dhcp relay information policy keep
>security network dhcp relay information policy
DHCP Relay Information Policy : keep
>
```

Command: **Show / Clear DHCP Relay Statistics**
Syntax: **security network dhcp relay statistics** [clear]
Description: Show or clear DHCP relay statistics, where:
clear: Clears (resets to zero) all of the DHCP relay statistics.

Example:
```
>security network dhcp relay statistics

Server Statistics:
------------------
Transmit to Server         :         0   Transmit Error               :   0
Receive from Server        :         0   Receive Missing Agent Option :   0
Receive Missing Circuit ID :         0   Receive Missing Remote ID    :   0
Receive Bad Circuit ID     :         0   Receive Bad Remote ID        :   0

Client Statistics:
--------------------
Transmit to Client   :          0   Transmit Error       :          0
Receive from Client  :          0   Receive Agent Option :          0
Replace Agent Option :          0   Keep Agent Option    :          0
Drop Agent Option    :          0
>
```

Command: **Show Current DHCP Snooping Configuration**
Syntax: **security network dhcp snooping config**
Description: Show the current DHCP snooping configuration.
Example:

```
>security network dhcp snooping config

DHCP Snooping Configuration:
============================

DHCP Snooping Mode : Disabled

Port  Port Mode
----  -----------
1     trusted
2     trusted
3     trusted
4     trusted
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show DHCP Snooping Mode**
Syntax: **security network dhcp snooping mode** [enable|disable]
Description: Set or show the current DHCP snooping mode, where:
enable : Enable DHCP snooping mode. When you enable DHCP snooping mode operation, the request DHCP messages will be forwarded to trusted ports and only allowed reply packets from trusted ports.
disable: Disable DHCP snooping mode
(The default is 'Show flow DHCP snooping mode'.)
Example:

```
>security network dhcp snooping mode
DHCP Snooping Mode : Disabled
>security network dhcp snooping mode enable
>security network dhcp snooping mode
DHCP Snooping Mode : Enabled
>
```

Command: **Set / Show DHCP Snooping Port Mode**
Syntax: **security network dhcp snooping port mode** [<port_list>] [trusted|untrusted]
Description: Set or show the current DHCP snooping port mode, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
trusted : Configures the port as trusted sources of the DHCP message (default).
untrusted: Configures the port as untrusted sources of the DHCP message.
(The default is 'Show flow DHCP snooping port mode'.)

Example:

```
>security network dhcp snooping port mode

Port  Port Mode
----  -----------
1     trusted
2     trusted
3     trusted
4     trusted
>security network dhcp snooping port mode 3-4 untrusted
>security network dhcp snooping port mode

Port  Port Mode
----  -----------
1     trusted
2     trusted
3     untrusted
4     untrusted
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Show / Clear DHCP Snooping Statistics**
Syntax: **security network dhcp snooping statistics** [<port_list>] [clear]
Description: Show or clear DHCP snooping statistics, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports. Note that the 'All' form can be a long display.
clear : Clear DHCP snooping statistics.

Example:

```
>security network dhcp snooping statistics 1
Port 1 Statistics:
--------------------
Rx Discover:                          0   Tx Discover:                          0
Rx Offer:                             0   Tx Offer:                             0
Rx Request:                           0   Tx Request:                           0
Rx Decline:                           0   Tx Decline:                           0
Rx ACK:                               0   Tx ACK:                               0
Rx NAK:                               0   Tx NAK:                               0
Rx Release:                           0   Tx Release:                           0
Rx Inform:                            0   Tx Inform:                            0
Rx Lease Query:                       0   Tx Lease Query:                       0
Rx Lease Unassigned:                  0   Tx Lease Unassigned:                  0
Rx Lease Unknown:                     0   Tx Lease Unknown:                     0
Rx Lease Active:                      0   Tx Lease Active:                      0
>
```

Security Network IP Source Guard Group

IP Source Guard is a security feature used to restrict IP traffic on DHCP snooping untrusted ports by filtering traffic based on the DHCP Snooping Table or manually configured IP Source Bindings. It helps prevent IP spoofing attacks when a host tries to spoof and use the IP address of another host.

When enabled, IP source guarding will check the IP SA and MAC SA of packets received from untrusted ports against the DHCP snooping database. If IP source guard determines that the packet header contains an invalid source IP address or source MAC address, it keeps the switch from forwarding the packet (the packet is discarded). When you configure IP source guard, you enable on it on one or more VLANs. IP source guard applies its checking rules to packets received from untrusted access interfaces on those VLANs.

After the DHCP snooping database is populated (via either dynamic DHCP snooping or configuring specific static IP address/MAC address bindings) the IP Source Guard database is built. It then checks incoming packets from access interfaces on the VLANs on which it is enabled. If the source IP addresses and source MAC addresses match the IP Source Guard binding entries, the switch forwards the packets to their specified destination addresses. If they do not match, the packets are discarded.

This group includes the following IP Source Guard commands.

>**Security Network IP ?**
Available Commands:

Security Network IP Source Guard Configuration
Security Network IP Source Guard Mode [enable|disable]
Security Network IP Source Guard Port Mode [<port_list>] [enable|disable]
Security Network IP Source Guard limit [<port_list>] [<dynamic_entry_limit>|unlimited]
Security Network IP Source Guard Entry [<port_list>] add|delete <vid> <allowed_ip> <ip_mask>
Security Network IP Source Guard Status [<port_list>]
Security Network IP Source Guard Translation

Each of the IP Source Guard commands is explained below.

Command: **Show Current IP Source Guard Configuration**
Syntax: **security network ip source guard config**
Description: Display the current IP source guard configuration.
Example:

```
>security network ip source guard config

IP Source guard Configuration:
==============================

IP Source Guard Mode : Enabled

Port  Port Mode    Dynamic Entry Limit
----  ----------  --------------------
1     Enabled     1
2     Enabled     2
3     Disabled    unlimited
4     Enabled     unlimited

IP Source Guard Entry Table:

Type     Port  VLAN  IP Address       IP Mask
-------  ----  ----  ---------------  ---------------
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set or Show IP Source Guard Mode**
Syntax: **security network ip source guard mode** [enable|disable]
Description: Set or show IP Source Guard mode, where:
enable : Enable IP Source Guard global mode.
disable: Disable IP Source Guard global mode (default).
Example:

```
>security network ip source guard mode
IP Source Guard Mode : Disabled
>security network ip source guard mode enable
>security network ip source guard mode
IP Source Guard Mode : Enabled
>
```

Note: the IP Source Guard function is enabled on a given port only when IP Source Guard is enabled in both Global Mode (via the **security network ip source guard mode** command) and Port Mode (the **security network ip source guard port mode** command. In other words, IP Source Guard must be enabled at the device level (globally) and at the port level (locally) to be fully enabled.

Command: **Set or Show IP Source Guard Port Mode**
Syntax: **security network ip source guard port mode** [<port_list>] [enable|disable]
Description: Set or show the IP Source Guard port mode, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
enable : Enable IP Source Guard for one or more ports.
disable : Disable IP Source Guard for one or more ports.
(The default is 'Show IP Source Guard port mode'.)

Example:
```
>security network ip source guard port mode

Port  Port Mode
----  -----------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>security network ip source guard port mode 2-4 enable
>security network ip source guard port mode

Port  Port Mode
----  -----------
1     Disabled
2     Enabled
3     Enabled
4     Enabled
>
```

Note that the IP Source Guard function is enabled on a given port only when IP Source Guard is enabled in both Global Mode (via the **security network ip source guard mode** command) and Port Mode (the **security network ip source guard port mode** command. In other words, IP Source Guard must be enabled at the device level (globally) and at the port level (locally) to be fully enabled.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show IP Source Guard Limit**
Syntax: **security network ip source guard limit** [<port_list>] [<dynamic_entry_limit>|unlimited]
Description: Set or show the IP Source Guard port limitation for dynamic entries. The parameters are:
<**port_list**> : Port list or 'All'. The default is 'All' ports.
<**dynamic_entry_limit**>|**unlimited**: dynamic entry limit (0-2) or unlimited.

Example:

```
>security network ip source guard limit

Port  Dynamic Entry Limit
----  --------------------
1     unlimited
2     unlimited
3     unlimited
4     unlimited
>security network ip source guard limit 2,3 6
Invalid parameter: 6

Syntax:
Security Network IP Source Guard limit [<port_list>]
        [<dynamic_entry_limit>|unlimited]
>security network ip source guard limit 2,3 2
>security network ip source guard limit

Port  Dynamic Entry Limit
----  --------------------
1     unlimited
2     2
3     2
4     unlimited
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Add or Delete IP Source Guard Entry**
Syntax: **security network ip source guard entry** [<port_list>] add|delete <vid> <allowed_ip> <ip_mask >
Description: Add or delete IP source guard static entry, where:
<**port_list**> : Port list or 'all'. The default is 'All' ports.
add : Add new port IP source guard static entry.
delete : Delete existing port IP source guard static entry.
<**vid**> : VLAN ID (1-4094).
<**allowed_ip**> : IP address (a.b.c.d), IP address allowed for doing IP source guard.
<**ip_mask**> : IPv4 mask (a.b.c.d). The IP mask for allowed IP address .

Example:

```
>security network ip source guard entry 2 add 1 192.168.1.30 255.255.255.0
>security network ip source guard status

IP Source Guard Entry Table:

Type     Port  VLAN  IP Address       IP Mask
-------  ----  ----  ---------------  ---------------
Static      2     1  192.168.1.30     255.255.255.0
>security network ip source guard entry 3 add 2 192.168.1.40 255.255.255.0
>security network ip source guard status

IP Source Guard Entry Table:

Type     Port  VLAN  IP Address       IP Mask
-------  ----  ----  ---------------  ---------------
Static      2     1  192.168.1.30     255.255.255.0
Static      3     2  192.168.1.40     255.255.255.0
>security network ip source guard entry 2 delete 1 192.168.1.30 255.255.255.0
>security network ip source guard status

IP Source Guard Entry Table:

Type     Port  VLAN  IP Address       IP Mask
-------  ----  ----  ---------------  ---------------
Static      3     2  192.168.1.40     255.255.255.0
>
```

Messages: *IP source guard: the entry maybe exists on the DB.*

Command: **Show IP Source Guard Status**
Syntax: **security network ip source guard status** [<port_list>]
Description: Show IP source guard static and dynamic entries, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.

Example:

```
>security network ip source guard status

IP Source Guard Entry Table:

Type     Port  VLAN  IP Address       IP Mask
-------  ----  ----  ---------------  ---------------
Static      2     1  192.168.1.30     255.255.255.0
>
```

Command: **Translate IP Source Guard Dynamic to Static**
Syntax: **security network ip source guard translation**
Description: Translate IP source guard dynamic entries into static entries.
Example:

```
>security network ip Source guard translation
IP Source Guard:
        Translate 0 dynamic entries into static entries.
>
```

Security Network ARP Group
ARP Inspection is a secure feature. Several types of attacks can be launched against a host or devices connected to Layer 2 networks by "poisoning" the ARP caches. This feature is used to block such attacks. Only valid ARP requests and responses can go through the switch device.

The ARP Inspection commands are listed below.

>**security network arp ?**
Available Commands:

Security Network ARP Inspection Configuration
Security Network ARP Inspection Mode [enable|disable]
Security Network ARP Inspection Port Mode [<port_list>] [enable|disable]
Security Network ARP Inspection Entry [<port_list>] add|delete <vid> <allowed_mac> <allowed_ip>
Security Network ARP Inspection Status [<port_list>]
Security Network ARP Inspection Translation
>

The Security Network ARP group commands are explained below.

Command: **Show Current ARP Inspection Configuration**
Syntax: **security network arp inspection config**
Description: Show the current ARP inspection configuration.
Example:

```
>security network arp inspection config

ARP Inspection Configuration:
=============================

ARP Inspection Mode : Disabled

Port  Port Mode
----  -----------
1     Disabled
2     Disabled
3     Disabled
4     Disabled

ARP Inspection Entry Table:

Type     Port  VLAN  MAC Address        IP Address
-------  ----  ----  -----------------  -------------
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set or Show ARP Inspection Mode**
Syntax: **security network arp inspection mode** [enable|disable]
Description: Set or show ARP inspection mode, where:
enable : Enable ARP Inspection.
disable: Disable ARP Inspection.

Example:
```
>security network arp inspection mode
ARP Inspection Mode : Disabled
>security network arp inspection mode enable
>security network arp inspection mode
ARP Inspection Mode : Enabled
>
```

Note that the ARP Inspection function is enabled on a given port only when ARP Inspection is enabled in both Global mode (via the **security network arp inspection mode** command) and Port mode (the **security network arp inspection port mode** command. In other words, ARP Inspection must be enabled at the device level (globally) and at the port level (locally) to be fully enabled.

Command: **Set or Show ARP Inspection Port Mode**
Syntax: **security network arp inspection port mode** [<port_list>] [enable|disable]
Description: Set or show the ARP Inspection port mode, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
enable : Enable ARP Inspection port.
disable : Disable ARP Inspection port (the default).
(The default is 'Show ARP Inspection port mode'.)

Example:

```
>security network arp inspection port mode

Port  Port Mode
----  -----------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>security network arp inspection port mode 2-4 enable
>security network arp inspection port mode

Port  Port Mode
----  -----------
1     Disabled
2     Enabled
3     Enabled
4     Enabled
>
```

Note: the ARP Inspection function is enabled on a given port only when ARP Inspection is enabled in both Global mode (via the **security network arp inspection mode** command) and Port mode (the **security network arp inspection port mode** command. In other words, ARP Inspection must be enabled at the device level (globally) and at the port level (locally) to be fully enabled.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Add or Delete ARP Inspection Entry**
Syntax: **security network arp inspection entry** [<port_list>] add|delete <vid> <allowed_mac> <allowed_ip>
Description: Add or delete ARP inspection static entry, where:
<**port_list**> : Port list or 'all', default: All ports
add : Add new port ARP inspection static entry
delete : Delete existing port ARP inspection static entry
<**vid**> : VLAN ID (1-4094)
<**allowed_mac**>: MAC address ('xx-xx-xx-xx-xx-xx' or 'xx.xx.xx.xx.xx.xx' or 'xxxxxxxxxxxx', where x is a hexadecimal digit); the MAC address allowed to do ARP requests.
<**allowed_ip**> : IP address (a.b.c.d); the IP address allowed to do ARP requests.
Example:

```
>security network arp inspection entry 1 add 1 11-22-33-44-55-66 192.168.1.30
>security network arp inspection status

ARP Inspection Entry Table:

Type     Port  VLAN  MAC Address        IP Address
-------  ----  ----  -----------------  -------------
Static      1     1  11-22-33-44-55-66  192.168.1.30
>security network arp inspection entry 1 delete 1 11-22-33-44-55-66 192.168.1.30
>security network arp inspection status

ARP Inspection Entry Table:

Type     Port  VLAN  MAC Address        IP Address
-------  ----  ----  -----------------  -------------
>
```

Command: **Show Current ARP Inspection Status** [<port_list>]
Syntax: **security network arp inspection status** [<port_list>]
Description: Show ARP inspection static and dynamic entries, where:
<**port_list**>: Port list or 'All'. The default is ‘All’ ports.
Example:

```
>security network arp inspection entry 1 add 1 11-22-33-44-55-66 192.168.1.30
>security network arp inspection status

ARP Inspection Entry Table:

Type     Port  VLAN  MAC Address        IP Address
-------  ----  ----  -----------------  -------------
Static      1     1  11-22-33-44-55-66  192.168.1.30
>security network arp inspection entry 1 delete 1 11-22-33-44-55-66 192.168.1.30
>security network arp inspection status

ARP Inspection Entry Table:

Type     Port  VLAN  MAC Address        IP Address
-------  ----  ----  -----------------  -------------
>
```

Command: **Translate ARP Inspection Entries**
Syntax: **security network arp inspection translation**
Description: Translate ARP inspection dynamic entries into static entries.
Example:

```
>security network arp inspection translation
ARP Inspection:
        Translate 0 dynamic entries into static entries.
>
```

Security > AAA Commands

The LIB-4xxx supports Security **AAA** (Authentication, Authorization, Accounting) commands for RADIUS and TACACS+.

> **RADIUS** (Remote Authentication Dial In User Service) is a networking protocol that provides centralized access, authorization and accounting management for people or computers to connect and use a network service.
>
> **TACACS**+ (Terminal Access Controller Access Control System Plus) is a networking protocol which provides access control for routers, network access servers and other networked computing devices via one or more centralized servers. TACACS+ provides separate authentication, authorization and accounting services.

Caution: Before enabling Radius or TACACS+, make sure that the related AAA server is operational and that at least the AAA server's IP address/hostname and encryption/decryption key parameters are set correctly.

These commands are used to verify that a proper RADIUS or TACACS+ server is configured. Then try a telnet session to make sure. If it fails you can still use the CLI to correct any errors.

These CLI command setting are common for all of the Authentication Servers.

The available LIB-4xxx Security **AAA** commands include:

>**security aaa ?**
Available Commands:

Security AAA Configuration
Security AAA Timeout [<timeout>]
Security AAA Deadtime [<dead_time>]
Security AAA RADIUS [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]
Security AAA ACCT_RADIUS [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]
Security AAA TACACS+ [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]
Security AAA Statistics [<server_index>]

The LIB-4xxx Security **AAA** commands are explained below.

Command: **Show Current AAA Configuration**
Syntax: **security aaa config**
Description: Show the current Authentication and Accounting configuration.
Example:

```
>security aaa config

AAA Configuration:
==================

Server Timeout   : 15 seconds

Server Dead Time : 300 seconds

RADIUS Authentication Server Configuration:
===========================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Disabled                                                    1812
2       Disabled                                                    1812
3       Disabled                                                    1812
4       Disabled                                                    1812
5       Disabled                                                    1812

RADIUS Accounting Server Configuration:
=======================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Disabled                                                    1813
2       Disabled                                                    1813
3       Disabled                                                    1813
4       Disabled                                                    1813
5       Disabled                                                    1813

TACACS+ Authentication Server Configuration:
============================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Disabled                                                      49
2       Disabled                                                      49
3       Disabled                                                      49
4       Disabled                                                      49
5       Disabled                                                      49
>
```

Command: **Set / Show AAA Timeout**

Syntax: **security aaa timeout** [<timeout>]

Description: Set or show the server timeout period.

Timeout can be set to a number from 3 to 3600 seconds; it is the maximum time to wait for a reply from a server. If the server does not reply within this timeframe, the LIB-4xxx considers it to be 'dead' and continues with the next enabled server (if any).

RADIUS servers use the UDP protocol, which is less reliable by design. In order to cope with lost frames, the timeout interval is divided into 3 subintervals of equal length. If a reply is not received within the subinterval, the request is transmitted again. This algorithm causes the RADIUS server to be queried up to 3 times before it is considered to be 'dead'.

The parameters are:

<**timeout**>: Server response timeout (3-3600 seconds).

(The default is 'Show server timeout configuration'.)

Example:

```
>security aaa timeout

Server Timeout   : 15 seconds
>security aaa timeout 30
>security aaa timeout

Server Timeout   : 30 seconds
>
```

Command: **Set / Show AAA Deadtime**

Syntax: **security aaa deadtime** [<dead_time>]

Description: Set or show server dead time

Dead Time can be set to a number from 0 to 3600 seconds; it is the period during which the switch will not send new requests to a server that has failed to respond to a previous request. This will stop the switch from continually trying to contact a server that it has already determined as 'dead'. Setting the Dead Time to a value greater than 0 (zero) will enable this feature, but only if more than one server has been configured. The parameters are:

<**dead_time**>: Time that a server is considered dead if it doesn't answer a request. The valid range is 0-3600 seconds. The default is 300 seconds.

(The default is 'Show server dead time configuration'.)

Example:

```
>security aaa deadtime

Server Dead Time : 300 seconds
>security aaa deadtime 600
>security aaa deadtime

Server Dead Time : 600 seconds
>
```

Command: **Set / Show AAA RADIUS Server Setup**

Syntax: **security aaa radius** [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]

Description: Set or show RADIUS authentication server setup. The parameters are:

<**server_index**> :The AAA RADIUS server index (1-5).

(The default is 'Show RADIUS authentication server configuration'.)

enable : Enable RADIUS authentication server.

disable : Disable RADIUS authentication server.

(The default is 'Show RADIUS server mode'.)

<**ip_addr_string**>: IP host address (a.b.c.d) or a host name string

<**secret**> : Secret shared with external authentication server. To use spaces in secret, enquote the secret. Quotes within the secret are not allowed.

<**server_port**> : Server UDP port. Use 0 to use the default RADIUS port (1812)

Example:

```
>security aaa radius

RADIUS Authentication Server Configuration:
===========================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Disabled                                                    1812
2       Disabled                                                    1812
3       Disabled                                                    1812
4       Disabled                                                    1812
5       Disabled                                                    1812
>
```

Command: **Set / Show AAA ACCT_RADIUS Server Setup**

Syntax: **security aaa acct_radius** [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]

Description: Set or show RADIUS accounting server setup, where:

The AAA Accounting RADIUS server index (1-5).

(default: Show RADIUS accounting server configuration).

enable : Enable RADIUS accounting server

disable : Disable RADIUS accounting server

(The default is 'Show RADIUS server mode'.)

<**ip_addr_string**>: IP host address (a.b.c.d) or a host name string

<**secret**> : Secret shared with external accounting server. To use spaces in secret, enquote the secret. Quotes within the secret are not allowed. Enter up to 29 characters.

<**server_port**> : Server UDP port. Use 0 to use the default RADIUS port (1813).

Example:

```
>security aaa acct_radius

RADIUS Accounting Server Configuration:
=======================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Disabled                                                    1813
2       Disabled                                                    1813
3       Disabled                                                    1813
4       Disabled                                                    1813
5       Disabled                                                    1813
>
>security aaa acct_radius 1 enable 192.168.1.30 Buffrey1 1
>security aaa acct_radius 2 enable 192.168.1.30 Buffrey1 2
>security aaa acct_radius

RADIUS Accounting Server Configuration:
=======================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Enabled   192.168.1.30     ********                           1
2       Enabled   192.168.1.30     ********                           2
3       Disabled                                                    1813
4       Disabled                                                    1813
5       Disabled                                                    1813
>
```

Command: **Set / Show AAA TACACS+ Server Setup**

Syntax: **security aaa tacacs+** [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]

Description: Set or show TACACS+ authentication server setup. The parameters are:

<**server_index**> :The server index (1-5).

(The default is 'Show TACACS+ authentication server configuration',)

enable : Enable TACACS+ authentication server.

disable : Disable TACACS+ authentication server.

(The default is 'Show TACACS+ server mode'.)

<**ip_addr_string**>: IP host address (a.b.c.d) or a host name string.

<**secret**> : Secret shared with external authentication server. To use spaces in secret, enquote the secret. Quotes within the secret are not allowed. Enter up to 29 characters.

<**server_port>** : Server TCP port. Enter 0 to use the default TACACS+ port (49).

Example:

```
>security aaa tacacs+

TACACS+ Authentication Server Configuration:
============================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Disabled                                                     49
2       Disabled                                                     49
3       Disabled                                                     49
4       Disabled                                                     49
5       Disabled                                                     49
>security aaa tacacs+ 1 enable 192.168.1.30 Buffrey1 0
>security aaa tacacs+

TACACS+ Authentication Server Configuration:
============================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Enabled   192.168.1.30     ********                        49
2       Disabled                                                     49
3       Disabled                                                     49
4       Disabled                                                     49
5       Disabled                                                     49
>
>security aaa tacacs+ 2 enable 192.168.1.31 Buffrey1 2
>security aaa tacacs+

TACACS+ Authentication Server Configuration:
============================================
Server  Mode      IP Address       Secret                          Port
------  --------  ---------------  ------------------------------  -----
1       Enabled   192.168.1.30     ********                        49
2       Enabled   192.168.1.31     ********                         2
3       Disabled                                                     49
4       Disabled                                                     49
5       Disabled                                                     49
```

Command: **Show Current AAA Statistics**
Syntax: **security aaa statistics** [<server_index>]
Description: Show current RADIUS statistics, where:
<**server_index**> : The RADIUS server index number (1-5).
(The default is 'Show statistics for all servers'.).
Example:

```
>security aaa statistics 1

Server #1 (0.0.0.0:1812) RADIUS Authentication Statistics:
Rx Access Accepts:                    0   Tx Access Requests:                  0
Rx Access Rejects:                    0   Tx Access Retransmissions:           0
Rx Access Challenges:                 0   Tx Pending Requests:                 0
Rx Malformed Acc. Responses:          0   Tx Timeouts:                         0
Rx Bad Authenticators:                0
Rx Unknown Types:                     0
Rx Packets Dropped:                   0
State:                          Disabled
Round-Trip Time:                      0 ms

Server #1 (0.0.0.0:1813) RADIUS Accounting Statistics:
Rx Responses:                         0   Tx Requests:                         0
Rx Malformed Responses:               0   Tx Retransmissions:                  0
Rx Bad Authenticators:                0   Tx Pending Requests:                 0
Rx Unknown Types:                     0   Tx Timeouts:                         0
Rx Packets Dropped:                   0
State:                          Disabled
Round-Trip Time:                      0 ms
>
```

STP Commands

The LIB-4xxx supports an array of STP (Spanning Tree Protocol) CLI commands. STP is an OSI layer-2 protocol which ensures a loop free topology for any bridged LAN.

The LIB-4xxx supports the spanning tree protocols of STP/RSTP and MSTP on all interfaces. The Spanning Tree protocols help in creating a loop free bridged network. The implementation conforms to the IEEE specs 802.1D for STP, 802.1w for RSTP and 802.1s for MSTP.

The LIB-4xxx can act in the role of a root bridge or as a designated bridge by the process of election. The priorities for the bridge instance that is used in BPDU frames can be configured. For MSTP, each MSTI (Multiple Spanning Tree Instance) priority can be configured for the Common and Internal Spanning Tree (CIST) instance.

The MSTP protocol version works over VLAN instances, and multiple VLANs can be added to an MSTI; however, at any time a VLAN can be only be part of one MSTI. Configuration for each MSTI and the VLANs that belong to that instance is supported. The LIB-4xxx also supports configuration options for enabling or disabling BPDU guard, path cost for that port, restricting topology change notification, etc. Note that MSTP is not supported on the LIB-4xxx MGMT port.

These LIB-4xxx commands provide STP functions.

>**stp ?**
Available Commands:

STP Configuration
STP Version [<stp_version>]
STP Txhold [<holdcount>]
STP MaxHops [<maxhops>]
STP MaxAge [<max_age>]
STP FwdDelay [<delay>]
STP CName [<config-name>] [<integer>]
STP bpduFilter [enable|disable]
STP bpduGuard [enable|disable]
STP recovery [<timeout>]
STP Status [<msti>] [<stp_port_list>]
STP Msti Priority [<msti>] [<priority>]
STP Msti Map [<msti>] [clear]
STP Msti Add <msti> <vid-range>
STP Port Configuration [<stp_port_list>]
STP Port Mode [<stp_port_list>] [enable|disable]
STP Port Edge [<stp_port_list>] [enable|disable]
STP Port AutoEdge [<stp_port_list>] [enable|disable]
STP Port P2P [<stp_port_list>] [enable|disable|auto]
STP Port RestrictedRole [<stp_port_list>] [enable|disable]
STP Port RestrictedTcn [<stp_port_list>] [enable|disable]
STP Port bpduGuard [<stp_port_list>] [enable|disable]
STP Port Statistics [<stp_port_list>] [clear]
STP Port Mcheck [<stp_port_list>]
STP Msti Port Configuration [<msti>] [<stp_port_list>]
STP Msti Port Cost [<msti>] [<stp_port_list>] [<path_cost>]
STP Msti Port Priority [<msti>] [<stp_port_list>] [<priority>]
>

The available STP commands are explained below.

Command: **Show Current STP Configuration**
Syntax: **stp configuration**
Description: Displays the current LIB-4xxx configuration setup. Note that MSTP is not supported on the LIB-4xxx MGMT port.

Example:
```
STP>config
STP Configuration:
==================
Protocol Version: MSTP
Max Age         : 20
Forward Delay   : 15
Tx Hold Count   : 6
Max Hop Count   : 20
BPDU Filtering  : Disabled
BPDU Guard      : Disabled
Error Recovery  : Disabled
STP>
```

Command: **Set / Show STP Version**
Syntax: **stp version** [<stp_version>
Description: Set or show the STP Bridge protocol version, where <stp_version> = mstp|rstp|stp. Note that MSTP is disabled on the LIB-4xxx MGMT port. The parameters are:
mstp: configures the Multiple Spanning Tree protocol.
rstp: configures the Rapid Spanning Tree protocol.
stp: configures the Spanning Tree protocol.

Example:
```
STP>version
Protocol Version: Compatible (STP)
STP>version rstp
STP>version
Protocol Version: RSTP
STP>version mstp
STP>version
Protocol Version: MSTP
STP>
```

Command: **Set / Show STP Txhold Count**
Syntax: **stp txhold** [<holdcount>]
Description: Set or show the STP Bridge Transmit Hold Count parameter. The number of BPDU's a bridge port can send per second. When exceeded, transmission of the next BPDU will be delayed. Valid values are in the range 1 - 10 BPDU's per second. The default is 6 BPDU's / second. The parameters are:
<**holdcount**>: (1-10 BPDU's per second).

Example:
```
STP>txhold 3
STP>txhold
Tx Hold Count   : 3
STP>
```

Command: **Set / Show STP Max Hops**
Syntax: **stp maxhops** [<maxhops>]
Description: Sets or shows the MSTP Bridge Max Hop Count parameter, where:
<**maxhops**>: STP BPDU MaxHops (6-40)

Example:
```
STP>maxhops 5
Invalid parameter: 5

Syntax:
STP MaxHops [<maxhops>]
STP>maxhops 20
STP>maxhops
Max Hop Count   : 20
STP>
```

Command: **Set / Show STP Max Age**
Syntax: **stp maxage** [<max_age>]
Description: Sets or shows the bridge instance maximum age. This is the maximum age of the information transmitted by the Bridge when it is the Root Bridge. Valid values are 6 to 40 seconds, and MaxAge must be <= (FwdDelay-1)*2. The parameters are:
<**max_age**>: STP maximum age time (6-39, and max_age <= (forward_delay-1)*2)

Example:
```
STP>maxage 4
Invalid parameter: 4

Syntax:
STP MaxAge [<max_age>]
STP>maxage 40
Invalid parameter: 40

Syntax:
STP MaxAge [<max_age>]
STP>maxage 20
STP>maxage
Max Age         : 20
STP>
```

Command: **Set / Show STP Forward Delay**
Syntax: **stp fwddelay** [<delay>]
Description: Set or show the bridge instance forward delay. This is the delay used by STP Bridges to transit Root and Designated Ports to Forwarding (used in STP compatible mode). Valid values are in the range 4 to 30 seconds. The parameters are:
<**delay**>: MSTP forward delay (4-30, and max_age <= (forward_delay-1)*2))

Example:
```
STP>fwddelay 30
STP>fwddelay
Forward Delay   : 30
STP>
```

Command: **Set / Show STP Config Name**
Syntax: **stp cname** [<config-name>] [<integer>]
Description: Set or show MSTP configuration name and revision, where:
<**config-name**>: For the MSTP Configuration name, enter a text string up to 32 characters long. Use quotes (**"**) to embed spaces in name.
<**integer**> : Integer value

Example:
```
>STP cname
Configuration name: 00-c0-f2-56-0a-40
Configuration rev.: 0
>stp cname "MASTP cnfg"
>stp cname
Configuration name: MASTP cnfg
Configuration rev.: 0
>
```

Command: **Set / Show STP BPDU Filter**
Syntax: **stp bpdufilter** [enable|disable]
Description: Edge Port BPDU Filtering controls whether a port explicitly configured as Edge will transmit and receive BPDUs. Set or show edge port BPDU Filtering, where:
enable|**disable**: enable or disable BPDU Filtering for Edge ports.

Example:
```
STP>bpdufilter enable
STP>bpdufilter
BPDU Filtering  : Enabled
STP>
```

Command: **Set / Show STP BPDU Guard**
Syntax: **stp bpduguard** [enable|disable]
Description: **Edge Port BPDU Guard** controls whether a port explicitly configured as Edge will disable itself upon reception of a BPDU. The port will enter the error-disabled state, and will be removed from the active topology. Set or show edge port BPDU Guard, where:
enable|**disable**: enables or disables BPDU Guard for Edge ports.

Example:
```
>stp bpduguard
BPDU Guard      : Disabled
>stp bpduguard enable
>stp bpduguard
BPDU Guard      : Enabled
>
```

Command: **Set / Show STP Recovery**
Syntax: **stp recovery** [<timeout>]
Description: Set or show edge port error recovery timeout, where:
<**timeout**>: The time to elapse before error-disabled ports are re-enabled (30-86400 seconds; setting to 0 disables)
(The default is 'Show recovery timeout'.)

Example:
```
STP>recovery 30
STP>recovery
Error Recovery  : 30 seconds
STP>recovery 3000
STP>recovery
Error Recovery  : 3000 seconds
STP>
```

Command: **Show STP Status**
Syntax: **stp status** [<msti>] [<port_list>]
Description: Display the current STP Bridge status, where:
<**msti**> : STP bridge instance number (0-7, CIST=0, MSTI1=1, ...).
<**stp_port_list**>: Port list or 'All'. The default is 'All ports'.
Example:

```
>stp status
CIST Bridge STP Status
Bridge ID    : 32768.00-C0-F2-56-0B-40
Root ID      : 32768.00-C0-F2-56-0B-40
Root Port    : -
Root PathCost: 0
Regional Root: 32768.00-C0-F2-56-0B-40
Int. PathCost: 0
Max Hops     : 20
TC Flag      : Steady
TC Count     : 0
TC Last      : -
Port       Port Role       State       Pri  PathCost  Edge  P2P  Uptime
---------  --------------  ----------  ---  --------  ----  ---  -------------
        5  DesignatedPort  Forwarding  128    200000  Yes   Yes    0d 04:12:36
>
```

Command: **Set / Show STP MSTI Priority**
Syntax: **stp msti priority** [<msti>] [<priority>]
Description: This command lets you view / modify the current STP MSTI bridge instance priority configuration. Set or show the bridge instance priority. An MSTI (Multiple Spanning Tree Instance) is typically one of the uplink ports that connects to one of the gateway devices. MSTI information can include VLAN mapping, bridge priority, port priority, and cost.
The parameters are:
<**msti**> : STP bridge instance number (0-7, CIST=0, MSTI1=1, ...). 'MSTI' is the bridge instance. The CIST is the default instance, which is always active.
<**priority**>: STP bridge priority (0/4096/8192/12288/.../53248/57344/61440).
The 'Priority' controls the bridge priority. A lower numeric values gives better priority. The bridge priority plus the MSTI instance number, concatenated with the 6-byte MAC address of the switch forms a Bridge Identifier.

Example:

```
>stp msti priority
MSTI#  Bridge Priority
-----  ---------------
CIST   32768
MSTI1  32768
MSTI2  32768
MSTI3  32768
MSTI4  32768
MSTI5  32768
MSTI6  32768
MSTI7  32768
>stp msti priority 2 4096
>stp msti priority
MSTI#  Bridge Priority
-----  ---------------
CIST   32768
MSTI1  32768
MSTI2   4096
MSTI3  32768
MSTI4  32768
MSTI5  32768
MSTI6  32768
MSTI7  32768
>
```

Command: **Show / Clear STP MSTI Mapping**
Syntax: **stp msti map** [<msti>] [clear]
Description: Show or clear MSTP MSTI VLAN mapping configuration, where:
<**msti**>: STP bridge instance number (0-7, CIST=0, MSTI1=1, ...).
clear : Clear VID to MSTI mapping.

Example:
```
>stp msti map 1
MSTI  VLANs mapped to MSTI
----  --------------------
MSTI1  No VLANs mapped
>stp msti map 0
MSTI  VLANs mapped to MSTI
----  --------------------
MSTI1  No VLANs mapped
MSTI2  No VLANs mapped
MSTI3  No VLANs mapped
MSTI4  No VLANs mapped
MSTI5  No VLANs mapped
MSTI6  No VLANs mapped
MSTI7  No VLANs mapped
>stp msti map 7
MSTI  VLANs mapped to MSTI
----  --------------------
MSTI7  No VLANs mapped
>stp msti map clear
Mapping all VLANs to CIST
>
```

Command: **STP MSTI Add VLAN**
Syntax: **stp msti add** <msti> <vid-range>
Description: Add a VLAN to a MSTI, where:
<**msti**>: STP bridge instance number (0-7, CIST=0, MSTI1=1, ...).
<**vid-range**>: Single VLAN ID (1-4094) or 'xx-yy' VLAN ID range.
Note: use the **msti map** command to display the updated configuration.

Example:
```
>stp msti add 1 1
Add VLAN 1 to MSTI1
>stp msti map
MSTI  VLANs mapped to MSTI
----  --------------------
MSTI1  1
MSTI2  No VLANs mapped
MSTI3  No VLANs mapped
MSTI4  No VLANs mapped
MSTI5  No VLANs mapped
MSTI6  No VLANs mapped
MSTI7  No VLANs mapped
>stp msti add 1 1-3
Add VLANs 1-3 to MSTI1
>stp msti map
MSTI  VLANs mapped to MSTI
----  --------------------
MSTI1  1-3
MSTI2  No VLANs mapped
MSTI3  No VLANs mapped
MSTI4  No VLANs mapped
MSTI5  No VLANs mapped
MSTI6  No VLANs mapped
MSTI7  No VLANs mapped
>
```

Command: **Show Current STP Port Configuration**
Syntax: **stp port config** [<stp_port_list>]
Description: Show STP Port configuration, where:
< **stp_port_list**>: Port list or 'all'. Port zero (**0**) means aggregations.
Example:

```
>stp port config

Port  Mode      AdminEdge AutoEdge  restrRole restrTcn  Point2point
----  --------  ----------------  ----------------  -----------
Aggr  Enabled   Disabled  Enabled   Disabled  Disabled  Enabled

Port  Mode      AdminEdge AutoEdge  restrRole restrTcn  Point2point
----  --------  ----------------  ----------------  -----------
1     Enabled   Disabled  Enabled   Disabled  Disabled  Auto
2     Enabled   Disabled  Enabled   Disabled  Disabled  Auto
3     Enabled   Disabled  Enabled   Disabled  Disabled  Auto
4     Enabled   Disabled  Enabled   Disabled  Disabled  Auto
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show STP Port Mode**
Syntax: **stp port mode** [<stp_port_list>] [enable|disable]
Description: Set or show the STP enabling for a port, where:
< **stp_port_list**>: Port list or 'all'. Port zero (**0**) means aggregations.
enable : Enable MSTP protocol.
disable: Disable MSTP protocol.
Example:

```
>stp port mode

Port  Mode
----  --------
Aggr  Enabled

Port  Mode
----  --------
1     Enabled
2     Enabled
3     Enabled
4     Enabled
>stp port mode 2,3 disable
>stp port mode

Port  Mode
----  --------
Aggr  Enabled

Port  Mode
----  --------
1     Enabled
2     Disabled
3     Disabled
4     Enabled
>
>stp port mode 0

Port  Mode
----  --------
Aggr  Enabled
>
```

Command: **Set / Show STP Port Edge**
Syntax: **stp port edge** [<stp_port_list>] [enable|disable]
Description: Set or show the STP adminEdge port parameter, where:
< **stp_port_list**>: Port list or 'All'. The default is 'All' ports. Port zero (0) means aggregations.
enable : Configure MSTP adminEdge to Edge.
disable: Configure MSTP adminEdge to Non-edge.

Example:

```
>stp port edge

Port  AdminEdge
----  ----------
Aggr  Disabled

Port  AdminEdge
----  ----------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>stp port edge 0

Port  AdminEdge
----  ----------
Aggr  Disabled
>stp port edge 0 enable
>stp port edge 0

Port  AdminEdge
----  ----------
Aggr  Enabled
>stp port edge 2-4 enable
>stp port edge

Port  AdminEdge
----  ----------
Aggr  Enabled

Port  AdminEdge
----  ----------
1     Disabled
2     Enabled
3     Enabled
4     Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show STP Port AutoEdge**
Syntax: **stp port autoedge** [<stp_port_list >] [enable|disable]
Description: AutoEdge controls whether the bridge should enable automatic edge detection on the bridge port. This allows *operEdge* to be derived from BPDU's received on the port.
Set or show the STP autoEdge port parameter, where:
< **stp_port_list**>: Port list or 'All'. The default is 'All' ports. Port zero (0) means aggregations.
enable : Enable MSTP AutoEdge.
disable: Disable MSTP AutoEdge.

Example:

```
>stp port autoedge

Port  AutoEdge
----  --------
Aggr  Enabled

Port  AutoEdge
----  --------
1     Enabled
2     Enabled
3     Enabled
4     Enabled
>stp port autoedge 5,6 disable
Invalid parameter: 5,6

Syntax:
STP Port AutoEdge [<stp_port_list>] [enable|disable]
>stp port autoedge 4 disable
>stp port autoedge

Port  AutoEdge
----  --------
Aggr  Enabled

Port  AutoEdge
----  --------
1     Enabled
2     Enabled
3     Enabled
4     Disabled
>stp port autoedge 0

Port  AutoEdge
----  --------
Aggr  Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show STP Port P2P**
Syntax: **stp port p2p** [<stp_port_list >] [enable|disable|auto]
Description: Port Point2Point (P2P) controls whether the port connects to a point-to-point LAN rather than to a shared medium. This can be automatically determined, or forced either true (enabled) or false. Transition to the forwarding state is faster for point-to-point LANs than for shared media.
Set or show the STP point-to-point port parameter, where:
< **stp_port_list** >: Port list or 'All'. The default is 'All ports'.
enable : Enable MSTP point2point.
disable: Disable MSTP point2point.
auto : Automatic MSTP point2point detection configured (the default).

Example:

```
>stp port p2p

Port  Point2point
----  -----------
Aggr  Enabled

Port  Point2point
----  -----------
1     Auto
2     Auto
3     Auto
4     Auto
>stp port p2p 2,3 enable
>stp port p2p 4 disable
>stp port p2p

Port  Point2point
----  -----------
Aggr  Enabled

Port  Point2point
----  -----------
1     Auto
2     Enabled
3     Enabled
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show STP Port Restricted Role**
Syntax: **stp port restrictedrole** [<stp_port_list >] [enable|disable]
Description: Restricted Role, if enabled, causes the port not to be selected as Root Port for the CIST or any MSTI even if it has the best spanning tree priority vector. Such a port will be selected as an Alternate Port after the Root Port has been selected. If set, it can cause lack of spanning tree connectivity. It can be set by an administrator to prevent bridges external to a core region of the network from influencing the spanning tree active topology, possibly because those bridges are not under the full control of the administrator. This feature is also called 'Root Guard'.

Set or show the MSTP '*restrictedRole*' port parameter, where:
< **stp_port_list** >: Port list or 'all', default: All ports.
enable : Enable MSTP restricted role.
disable: Disable MSTP restricted role.

Example:

```
>stp port restrictedrole

Port  restrRole
----  ----------
Aggr  Disabled

Port  restrRole
----  ----------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>stp port restrictedrole 2,3 enable
>stp port restrictedrole

Port  restrRole
----  ----------
Aggr  Disabled

Port  restrRole
----  ----------
1     Disabled
2     Enabled
3     Enabled
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show STP Port Restricted TCN**
Syntax: **stp port restrictedtcn** [<stp_port_list >] [enable|disable]
Description: Restricted TCN, if enabled, causes the port to not propagate received topology change notifications and topology changes to other ports. If set it can cause temporary loss of connectivity after changes in a spanning tree's active topology as a result of persistently incorrect learned station location information. It is set by a network administrator to prevent bridges external to a core region of the network from causing address flushing in that region, possibly because those bridges are not under the full control of the administrator or the physical link state of the attached LANs changes frequently.
Set or show the MSTP *restrictedTcn* port parameter, where:
<**stp_port_list** >: Port list or 'all', default: All ports.
enable : Enable MSTP restricted TCN.
disable: Disable MSTP restricted TCN

Example:

```
>stp port restrictedtcn

Port  restrTcn
----  --------
Aggr  Disabled

Port  restrTcn
----  --------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>stp port restrictedtcn 2,3 enable
>stp port restrictedtcn

Port  restrTcn
----  --------
Aggr  Disabled

Port  restrTcn
----  --------
1     Disabled
2     Enabled
3     Enabled
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show STP Port BPDU Guard**
Syntax: **stp port bpduguard** [<stp_port_list >] [enable|disable]
Description: BPDU Guard, if enabled, causes the LIB-4xxx port to disable itself upon receiving valid BPDU's. Contrary to the similar bridge setting, the port **Edge** status does not affect this setting. A port entering error-disabled state due to this setting is subject to the bridge Port Error Recovery setting as well. Set or show the bpduGuard port parameter, where:

<**stp_port_list** >: Port list or 'all', default: All ports.
enable : Enable port BPDU Guard.
disable: Disable port BPDU Guard.

Example:

```
>stp port bpduguard

Port  bpduGuard
----  ----------
Aggr  Disabled

Port  bpduGuard
----  ----------
2     Disabled
3     Disabled
4     Disabled
>stp port bpduguard 2,3 enable
>stp port bpduguard

Port  bpduGuard
----  ----------
Aggr  Disabled

Port  bpduGuard
----  ----------
1     Disabled
2     Enabled
3     Enabled
4     Disabled
>stp port bpduguard 0

Port  bpduGuard
----  ----------
Aggr  Disabled
>
```

Messages:

```
>stp port bpduguard 1,3,12 enable
>W mstp 00:47:24 28/vtss_mstp_rx#1513: Warning: STP inconsistent
port#1 disabled
 (BPDU Guard)
stp port bpduguard 2,3,12 enable
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Show / Clear STP Port Statistics**
Syntax: **stp port statistics** [<stp_port_list >] [clear]
Description: Show or Clear the STP port statistics, where:
<**stp_port_list** >: Port list or 'all', default: All ports. Port zero means aggregations.
clear : Clear the selected port statistics.
Example:

```
>stp port statistics 1
Port       Rx MSTP   Tx MSTP   Rx RSTP   Tx RSTP   Rx STP   Tx STP   Rx TCN   Tx TCN   Rx Ill.  Rx Unk.
---------  --------  --------  --------  --------  -------  -------  -------  -------  -------  -------
        1      1424         6         0         0        0        0        0    0        0        0
>stp port statistics 2
Port       Rx MSTP   Tx MSTP   Rx RSTP   Tx RSTP   Rx STP   Tx STP   Rx TCN   Tx TCN   Rx Ill.  Rx Unk.
---------  --------  --------  --------  --------  -------  -------  -------  -------  -------  -------
       12         0      1524         0         0        0        0        0    0        0        0
>stp port statistics clear
Port       Rx MSTP   Tx MSTP   Rx RSTP   Tx RSTP   Rx STP   Tx STP   Rx TCN   Tx TCN   Rx Ill.  Rx Unk.
---------  --------  --------  --------  --------  -------  -------  -------  -------  -------  -------
        1         0         0         0         0        0        0        0    0        0        0
       12         0         0         0         0        0        0        0    0        0        0
>stp port statistics 3
Port       Rx MSTP   Tx MSTP   Rx RSTP   Tx RSTP   Rx STP   Tx STP   Rx TCN   Tx TCN   Rx Ill.  Rx Unk.
---------  --------  --------  --------  --------  -------  -------  -------  -------  -------  -------
       12         0         4         0         0        0        0        0    0        0        0
>stp port statistics 4
Port       Rx MSTP   Tx MSTP   Rx RSTP   Tx RSTP   Rx STP   Tx STP   Rx TCN   Tx TCN   Rx Ill.  Rx Unk.
---------  --------  --------  --------  --------  -------  -------  -------  -------  -------  -------
        1         0         0         0         0        0        0        0    0        0        0
>
```

Command: **Set STP Port Migration Check**
Syntax: **stp port mcheck** [<stp_port_list >]
Description: Sets the STP mCheck (Migration Check) variable for ports. If a port running MSTP (or RSTP) connects to a bridge running STP, this port will automatically migrate to STP-compatible mode. However, it can not automatically migrate back to the MSTP (or RSTP) mode, but rather it will remain in STP-compatible mode if:

* The bridge running STP is shut down or removed.
* The bridge running STP migrates to the MSTP (or RSTP) mode.

Then you can perform an mCheck (Migration Check) operation to force the port to migrate to the MSTP (or RSTP) mode.
The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports. Port zero means aggregations.

Example:

```
STP>port mcheck 1
STP>port mcheck all
STP>
```

STP mCheck: Per IEEE 802.1D section 17.19.13 mcheck may be set by management to force the Port Protocol Migration state machine to transmit RST BPDUs for a MigrateTime (17.13.9) period, to test whether all STP Bridges (17.4) on the attached LAN have been removed and the Port can continue to transmit RSTP BPDUs. Setting mcheck has no effect if stpVersion (17.20.12) is TRUE (i.e., the Bridge is operating in "STP Compatibility" mode). For more information see http://www.ietf.org/rfc/rfc4318.txt or http://www.ieee802.org/1/files/public/MIBs/IEEE8021-MSTP-MIB-201208100000Z.txt.

Command: **Show Current STP MSTI Port Configuration**
Syntax: **stp msti port configuration** [<msti>] [<stp_port_list >]
Description: Display the current STP port instance configuration, where:
<**msti**> : STP bridge instance number (e.g., 0-7, CIST=0, MSTI1=1, ... for the LIB-4400).
<**stp_port_list** > : Port list or 'All'. The default is 'All' ports. Port zero (0) means aggregations.

Example:

```
>stp msti port config 1

MSTI  Port  Path Cost   Priority
----  ----  ----------  --------
MSTI1  Aggr  Auto        128

MSTI  Port  Path Cost   Priority
----  ----  ----------  --------
MSTI1  1     Auto        128
MSTI1  2     Auto        128
MSTI1  3     Auto        128
MSTI1  4     Auto        128
>
>stp msti port config 1 1

MSTI  Port  Path Cost   Priority
----  ----  ----------  --------
MSTI1  1     Auto        128
>
```

Command: **Set / Show STP MSTI Port Cost**
Syntax: **stp msti port cost** [<msti>] [<stp_port_list >] [<path_cost>]
Description: Set or show the STP port instance path cost, where:
<**msti**> : STP bridge instance number (e.g., 0-7, CIST=0, MSTI1=1, ... for the LIB-4400).
<**stp_port_list** >: Port list or 'all'. Port zero (**0**) means aggregations.
<**path_cost**>: STP port path cost (1-200000000) or 'auto'.

Example:

```
>stp msti port cost

MSTI  Port  Path Cost
----  ----  ----------
CIST  Aggr  Auto

MSTI  Port  Path Cost
----  ----  ----------
CIST  1     Auto
CIST  2     Auto
CIST  3     Auto
CIST  4     Auto
>stp msti port cost 0 1 500000
>stp msti port cost

MSTI  Port  Path Cost
----  ----  ----------
CIST  Aggr  Auto

MSTI  Port  Path Cost
----  ----  ----------
CIST  1     500000
CIST  2     Auto
CIST  3     Auto
CIST  4     Auto
>
```

Command: **Set / Show STP MSTI Port Priority**
Syntax: **stp msti port priority** [<msti>] [<stp_port_list >] [<priority>]
Description: The 'Priority' controls the priority of ports having identical port cost. Use this command to set or show the STP port instance priority, where:
<**msti**> : STP bridge instance number (e.g., 0-7, CIST=0, MSTI1=1, ... for the LIB-4400).
<**stp_port_list**>: Port list or 'all'. Port zero means aggregations.
<**priority**> : STP port priority (0/16/32/48/.../224/240).

Example:

```
>stp msti port priority

MSTI  Port  Priority
----  ----  --------
CIST  Aggr  128

MSTI  Port  Priority
----  ----  --------
CIST  1     128
CIST  2     128
CIST  3     128
CIST  4     128
>stp msti port priority 0 1 32
>stp msti port priority 0 2 64
>stp msti port priority

MSTI  Port  Priority
----  ----  --------
CIST  Aggr  128

MSTI  Port  Priority
----  ----  --------
CIST  1     32
CIST  2     64
CIST  3     128
CIST  4     128
>
```

Aggr (Aggregation) Commands

Aggr (aggregation) involves using multiple ports in parallel to increase the link speed beyond the limits of a port and to increase the redundancy for higher availability (e.g., port aggregation, link aggregation).

These LIB-4xxx commands provide Link Aggregation (Aggr) functions:

>**aggr ?**
Available Commands:

Aggr Configuration
Aggr Add <port_list > [<aggr_id>]
Aggr Delete <aggr_id>
Aggr Lookup [<aggr_id>]
Aggr Mode [smac|dmac|ip|port] [enable|disable]
>

The LIB-4xxx Link Aggregation (Aggr) commands are explained below.

Command: **Show Current Aggr Configuration**
Syntax: **aggr>configuration** or .**aggr configuration**
Description: Displays the current link aggregation configuration in terms of SMAC, DMAC, IP and Port.
Example:

```
>aggr config

Aggregation Configuration:
==========================

Aggregation Mode:

SMAC  : Enabled
DMAC  : Disabled
IP    : Enabled
Port  : Enabled
>
```

Command: **Add / Modify Aggregation ID**
Syntax: **aggr add** <port_list > [<aggr_id>]
Description: Add or modify link aggregation, where:
< **stp_port_list** >: Port list or 'all', default: All ports
<**aggr_id**> : Aggregation ID: 1 to (the number of frontports divided by 2).
Note: use the **aggr lookup** or **aggr config** command to view the configuration changes.

Example:

```
>aggr add 2,3,4 2
>aggr config

Aggregation Configuration:
==========================

Aggregation Mode:

SMAC  : Enabled
DMAC  : Disabled
IP    : Enabled
Port  : Enabled

Aggr ID  Name    Type    Configured Ports  Aggregated Ports
-------  ------  ------  ----------------  ----------------
2        LLAG2   Static  2-4               None
>aggr lookup

Aggr ID  Name    Type    Configured Ports  Aggregated Ports
-------  ------  ------  ----------------  ----------------
2        LLAG2   Static  2-4               None
>
```

If you try to aggregate a port in more than one Aggregation ID, a message such as "*Port 2 is already included in aggregation 2*" displays.

If you use this command to add or modify link aggregation and STP is enabled, the message "*802.1X is enabled on one or more ports in the aggregation*" displays.

Command: **Delete Existing Aggregation**
Syntax: **aggr delete** <aggr_id>
Description: Delete an existing link aggregation, where:
<**aggr_id**>: Aggregation ID: 1 to (the number of frontports divided by 2).

Example:

```
>aggr delete 2
>aggr lookup
>
>aggr lookup
>aggr add 2,3,4 2
>aggr lookup

Aggr ID  Name    Type    Configured Ports  Aggregated Ports
-------  ------  ------  ----------------  ----------------
2        LLAG2   Static  2-4               None
>aggr delete 2
>aggr lookup
>
```

Messages: *The aggregation does not exist*

Command: **Lookup (Display) Current Aggregation Config**
Syntax: **aggr lookup** [<aggr_id>]
Description: Displays the current link aggregation configuration of a port in terms of its ID, Name, Type, Configured Ports, and Aggregated Ports.

Example:

```
>aggr add 2,3 1
>aggr lookup

Aggr ID  Name    Type    Configured Ports  Aggregated Ports
-------  ------  ------  ----------------  ----------------
1        LLAG1   Static  2,3               None
>
```

Command: **Set / Show Aggregation Mode**
Syntax: **aggr mode** [smac|dmac|ip|port] [enable|disable]
Description: This command is used to configure the Aggregation hash mode and the aggregation group. Define or display the link aggregation traffic distribution mode, where:
smac = Source MAC address.
dmac = Destination MAC address.
ip = Source and destination IP address.
port = Source and destination UDP port.
enable = Enable field in traffic distribution.
disable = Disable field in traffic distribution.

Example:
```
>aggr mode
Aggregation Mode:

SMAC  : Enabled
DMAC  : Disabled
IP    : Enabled
Port  : Enabled
>aggr mode smac disable
>aggr mode dmac enable
>aggr mode
Aggregation Mode:

SMAC  : Disabled
DMAC  : Enabled
IP    : Enabled
Port  : Enabled
>
```

The Hash Code Contributors include the TCP/UDP Port Number, IP Address, Destination MAC Address, and the Source MAC Address, where:

Source MAC Address: can be used to calculate the destination port for the frame. Enable to use the Source MAC address, or disable. By default, Source MAC Address (SMAC) is enabled.

Destination MAC Address: can be used to calculate the destination port for the frame. Enable to use the Destination MAC Address. By default, Destination MAC Address (DMAC) is disabled.

IP Address: can be used to calculate the destination port for the frame. Enable for the use of the IP Address, or uncheck to disable. By default, IP Address is enabled.

TCP/UDP Port Number: can be used to calculate the destination port for the frame. Enable to use the TCP/UDP Port Number. By default, TCP/UDP Port Number is enabled.

LACP Commands

LACP is the IEEE 802.3ad Link Aggregation Control Protocol that allows bundling several physical ports together to form a single logical port.

The LIB-4xxx supports Link aggregation per IEEE 802.1AX-2008. The Link aggregation supports several physical links bundled into a single logical link for resiliency and load sharing. The LIB-4xxx uses LACP PDUs to negotiate with peer devices and to exchange information about the links to be bundled automatically when enabled on the physical port.

The resolved aggregation status and peer information status are available. The load sharing mechanism uses all the physical links to transfer the traffic, but for a flow only one link can be used to make sure the packets are sent/received in order. It uses a hash function to determine which port should carry a traffic flow. The device lets you choose the fields that are needed for generating the hash code needed for routing a flow through a single physical port belonging to the aggregate group.

LACP takes care of link failures where if one link fails the flows belonging to that link are transferred to another link based on the hash mechanism which needs to choose from the available links. The static aggregation option is also supported so the LIB-4xxx will work with devices which don't support LACP.

Note: The LACP module can have a maximum of four groups, and up to eight ports can be in a LAG (Link Aggregation Group) at any time.

These LIB-4xxx commands provide Link Aggregation Control Protocol (LACP) functions.

>**lacp ?**
Available Commands:

LACP Configuration [<port_list>]
LACP Mode [<port_list>] [enable|disable]
LACP Key [<port_list>] [<key>]
LACP Prio [<port_list>] [<prio>]
LACP System Prio [<sysprio>]
LACP Role [<port_list>] [active|passive]
LACP Status [<port_list>]
LACP Statistics [<port_list>] [clear]
LACP Timeout [<port_list>] [fast|slow]

The LIB-4xxx Link Aggregation (Aggr) commands are explained below.

Command: **Display Current LACP Config**
Syntax: **lacp config** [<port_list>]
Description: Displays the current LACP configuration in terms of each port's Mode, Key, Role, Timeout, and Priority, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:

```
>lacp config

LACP Configuration:
===================
System Priority: 32768

Port  Mode      Key   Role    Timeout  Priority
----  --------  ----  ------  -------  --------
1     Disabled  Auto  Active  Fast     32768
2     Disabled  Auto  Active  Fast     32768
3     Disabled  Auto  Active  Fast     32768
4     Disabled  Auto  Active  Fast     32768
>
```

Command: **Set / Show LACP Mode**
Syntax: **lacp mode** [<port_list>] [enable|disable]
Description: Set or show LACP mode. 'LACP Enabled' controls whether LACP is enabled on this LIB-4xxx port. LACP will form an aggregation when 2 or more ports are connected to the same partner. LACP can form up to 12 LLAGs per LIB-4xxx. The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All ports'. The port specified can not already be included in a static aggregation.
enable : Enable LACP protocol.
disable: Disable LACP protocol.
(The default is 'Show LACP mode'.)

Example:

```
>lacp mode

Port  Mode
----  --------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>lacp mode 1 enable
>lacp mode

Port  Mode
----  --------
1     Enabled
2     Disabled
3     Disabled
4     Disabled
>
```

Messages: *Can not enable LACP on port 2 because it already has 802.1X enabled.*
Port x is already included in a static aggregation

Command: **Set / Show LACP Key**
Syntax: **lacp key** [<port_list>] [<key>]
Description: Set or show the LACP key. The Key value incurred by the port, range 1-65535.
The Auto setting will set the key as appropriate by the physical link speed (10Mb = 1, 100Mb = 2, 1Gb = 3). Using the 'Specific' setting, a user-defined value can be entered.
Ports with the same Key value can participate in the same aggregation group, while ports with different keys cannot. The LACP Key parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**key**> : LACP key (1-65535) or 'Auto'. The default is 'Auto'.

Example:

```
>lacp key

Port  Key
----  ----
1     Auto
2     Auto
3     Auto
4     Auto
>lacp key 2,3
Port 2 is already included in a static aggregation
Port 3 is already included in a static aggregation
>lacp key 4 456
>lacp key

Port  Key
----  ----
1     Auto
2     Auto
3     Auto
4     456
>
```

Messages: *Can not enable LACP on port 2 because it already has 802.1X enabled.*
Port x is already included in a static aggregation

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LACP Role**
Syntax: **lacp role** [<port_list>] [active|passive]
Description: Sets or displays the LACP Role. The Role sets the LACP activity status. Enter 'Active' to transmit LACP packets each second, or enter 'Passive' to wait for a LACP packet from a partner (i.e., 'speak only if spoken to'). The LACP Role parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
active : Initiate LACP negotiation.
passive: Listen for LACP packets.
(The default is 'Show LACP role'.)

Example:

```
>lacp role

Port  Role
----  ------
1     Active
2     Active
3     Active
4     Active
>lacp role 2,3 passive
Port 2 is already included in a static aggregation
Port 3 is already included in a static aggregation
>lacp role 4 passive
>lacp role

Port  Role
----  ------
1     Active
2     Active
3     Active
4     Passive
>
```

Messages: *Port x is already included in a static aggregation*

Command: **Show Current LACP Status**
Syntax: **lacp status** [<port_list>]
Description: Displays the current LACP Status in terms of each port's Key, Aggr ID, Partner System ID and Partner Port.

Example:

```
>lacp status

Port  Mode      Key    Aggr ID  Partner System ID  Partner Port  Partner Port Prio
----  --------  -----  -------  -----------------  ------------  -----------------
1     Disabled  6      -        -                  -             -
2     Disabled  1      -        -                  -             -
3     Disabled  1      -        -                  -             -
4     Disabled  1      -        -                  -             -
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Show / Clear LACP Statistics**
Syntax: **lacp statistics** [<port_list>] [clear]
Description: Displays or clears the LACP port statistics.
Example:

```
>lacp statistics

Port  Rx Frames   Tx Frames   Rx Unknown  Rx Illegal
----  ----------  ----------  ----------  ----------
1     0           0           0           0
2     0           0           0           0
3     0           0           0           0
4     0           0           0           0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **LACP Timeout**
Syntax: **lacp timeout** [<port_list>] [fast|slow]
Description: Set or show the LACP timeout speed, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
fast : Fast PDU transmissions (fast timeout).
slow : Slow PDU transmissions (slow timeout).
(The default is 'Show LACP timeout'.)
Example:

```
>lacp timeout

Port  Timeout
----  -------
1     Fast
2     Fast
3     Fast
4     Fast
>lacp timeout 2,3 slow
Port 2 is already included in a static aggregation
Port 3 is already included in a static aggregation
>lacp timeout 4 slow
>lacp timeout

Port  Timeout
----  -------
1     Fast
2     Fast
3     Fast
4     Slow
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **LACP System Prio**
Syntax: **lacp system prio** [<sysprio>]
Description: Set or show the LACP System priority, where:
<**sysprio**>: LACP System Priority setting (0-65535). The default is 32768.

Example:
```
>lacp sys prio
System Priority: 55678
>lacp sys prio 99999
Invalid parameter: 99999

Syntax:
LACP System Prio [<sysprio>]
>lacp sys prio 65535
>lacp sys prio
System Priority: 65535
>
```

Command: **LACP Prio**
Syntax: **lacp prio** [<port_list>] [<prio>]
Description: Set or show the LACP priority, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
<**prio**> : LACP Prio (0-65535). The default is 32768.

Example:
```
>lacp prio

Port  Priority
----  --------
1     32768
2     32768
3     32768
4     32768
>lacp prio 1 44444
>lacp prio

Port  Priority
----  --------
1     44444
2     32768
3     32768
4     32768
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

LLDP Commands

The Link Layer Discovery Protocol (LLDP) is the IEEE 802.1ab standard specified that allows stations attached to an IEEE 802 LAN to advertise (to other stations attached to the same IEEE 802 LAN) the major capabilities provided by the system incorporating that station, the management address or addresses of the entity or entities that provide management of those capabilities, and the identification of the stations point of attachment to the IEEE 802 LAN required by those management entity or entities. The information distributed via this protocol is stored by its recipients in a standard Management Information Base (MIB), making it possible for the information to be accessed by a Network Management System (NMS) using a management protocol such as the Simple Network Management Protocol (SNMP).

These LIB-4xxx commands provide Link Layer Discovery Protocol (LLDP) functions. The available LLDP commands are listed below.

>**lldp ?**
Available Commands:

LLDP Configuration [<port_list>]
LLDP Mode [<port_list>] [enable|disable|rx|tx]
LLDP Optional_TLV [<port_list>] [port_descr|sys_name|sys_descr|sys_capa|mgmt_addr] [enable|disable]
LLDP Interval [<interval>]
LLDP Hold [<hold>]
LLDP Delay [<delay>]
LLDP Reinit [<reinit>]
LLDP Statistics [<port_list>] [clear]
LLDP Info [<port_list>]
LLDP cdp_aware [<port_list>] [enable|disable]
>

The LIB-4xxx LLDP commands are explained below.

Command: **LLDP Configuration**
Syntax: **lldp configuration** [<port_list>]
Description: Displays the current LLDP configuration, where:
<**port_list**>: Port list or 'all', default: All ports.

Example:

```
>lldp config

LLDP Configuration:
===================

Interval    : 3
Hold        : 0
Tx Delay    : 0
Reinit Delay: 0

Port  Mode     Port Descr  System Name  System Descr  System Capa  Mgmt Addr  CDP awareness
----  -------- ----------  -----------  ------------  -----------  ---------  -------------
1     Disabled  Disabled    Disabled     Disabled      Disabled     Disabled   Disabled
2     Rx        Disabled    Disabled     Disabled      Disabled     Disabled   Disabled
3     Disabled  Disabled    Disabled     Disabled      Disabled     Disabled   Disabled
4     Disabled  Disabled    Disabled     Disabled      Disabled     Disabled   Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LLDP Mode**
Syntax: **lldp mode** [<port_list>] [enable|disable|rx|tx]
Description: Set or show LLDP mode, where:
<**port_list**>: Port list or 'all', default: All ports.
enable : Enable LLDP reception and transmission. The switch will send out LLDP information, and will analyze LLDP information received from neighbours.
disable: Disable LLDP. The switch will not send out LLDP information, and will drop LLDP information received from neighbours.
rx : Enable LLDP reception only. The LIB-4xxx will not send out LLDP information, but LLDP information from neighbour units is analyzed.
tx : Enable LLDP transmission only. The switch will drop LLDP information received from neighbours, but will send out LLDP information.
(The default is 'Show LLDP mode'.)

Example:

```
>lldp mode

Port  Mode
----  --------
1     Disabled
2     Rx
3     Disabled
4     Disabled
>lldp mode 3,4 tx
>lldp mode

Port  Mode
----  --------
1     Disabled
2     Rx
3     Tx
4     Tx
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LLDP Optional_TLV**
Syntax: **lldp optional_tlv** [<port_list>] [port_descr|sys_name|sys_descr|sys_capa|mgmt_addr] [enable|disable]
Description: An LLDP frame contains multiple TLVs (Type Length Values). An LLDP frame can contain multiple pieces of information. Each of these pieces of information is a 'TLV'. For some TLVs it is configurable if the LIB-4xxx includes the TLV in the LLDP frame. These TLVs are known as 'optional TLVs'. If an optional TLVs is disabled the corresponding information is not included in the LLDP frame. This command lets you set or show LLDP Optional TLVs, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
port_descr : Description of the port to be included in LLDP information transmitted.
sysm_name : System name to be included in LLDP information transmitted.
sys_descr : Description of the system to be included in LLDP information transmitted.
sys_capa : System capabilities to be included in LLDP information transmitted.
mgmt_addr : Master's IP address to be included in LLDP information transmitted.
(default: Show optional TLV's configuration)
enable : Enables TLV.
disable : Disable TLV.
(The default is 'Show optional TLV's configuration'.)

Example:
```
>lldp optional_tlv

Port  Port Descr  System Name  System Descr  System Capa  Mgmt Addr
----  ----------  -----------  ------------  -----------  ---------
1     Disabled    Disabled     Disabled      Disabled     Disabled
2     Disabled    Disabled     Disabled      Disabled     Disabled
3     Disabled    Disabled     Disabled      Distabled    Disablned
4     Disabled    Disabled     Disabled      Disabled     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LLDP Interval**
Syntax: **lldp interval** [<interval>]
Description: Set or show LLDP Tx interval. The switch periodically transmits LLDP frames to its neighbours for having the network discovery information up-to-date. The interval between each LLDP frame is determined by the Tx Interval value. Valid values are 5 - 32768 seconds.

Example:
```
>lldp interval
Interval    : 30
>lldp interval 9
>lldp interval
Interval    : 9
>
```

Command: **Set / Show LLDP Hold**
Syntax: **lldp hold** [<hold>]
Description: Set or show LLDP Tx hold value. Each LLDP frame contains information about how long the information in the LLDP frame is considered valid. The LLDP information valid period is set to Tx Hold multiplied by Tx Interval seconds. Valid values are 2 - 10 times.

Example:
```
>lldp hold
Hold        : 4
>lldp hold 8
>lldp hold
Hold        : 8
>
```

Command: **Set / Show LLDP Delay**
Syntax: **lldp delay** [<delay>]
Description: Set or show LLDP Tx delay. If some configuration is changed (e.g. the IP address) a new LLDP frame is transmitted, but the time between the LLDP frames will always be at least the value of Tx Delay seconds. The 'Tx Delay' cannot be larger than 1/4 of the 'Tx Interval' value. Valid values are 1 - 8192 seconds.

Example:
```
>lldp delay
Tx Delay    : 2
>lldp delay 1
>lldp delay 2
>lldp delay 3
Delay must be less than 1/4 of Interval
>
```

Command: **Set / Show LLDP Reinit Delay**
Syntax: **lldp reinit** [<reinit>]
Description: Set or show LLDP reinitialization delay. When a port is disabled, LLDP is disabled or the LIB-4xxx is rebooted, an LLDP shutdown frame is transmitted to the neighboring units, signaling that the LLDP information isn't valid anymore. The 'Tx Reinit' value defines the number of seconds between the shutdown frame and a new LLDP initialization.
Valid values are 1 - 10 seconds.

Example:
```
>lldp reinit
Reinit Delay: 2
>lldp reinit 9
>lldp reinit
Reinit Delay: 9
>
```

Command: **Display / Clear LLDP Statistics**
Syntax: **lldp statistics** [<port_list>] [clear]
Description: Displays or clears the current LLDP counters data for one or more LIB-4xxx ports.
Example:

```
>lldp statistics

LLDP global counters
Neighbor entries was last changed at 1970-01-01T00:00:00+00:00  (156639 secs. ago).
Total Neighbors Entries Added    0.
Total Neighbors Entries Deleted  0.
Total Neighbors Entries Dropped  0.
Total Neighbors Entries Aged Out 0.

LLDP local counters
       Rx       Tx       Rx       Rx       Rx TLV   Rx TLV   Rx TLV
Port   Frames   Frames   Errors   Discards Errors   Unknown  Organiz.  Aged
----   ------   ------   ------   -------- ------   -------  -------  -----
1      0        0        0        0        0        0        0        0
2      0        0        0        0        0        0        0        0
3      0        0        0        0        0        0        0        0
4      0        0        0        0        0        0        0        0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Display Current LLDP Info**
Syntax: **lldp info** [<port_list>]
Description: Displays existing (configured) LLDP neighbor device information, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:

```
>lldp info
No LLDP entries found
```

```
>lldp info

Local port          : Port 4
Chassis ID          : 00-C0-F2-21-B8-C4
Port ID             : 5
Port Description    : Port #5
System Name         :
System Description  : LIB-4400 (standalone) 1.7.3 2013-08-28T10:27:01-
05:00
System Capabilities : Bridge(+)
Management Address  : 192.168.1.110 (IPv4)

>
```

Messages: *No LLDP entries found* displays if no LLDP neighbor exists.

Command: **Set / Show LLDP CDP Aware**

Syntax: **lldp cdp_aware** [<port_list>] [enable|disable]

Description: Set or show if discovery information from received CDP (Cisco Discovery Protocol) frames is added to the LLDP neighbor table. The parameters are:

<**port_list**>: Port list or 'all'. The default is 'All' ports.

enable : Enable CDP awareness (CDP discovery information is added to the LLDP neighbor table).

disable: Disable CDP awareness.

(The default is 'Show CDP awareness configuration'.)

Example:

```
>lldp cdp_aware

Port  CDP awareness
----  -------------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>lldp cdp_aware 4 enable
>lldp cdp_aware

Port  CDP awareness
----  -------------
1     Disabled
2     Disabled
3     Disabled
4     Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

The CDP operation is restricted to decoding incoming CDP frames (the LIB-4xxx does not transmit CDP frames). CDP frames are only decoded if LLDP on the port is enabled.

Only CDP TLVs that can be mapped to a corresponding field in the LLDP neighbours' table are decoded. All other TLVs are discarded (Unrecognized CDP TLVs and discarded CDP frames are not shown in the LLDP statistics.). CDP TLVs are mapped onto LLDP neighbours' table as follows:

CDP TLV "Device ID" is mapped to the LLDP "Chassis ID" field.

CDP TLV "Address" is mapped to the LLDP "Management Address" field. The CDP address TLV can contain multiple addresses, but only the first address is shown in the LLDP neighbours table.

CDP TLV "Port ID" is mapped to the LLDP "Port ID" field.

CDP TLV "Version and Platform" is mapped to the LLDP "System Description" field.

Both the CDP and LLDP support "system capabilities", but the CDP capabilities cover capabilities that are not part of the LLDP. These capabilities are shown as "others" in the LLDP neighbours' table.

If all ports have CDP awareness disabled, the switch forwards CDP frames received from neighbour devices. If at least one port has CDP awareness enabled all CDP frames are terminated by the switch.

Note: When CDP awareness on a port is disabled, the CDP information is not removed immediately, but gets removed when the hold time is exceeded.

EVC Commands

The EVC (Ethernet Virtual Connection) commands let you configure LIB-4xxx Ethernet services in terms of EVCs and ECEs (EVC Control Entries). Only Provider Bridge based EVCs are supported on the LIB-4xxx.

The EVC is an association of two or more UNIs that limits the exchange of frames to UNIs in the Ethernet Virtual Connection. The User Network Interface (UNI) is the physical interface or port that is the demarcation between the customer and the service provider/Cable Operator/Carrier/MSO. The UNI is the physical demarcation point between the responsibility of the Service Provider and the responsibility of the Subscriber.

ECEs (EVC Control Entries): Unique ECE IDs are automatically assigned to ECEs added. The possible range is from 1 through 128. The ECE ID identifies the ECE.

Ethernet Services: Generally refers to Metro Ethernet Services available from service providers (SPs) per MEF specifications (MEF 6, Ethernet Services Definitions, and MEF 10, Ethernet Services Attributes).

EVC (Ethernet Virtual Connection): An association of two or more UNIs that limits the exchange of frames to UNIs in the EVC. Generally, an EVC allows Ethernet service frames to be exchanged between UNIs that are connected via the same EVC.

Note: You must set up an EVC before trying to set up a related ECE. The set of EVC commands include:

>**evc ?**
Available Commands:

EVC Configuration [<port_list>] [<policer_id>]
EVC Port DEI [<port_list>] [<dei_mode>]
EVC Port L2CP [<port_list>] [<l2cp_list>] [<mode>]
EVC Policer [<policer_id>] [enable|disable] [<policer_mode>] [<cir>] [<cbs>] [<eir>] [<ebs>]
EVC Add <evc_id> [<vid>] [<ivid>] [<nni_list>] [<learning>] [<policer_id>]
EVC Delete <evc_id>
EVC Lookup [<evc_id>]
EVC Name [<evc_id>] [<name>]
EVC Status [<evc_id>]
EVC Statistics [<evc_id>] [<port_list>] [<command>] [frames|bytes]
EVC ECE Add [<ece_id>] [<ece_id_next>] [uni] [<uni_list>]
[tag] [<tag_type>] [<vid>] [<pcp>] [<dei>]
[intag] [<in_type>] [<in_vid>] [<in_pcp>] [<in_dei>]
[all | (ipv4 [<dscp>]) | (ipv6 [<dscp>])]
[direction] [<direction>]
[evc] [<evc_id>] [<policer_id>]
[pop] [<pop>]
[policy] [<policy>]
[outer] [<ot_mode>] [<ot_vid>] [<ot_preserve>] [<ot_pcp>] [<ot_dei>]
[inner] [<it_type>] [<it_vid>] [<it_preserve>] [<it_pcp>] [<it_dei>]
EVC ECE Delete <ece_id>
EVC ECE Lookup [<ece_id>]
EVC ECE Status [<ece_id>]
EVC ECE Statistics [<ece_id>] [<port_list>] [<command>] [frames|bytes]
>

The LIB-4xxx EVC commands are explained below.

Command: **Show Current EVC Configuration**
Syntax: **evc configuration** [<**port_list**>] [<**policer_id**>]
Description: Displays the current EVC configuration, where:
<**port_list**> : Port list or 'all'. The default is 'All' ports.
<**policer_id**>: Policer ID (1-128).

Example:

```
>evc config 1 1
Port  DEI Mode  BPDU                              GARP

----  --------  --------------------------------  --------------------------------

1     Fixed     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T

Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Disabled  Blind    0        0      0        0
>evc config 2 1
Port  DEI Mode  BPDU                              GARP

----  --------  --------------------------------  --------------------------------

2     Fixed     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T

Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Disabled  Blind    0        0      0        0
>evc config 2-4 3
Port  DEI Mode  BPDU                              GARP

----  --------  --------------------------------  --------------------------------

2     Fixed     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T

3     Fixed     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T

4     Fixed     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T

Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
3        Disabled  Blind    0        0      0        0
>
```

Command: **Set / Show EVC Port DEI**
Syntax: **evc port dei** [<**port_list**>] [<**dei_mode**>]
Description: Set or show the port DEI mode, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
<**dei_mode**> : DEI mode, either **coloured** or **fixed**. The DEI (Drop Eligible Indicator) is a 1-bit field in the VLAN tag. The DEI mode for an NNI port determines whether frames that are transmitted on the port will have the DEI field in the outer tag marked based on the colour of the frame. The parameters are:
Coloured: The DEI is **1** for yellow frames and **0** for green frames.
Fixed: The DEI value is determined by ECE rules (default).

Example:

```
>evc port dei
Port  DEI Mode
----  --------
1     Fixed
2     Fixed
3     Fixed
4     Fixed
>evc port dei 2-4 coloured
>evc port dei
Port  DEI Mode
----  --------
1     Fixed
2     Coloured
3     Coloured
4     Coloured
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show EVC Port L2CP**
Syntax: **evc port l2cp** [<**port_list**>] [<**l2cp_list**>] [<**mode**>]
Description: Set or show port L2CP mode, where:
<**port_list**>: Port list or 'all', default: All ports
<**l2cp_list**>: L2CP ID list (0-31). BPDU range: 0-15, GARP range: 16-31
<**mode**> : The mode takes the following values:
tunnel : Forwarding of L2CP frames.
discard : Discards all L2CP frames.
peer : Peers if the protocol is enabled, else discards.

Example:

```
>evc port l2cp
Port  BPDU                                GARP
----  ------------------------------  ------------------------------
1     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T
2     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T
3     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T
4     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T
>evc port l2cp 2-4 discard
>evc port l2cp
Port  BPDU                                GARP
----  ------------------------------  ------------------------------
1     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T
2     D D D D D D D D-D D D D D D D D-D D D D D D D D-D D D D D D D D
3     D D D D D D D D-D D D D D D D D-D D D D D D D D-D D D D D D D D
4     D D D D D D D D-D D D D D D D D-D D D D D D D D-D D D D D D D D
>evc port l2cp 2-4 tunnel
>evc port l2cp
Port  BPDU                                GARP
----  ------------------------------  ------------------------------
1     P P P P P P P P-P P P P P P P P-T T T T T T T T-T T T T T T T T
2     T T T T T T T T-T T T T T T T T-T T T T T T T T-T T T T T T T T
3     T T T T T T T T-T T T T T T T T-T T T T T T T T-T T T T T T T T
4     T T T T T T T T-T T T T T T T T-T T T T T T T T-T T T T T T T T
>
```

Note: You can not use the LIB-4xxx web interface to set or show port L2CP mode the L2CP settings. See the LIB-4400/LIB-4424/ User Guide for additional L2CP processing information.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show EVC Policer**
Syntax: **evc policer** [<policer_id>][enable|disable][<policer_mode>][<cir>][<cbs>][<eir>][<ebs>]
Description: Set or show EVC bandwidth profile (BWP), where:
<**policer_id**> : The Policer ID (1-128).
enable : Enable EVC policer.
disable : Disable EVC policer.
<**policer_mode**>: The colour mode of the bandwidth profile. The valid values are:
Coupled: Colour-aware mode with coupling enabled.
Aware: Colour-aware mode with coupling disabled.
<**cir**> : Committed Information Rate [kbps] of the BWP. The valid range is 0 - 10000000 kilobits per second (KBPS).
<**cbs**> : Committed Burst Size [bytes] of the BWP. The valid range is 0 - 100000 bytes.
<**eir**> : Excess Information Rate [kbps] of the BWP. The valid range is 0 - 10000000 kilobits per second.
<**ebs**> : Excess Burst Size [bytes] of the BWP. The valid range is 0 - 100000 bytes.

Example:

```
>evc policer 1
Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Disabled  Blind    0        0      0        0
>evc policer 1 enable coupled 1 1 1 1
>evc policer 1
Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Enabled   Coupled  1        1      1        1
>evc policer 1 aware 25 50 75 100
>evc policer 1
Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Enabled   Aware    25       50     75       100
>evc policer 2 enable coupled 2 3 4 5
>evc policer 1
Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Enabled   Aware    25       50     75       100
>
```

CIR is the average bit rate of Ethernet service frames (does not include the preamble, start of frame delimiter, or inter-frame gap). CIR defines the average bandwidth that the service provider guarantees the user, regardless of network conditions. CIR is typically provided incrementally, and it must be less than or equal to the UNI rate.

CBS is the maximum number of bytes allowed for a burst of back-to-back Ethernet frames. If a frame size exceeds the CBS, the frame will be either buffered or discarded (see EBS).

EIR is an average rate of Ethernet frames allowed into the network based on a “best effort” basis. Service performance for these frames is not guaranteed and depends on available bandwidth. The combined CIR and EIR must not exceed the UNI rate.

EBS helps control congestion by allowing user traffic to briefly exceed the CBS threshold and still remain within service boundaries. EBS frames are permitted into the network without performance guarantees and may be queued if bandwidth is not available. Ethernet frames exceeding the EBS threshold are discarded (frames exceeding the CBS if EBS is set to zero are also discarded).

Command: **Add / Modify EVC**
Syntax: **evc add** <evc_id> [<vid>] [<ivid>] [<nni_list>] [<learning>] [<policer_id>]
Description: Add a new or modify an existing EVC, where:
<**evc_id**> : The EVC ID (1-128) that identifies the EVC.
<**vid**> : EVC VLAN ID. The VLAN ID in the PB network. It may be inserted in a C-tag, S-tag or S-custom tag depending on the NNI port VLAN configuration. The valid range is 1 - 4094.
<**ivid**> : Internal VLAN ID.
<**nni_list**> : NNI port list (1-6) or 'none'.
<**learning**> : Learning mode: **enable**|**disable**. The learning mode for the EVC controls whether source MAC addresses are learned for frames matching the EVC. Learning may be disabled if the EVC only includes two UNI/NNI ports. ***Enabled***: Learning is enabled (MAC addresses are learned).
<**policer_id**>: EVC policer ID (1-128) or 'none' or 'discard'
Note: when done, use the **EVC Lookup** command to verify the new EVC's configuration.

Example:
```
>evc add 1 1 1 3 enable 1
>evc add 2 1 1 4 enable discard
>evc lookup
EVC ID  VID   IVID  Learning  Policer  NNI Ports
------  ----  ----  --------  -------  ---------------
1       1     1     Enabled   1        3
2       1     1     Enabled   Discard  4
>
```

Messages: *EVC 1 does not exist*

Command: **Delete Existing EVC**
Syntax: **evc delete** <**evc_id**>
Description: Delete an existing EVC, where:
<**evc_id**>: an existing EVC ID (1-128).

Example:
```
>evc lookup
EVC ID  VID   IVID  Learning  Policer  NNI Ports
------  ----  ----  --------  -------  ---------------
1       1     1     Enabled   1        3
2       1     1     Enabled   Discard  4
3       1     1     Enabled   Discard  4
>evc delete 3
>evc lookup
EVC ID  VID   IVID  Learning  Policer  NNI Ports
------  ----  ----  --------  -------  ---------------
1       1     1     Enabled   1        3
2       1     1     Enabled   Discard  4
>evc lookup 3
EVC 3 does not exist
>
```

Note: when done, use the **EVC Lookup** command to verify that the EVC was deleted.
Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **EVC Lookup**
Syntax: **evc lookup** [<**evc_id**>]
Description: Lookup one or more existing EVCs, where
<**evc_id**>: An existing EVC ID (1-128). If the EVC has not been added, then the message "*EVC x does not exist*" displays. Verify the <evc_id> parameter in this case.

Example:
```
>evc lookup
EVC ID  VID   IVID  Learning  Policer  NNI Ports
------  ----  ----  --------  -------  ---------------
1       1     1     Enabled   1        3
2       1     1     Enabled   Discard  4
3       1     1     Enabled   Discard  4
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **EVC Status**
Syntax: **evc status** [<**evc_id**>]
Description: Show the current EVC Status, where:
<**evc_id**>: An existing EVC ID (1-128).

Example:
```
>evc status
EVC ID  VID   IVID  Conflict
------  ----  ----  --------
1       1     1     No
2       1     1     No
>evc status 3
EVC 3 does not exist
>
```

Command: **EVC Name**
Syntax: **evc name** [<evc_id>] [<name>]
Description: Name an existing EVC, where:
<**evc_id**>: An existing EVC ID (1-128).
<**name**> : Administrative name string: 1-128 ASCII characters, use 'clear' to clear.

Example:
```
>evc name
EVC ID  NAME
------  ------------------------
1
>evc name 1 100
>evc name
EVC ID  NAME
------  ------------------------
1       100
>
```

Command: **EVC Statistics**
Syntax: **evc statistics** [<evc_id>] [<port_list>] [<command>] [frames|bytes]
Description: Show or clear EVC statistics. With no qualifying parameters, the 'show all' version of this command can be very long. The valid parameters are:
<**evc_id**> : EVC ID (1-128) to show or clear.
<**port_list**> : Port list or 'All'. The default is 'All' ports.
<**class_list**>: QoS (Quality of Service) class list, 0-7.
<**command**> : Statistics command: clear|green|yellow|red|discard.
clear: Erase (clear) all stored EVC statistics.
green: Show (display) all stored RX Green and TX Green EVC statistics.
yellow: Show (display) all stored RX Yellow and TX Yellow EVC statistics.
red: Show (display) all stored RX Red and TX Red EVC statistics.
discard: Erase (discard) all stored EVC statistics.
frames|**bytes**: Show frame statistics or byte statistics.

Example:

```
>evc statistics
EVC ID 1, Port 3 Statistics:

Rx Green Frames:                      0   Tx Green Frames:                      0
Rx Yellow Frames:                     0   Tx Yellow Frames:                     0
Rx Red Frames:                        0
Rx Discard Frames:                    0   Tx Discard Frames:                    0
Rx Green Bytes:                       0   Tx Green Bytes:                       0
Rx Yellow Bytes:                      0   Tx Yellow Bytes:                      0
Rx Red Bytes:                         0
Rx Discard Bytes:                     0   Tx Discard Bytes:                     0

EVC ID 2, Port 4 Statistics:

Rx Green Frames:                      0   Tx Green Frames:                      0
Rx Yellow Frames:                     0   Tx Yellow Frames:                     0
Rx Red Frames:                        0
Rx Discard Frames:                    0   Tx Discard Frames:                    0
Rx Green Bytes:                       0   Tx Green Bytes:                       0
Rx Yellow Bytes:                      0   Tx Yellow Bytes:                      0
Rx Red Bytes:                         0
Rx Discard Bytes:                     0   Tx Discard Bytes:                     0

>evc statistics 1 all red byte
EVC ID  Port  Rx Red Bytes
------  ----  --------------------
1       3     0
>
```

Command: **Add EVC ECE**

Syntax: **evc ece add** [<ece_id>] [<ece_id_next>] [uni] [<uni_list>]
[tag] [<tag_type>] [<vid>] [<pcp>] [<dei>]
[intag] [<in_type>] [<in_vid>] [<in_pcp>] [<in_dei>]
[all | (ipv4 [<dscp>]) | (ipv6 [<dscp>])]
[direction] [<direction>]
[evc] [<evc_id>] [<policer_id>]
[pop] [<pop>]
[policy] [<policy>]
[outer] [<ot_mode>] [<ot_vid>] [<ot_preserve>] [<ot_pcp>] [<ot_dei>]
[inner] [<it_type>] [<it_vid>] [<it_preserve>] [<it_pcp>] [<it_dei>

Description: Add or modify EVC Control Entry (ECE):
- If <ece_id> is specified and the ECE exists, the ECE will be modified.
- If <ece_id> is omitted or the ECE does not exist, a new ECE will be added.
- If <ece_id_next> is specified, the ECE will be placed before this entry.
- If <ece_id_next> is 'last', the ECE will be placed at the end of the list.
- If <ece_id_next> is omitted and it is a new ECE, the ECE will be placed last.
- If <ece_id_next> is omitted and the ECE exists, the ECE will not be moved.

The EVC ECE parameters are:
<**ece_id**> : ECE ID (1-128)
<**ece_id_next**>: Next ECE ID (1-128) or 'last'
uni : UNI keyword
<**uni_list**> : UNI port list (1-6)
tag : Tag matching keyword
<**tag_type**> : Tag type: tagged|untagged|any
<**vid**> : VLAN ID value/range (0-4094) or 'any'
<**pcp**> : PCP value/range (0-7) or 'any'
<**dei**> : DEI value, 0, 1 or 'any'
intag : Inner tag matching keyword
<**in_type**> : Inner tag type: tagged|untagged|any
<**in_vid**> : Inner tag VLAN ID value/range (0-4094) or 'any'
<**in_pcp**> : Inner tag PCP value/range (0-7) or 'any'
<**in_dei**> : Inner tag DEI value, 0, 1 or 'any'
all : Keyword for matching any frame type
ipv4 : Keyword for matching IPv4 frames
<**dscp**> : DSCP value/range (0-63) or 'any'
ipv6 : Keyword for matching IPv6 frames
direction : Direction keyword
<**direction**> : ECE direction: both|uni-to-nni|nni-to-uni
evc : EVC keyword
<**evc_id**> : EVC ID (1-128) or 'none'
<**policer_id**> : ECE policer ID (1-128) or 'none' or 'discard' or 'evc'
pop : Pop keyword
<**pop**> : Tag pop count: 0|1|2
policy : Policy keyword
<**policy**> : ACL policy number (0-255)
outer : Outer tag action keyword
<**ot_mode**> : Outer tag for nni-to-uni direction: enable|disable
<**ot_vid**> : EVC outer tag VID for UNI ports
<**ot_preserve**>: Outer tag preserved or fixed PCP/DEI: preserved|fixed
<**ot_pcp**> : Outer tag PCP value (0-7)
<**ot_dei**> : Outer tag DEI value (0-1)
inner : Inner tag action keyword

<**it_type**> : Inner tag type: none|c-tag|s-tag|s-custom-tag
<**it_vid**> : Inner tag VLAN ID (1-4094)
<**it_preserve**>: Inner tag preserved or fixed PCP/DEI: preserved|fixed
<**it_pcp**> : Inner tag PCP value (0-7)
<**it_dei**> : Inner tag DEI value (0-1)

Example:

```
>evc ece add 1
>evc ece add 2
>evc ece add 3
>evc ece look
ECE ID  Direction   EVC ID  Tag Type  VID        PCP  DEI  Frame  UNI Ports
------  ----------  ------  --------  ---------  ---  ---  -----  ---------
1       Both        1       Any       Any        Any  Any  Any    None
2       Both        1       Any       Any        Any  Any  Any    None
3       Both        1       Any       Any        Any  Any  Any    None
>
```

Messages: Invalid parameter: unicast

Note: The EVCs and ECEs are used to set up flows in one or both directions as determined by the ECE "direction" parameter. If the ECE is bidirectional, the ingress rules of the NNI ports will be setup to match the traffic being forwarded to NNI ports. The valid values are:
Both: Bidirectional.
UNI-to-NNI: Unidirectional from UNI to NNI.
NNI-to-UNI: Unidirectional from NNI to UNI. The 'NNI-to-UNI Tag Mode' is only used when the direction is 'NNI-to-UNI'. It only applies to the 'NNI-to-UNI' direction. The 'NNI-to-UNI Tag Mode' selection is disabled when the direction is not 'NNI-to-UNI'.
The 'NNI-to-UNI Tag Mode' may be used in situations where you would like to translate from C-tag to S-tag and optionally also change the VLAN ID. Frames traversing from NNI-to-UNI will pop an S-tag, and on egress from the UNI push a new C-tag with the VLAN ID from 'EVC Configuration > Outer Tag > VLAN ID'. In the other direction you should be able to do similar actions in the ECE using 'Tag Pop Count'.
Note: The two unidirectional services in each direction do not equate to a bidirectional service. Also, it is recommended to make the NNI ports as C/S-ports and to add VLAN membership entries accordingly to ensure proper operation on the EVCs.

Note: When you edit the "Inner Tag VLAN ID Range" when selecting the "Range" in the Inner VLAN ID Filter, if the expected maximum number of VIDs is 4094, you cannot apply the ECE entry with a valid range VLAN of 2048. The default VID range is 0-2047.

Command: **EVC ECE Delete**
Syntax: **evc ece delete** <**ece_id**>
Description: Delete an existing ECE, where:
<**ece_id**>: ECE ID (1-128)
Example:

```
>evc ece look
ECE ID  Direction   EVC ID  Tag Type  VID        PCP  DEI  Frame  UNI Ports
------  ----------  ------  --------  ---------  ---  ---  -----  ---------
1       Both        1       Any       Any        Any  Any  Any    None
2       Both        1       Any       Any        Any  Any  Any    None
3       Both        1       Any       Any        Any  Any  Any    None
>evc ece del 3
>evc ece look
ECE ID  Direction   EVC ID  Tag Type  VID        PCP  DEI  Frame  UNI Ports
------  ----------  ------  --------  ---------  ---  ---  -----  ---------
1       Both        1       Any       Any        Any  Any  Any    None
2       Both        1       Any       Any        Any  Any  Any    None
>
```

Messages: *W evc 04:37:12 50/evc_mgmt_ece_del#1297: Warning: id: 1 not found*
ECE delete failed

Command: **EVC ECE Lookup**
Syntax: **evc ece lookup** [<**ece_id>**]
Description: Look up an existing ECE, where:
<**ece_id**>: An existing ECE ID (1-128).
Example:

```
>evc ece look
ECE ID  Direction   EVC ID  Tag Type  VID        PCP  DEI  Frame  UNI Ports
------  ----------  ------  --------  ---------  ---  ---  -----  ---------
1       Both        1       Any       Any        Any  Any  Any    None
2       Both        1       Any       Any        Any  Any  Any    None
3       Both        1       Any       Any        Any  Any  Any    None
>
```

Messages: *ECE ID not found*
Invalid parameter: 0

Command: **EVC ECE Status**
Syntax: **evc ece status** [<**ece_id**>]
Description: Display (show) the current status of one or more existing ECEs, where:
<**ece_id**>: The ECE ID (1-128) to display.

Example 1:

```
>evc ece status
ECE ID  Direction   EVC ID  Conflict
------  ----------  ------  --------
1       Both        1       No
2       Both        1       No
>
```

Example 2:

```
>evc ece status
ECE ID  Direction   EVC ID  Conflict
------  ----------  ------  --------
1       Both        1       No
2       Both        1       No
>evc ece status 1
ECE ID          : 1

Key Parameters
--------------
UNI Ports       : None
Outer Tag Type  : Any
Outer VID       : Any
Outer PCP       : Any
Outer DEI       : Any
Inner Tag Type  : Any
Inner VID       : Any
Inner PCP       : Any
Inner DEI       : Any
Frame Type      : Any

Action Parameters
-----------------
Direction       : Both
EVC ID          : 1
Tag Pop Count   : 0
Policer ID      : 1
Policy Number   : 0
Outer Mode      : Disabled
Outer VID       : 0
Outer PCP/DEI   : Fixed
Outer PCP       : 0
Outer DEI       : 0
Inner Tag Type  : None
Inner VID       : 1
Inner PCP/DEI   : Fixed
Inner PCP       : 0
Inner DEI       : 0
Conflict        : No
>
```

Messages:
ECE ID not found
Invalid parameter: 0

Command: **EVC ECE Statistics**
Syntax: **evc ece statistics** [<ece_id>] [<port_list>] [<command>] [frames|bytes]
Description: Show or clear ECE statistics, where:
<**ece_id**> : The ECE ID (1-128) to show or clear.
<**port_list**> : Port list or 'All'. The default is 'All' ports.
<**command**> : Statistics command: clear|green|yellow|red|discard:
clear: Erase (clear) all stored EVC statistics.
green: Show (display) all stored RX Green and TX Green EVC statistics.
yellow: Show (display) all stored RX Yellow and TX Yellow EVC statistics.
red: Show (display) all stored RX Red and TX Red EVC statistics.
discard: Erase (discard) all stored EVC statistics.
frames|**bytes**: Show frame statistics or show byte statistics.

Example:

```
>evc ece statistics
ECE ID 2, Port 4 Statistics:

Rx Green Frames:                    0   Tx Green Frames:                    0
Rx Yellow Frames:                   0   Tx Yellow Frames:                   0
Rx Red Frames:                      0
Rx Discard Frames:                  0   Tx Discard Frames:                  0
Rx Green Bytes:                     0   Tx Green Bytes:                     0
Rx Yellow Bytes:                    0   Tx Yellow Bytes:                    0
Rx Red Bytes:                       0
Rx Discard Bytes:                   0   Tx Discard Bytes:                   0

>evc ece statistics 1 1 green frames
>evc ece statistics 1 1 green bytes
>
```

EPS Commands

EPS (Ethernet Protection Switching) is defined in ITU/T G.8031. The LIB-4xxx implements the ITU G.8031 standard for EPS at the port level. It can perform 1:1 and 1+1 protection in unidirectional and bidirectional switching. The EPS feature provides the option to configure revertive and non-revertive mode in both 1:1 and 1+1 switching. It also allows configuring WTR (Wait To Restore) timer in revertive mode to avoid a 'flapping' working link which could trigger constant protection switching. A misconfigured or mismanaged router may get into a rapid cycle between down and up states. This pattern of repeating withdrawal and re-announcement is known as route 'flapping' and it can cause excessive activity in all the other routers that know about the broken link, as the same route is continuously injected and withdrawn from the routing tables. With BGP, traffic delivery may not function while routes are being updated.

The LIB-4xxx supports a 'Hold-Off-Timer' which would delay the protection switching until an upstream device or the lower layer is ready. Both the WTR and Hold-Off-Timer are configurable in fine granular time increments.

The EPS instance is associated with the MEPs on the working and protection links which are responsible for sending/receiving APS frames. The MEPs associated with the EPS must have APS enabled for protection. The APS frames can be unicast to the peer or a multicast. The APS frames can carry specific commands to its peer entity. When there is a failure in the working link in 1+1 or 1:1 switching, the protection link takes over.

These LIB-4xxx commands provide Ethernet linear Protection Switching (EPS) functions.

>**eps ?**
Available Commands:

EPS create [<inst>] [domport] [1p1|1f1] [<flow_w>] [<flow_p>] [<mep_w>] [<mep_p>] [<mep_aps>] [enable|disable]
EPS config [<inst>] [aps|noaps] [revert|norevert] [unidir|bidir] [w0s|w10s|w30s|w1m|w5m|w12m]
[h0s|h100ms|h500ms|h1s|h2s|h5s|h10s]
EPS command [<inst>] [clear|lockout|forced|manualp|manualw|exercise|freeze|lockoutlocal]
EPS state [<inst>]
>

The typical CLI process to create, configure, set up, and verify an EPS instance requires you to:

1. Create a new EPS instance using the **eps create** command.
2. Configure the EPS using the **eps config** command.
3. Set the EPS command operation using the **eps command** command.
4. Verify the new EPS configuration using the **eps state** command.

The LIB-4xxx EPS commands are explained below.

Command: **Create EPS Instance**
Syntax: **eps create** [<inst>] [domport] [1p1|1f1] [<flow_w>] [<flow_p>] [<mep_w>] [<mep_p>] [<mep_aps>] [enable|disable]
Description: Create a new EPS instance, where:
<**inst**> : Instance number.
domport : Flow domain.
1p1|**1f1** : EPS architecture.
<**flow_w**> : Working flow instance number.
<**flow_p**> : Protecting flow instance number.
<**mep_w**> : Working MEP instance number.
<**mep_p**> : Protecting MEP instance number.
<**mep_aps**> : APS MEP instance number.
enable|**disable**: enable/disable protection.

Example 1:

```
>eps config

Configuration is:
     Inst     Dom     Archi     Wflow     Pflow     Wmep     Pmep     APSmep
 Direct     Revert     Wtr     Hold     Aps
>eps create 1 domport 1p1 1 2 3 4 enable
Invalid APS MEP
>eps create 1 domport 1p1 1 1 1 1 enable
Working and protecting SF MEP is equal
>eps create 1 domport 1p1 1 2 1 2 enable
Invalid APS MEP
>eps create 1 domport 1p1 1 2 1 1 enable
Working and protecting SF MEP is equal
>eps create 1 domport 1p1 1 2 1 3 enable
Invalid APS MEP
>eps config

Configuration is:
     Inst     Dom     Archi     Wflow     Pflow     Wmep     Pmep     APSmep
 Direct     Revert     Wtr     Hold     Aps
        1    Port    1plus1         2         1        2        1          1
  Bidir       True    w10s    True

>
```

Messages:
Creating an instance already created
Invalid parameter: w
Invalid parameter error returned from EPS
Invalid working SF MEP
Invalid APS MEP
Working and protecting SF MEP is equal

Command: **EPS Config**
Syntax: **eps config** [<inst>] [aps|noaps] [revert|norevert] [unidir|bidir]
[w0s|w10s|w30s|w1m|w5m|w12m] [h0s|h100ms|h500ms|h1s|h2s|h5s|h10s]
Description: EPS config operation, where:
<inst> : Instance number
aps|noaps : APS enable/disable
revert|norevert : Revertive enable/disable
unidir|bidir : Unidirectional or bidirectional switching
w0s|w10s|w30s|w1m|w5m|w12m : Wait To Restore timer value (in **s**econds or **m**inutes).
h0s|h100ms|h500ms|h1s|h2s|h5s|h10s: Hold off timer value (in **s**econds or **m**illiseconds).

Example 1:

```
>eps config 1 aps revert bidir w10s h1s
EPS instance not created
>eps config 1 aps norevert bidir w10s h0s
EPS instance not created
>eps config

Configuration is:
     Inst     Dom     Archi     Wflow     Pflow     Wmep     Pmep     APSmep
 Direct     Revert     Wtr     Hold     Aps

>
```

Messages:
EPS instance not created
Invalid parameter: w
Operating on an instance not created

Command: **EPS Command**
Syntax: **eps command** [<inst>] [clear|lockout|forced|manualp|manualw|exercise|freeze|lockoutlocal]
Description: EPS command set operation. An EPS must first be created (**eps create** command above) and configured (**eps config** command above) to be able to use this command. The parameters are:
<**inst**> : An existing Instance number.
clear|**lockout**|**forced**|**manualp**|**manualw**|**exercise**|**freeze**|**lockoutlocal**: EPS protection command type, either:
clear: Clear = 'no command active'.
lock Out: This EPS is locked to working (not active). In case of 1:N (more than one EPS with same protecting flow) when one EPS switches to protecting flow, the other EPS is enforced with this command
forced: Forced switch to protecting.
manualp: Manual switch to protecting.
manualw: Manual switch to working - this is only possible in 1:1 non-revertive.
exercise: Exercise of the protocol - not traffic effecting.
freeze: This EPS is locally freezed - ignoring all input.
lock out local: This EPS is locally "locked out" - ignoring local SF detected on working.

Example:

```
>eps command

Commands:
     Inst

>eps command 1 exercise
EPS instance not created
>eps command 1 clear
EPS instance not created
>eps command 1 lockout
EPS instance not created
>eps command 1 forced
EPS instance not created
>
```

Messages: *EPS instance not created*
EPS NOT created
Operating on an instance not created

Command: **Show EPS State**
Syntax: **eps state** [<inst>]
Description: Display the current EPS protection state, where:
<**inst**>: An existing Instance number.

Example:

```
>eps state 1

EPS state is:
     Inst        State     Wstate     Pstate     TxAps r b     RxAps r b     Fop
Pm     FopCm     FopNr     FopNoAps
        1        ExerW         Ok         Ok      EXER 0 1        NR 0 0     Fal
se     False     False         True

>eps state 2

EPS state is:
     Inst        State     Wstate     Pstate     TxAps r b     RxAps r b     Fop
Pm     FopCm     FopNr     FopNoAps

>
```

The EPS State table parameters displayed are:

Inst: An existing EPS Instance number.

State: The current EPS protection state for this instance (‘enable’ or ‘disable’).

Wstate: The current Working flow state for this instance.

Pstate: The current Protecting flow state for this instance.

TxAps r b: Transmit APS r b: The ‘r b’ indicates ‘RPL Blocked’. This is the transmitted APS according to the State Transition Tables in the G.8032 standard.

RxAps r b: Receive APS r b: The ‘r b’ indicates ‘RPL Blocked’. This is the received APS according to the State Transition Tables in the G.8032 standard.

FopPm: Displays ‘true’ if a Failure of Protocol – Provisioning Mismatch has occurred, otherwise displays ‘false’. Due to errors in provisioning, the ERP control process may detect a combination of conditions which should not occur during "normal" conditions. To warn the operator of such an event, a failure of protocol – provisioning mismatch (FOP-PM) is defined. The FOP-PM defect, detected if the RPL owner node receives one or more No Request R-APS message(s) with the RPL Blocked status flag set (NR, RB), and a node ID that differs from its own. The ERP control process must notify the equipment fault management process when it detects such a defect condition, and continue its operation as well as possible. This is only an overview of the defect condition. The associated defect and its details are defined in ITU-T G.8021 as amended by its Amendments 1 and 2.

FopCm: Displays ‘true’ if a Failure of Protocol – Configuration Mismatch has occurred, otherwise displays ‘false’. Fully incompatible provisioning and working/protection Configuration mismatches are detected by receiving just one APS frame.

FopNr: The ‘Nr’ indicates ‘No Request’ (e.g., NR Null/Null displayed). No request (NR) is the ring protection condition when no local protection switching requests are active. This is the transmitted APS according to the State Transition Tables in the G.8032 standard.

FopNoAps: APS PDU not received from the other end.

When any Failure of Protocol Defect (FOP) is detected, the LIB-4xxx red LED displays on the web GUI “Ethernet Protection Switching” table; otherwise the green LED displays.

Automatic Protection Switching (the APS protocol) is mandatory for 1:1 protection. It enables the automatic protection switching APS protocol and linear protection switching mechanisms for point-to-point VLAN-based ETH SNC in Ethernet transport networks per Rec. ITU-T G.8031/Y.1342 (11/2009).
APS protocol information transportation based on transmitting / receiving R-APS/L-APS PDU can be enabled/disabled. This must be enabled to support ERPS/ELPS implementing APS. This is only valid with one Peer MEP configured.

Per ITU-T Rec. G.8021/Y.1341 (2004)/Amd.1 (06/2006): provides updated material describing the functions required to support link aggregation and a subset of the Ethernet OAM, i.e., clauses 8.1 (OAM related processes), 9 (Ethernet layer functions), 9.1 (ETH_FD function), 9.2 (ETHx/ETH_A adaptation function), 9.3 (ETHG/ETH_A adaptation function), 9.5 (<server>/ETH_A adaptation function) and 9.7 (ETH link aggregation function). Amendment 1 also defines the Ethernet-specific equipment functional details for the CSF and RFI mechanisms.

Per Rec. ITU-T G.8021/Y.1341 (2007)/Amendment 2 (02/2010) – Prepublished version:
Defect Generation Process: this process detects and clears the defects (dLOC[i], dRDI[i], dLCK, dAIS, dUNL, dMMG, dUNM, dUNP, dUNPr, dDEG) as defined in Clause 6, where [i] = maintenance entity.
Defects: this function detects dLOC[i], dRDI[i], dLCK, dAIS, dUNL, dMMG, dUNM, dUNP, dUNPr, and dDEG.
Defect correlations: cRDI[i] ← (dRDI[1..n]) and (MI_CC_Enable)
Performance monitoring:
pN_LFFLC ← N_LF
pN_TFC ← N_TF
pF_LFFLC ← F_LF
pF_TFNTC ← F_TF

dDEG (Degraded Signal defect) - this defect is only defined for point-to-point ETH connections. The Degraded Signal defect is calculated at the ETH layer. It monitors the connectivity of an ETH Trail. Every second the LIB-4xxx receives the 1 second counters for far near end received and transmitted frames and determines whether the second was a Bad Second. The defect is detected if there are MI_LM_DEGM consecutive Bad Seconds and cleared if there are MI_LM_M consecutive Good Seconds. In order to declare a Bad Second the number of transmitted frames must exceed a threshold (TF_MIN). If this is true then a Bad Second is declared if either the Frame Loss is negative (i.e., there are more frames received than transmitted) or the Frame Loss Ratio (lost frames/transmitted frames) is greater than MI_LM_DEGTHR.

dFOP-PM (Linear or Ring protection Failure of Protocol Provisioning Mismatch) - the Failure of Protocol Provisioning Mismatch defect is calculated at the ETH layer. It monitors provisioning mismatch of:

- Linear protection by comparing B bits of the transmitted and the received APS protocol, or
- Ring protection by comparing the Node ID of the RPL Owner and the Node ID in a received R-APS(NR, RB) frame.

dFOP-PM is detected:

- In the case of linear protection, on receipt of an APSb event and cleared on receipt of an expAPS event. These events are generated by the subnetwork connection protection process (Clause 9.1.3.), or
- In the case of ring protection, on receipt of an RAPSpm event and cleared on receipt of no RAPSpm event during K times the long R-APS frame intervals defined in G.8032/Y.1344, where K>=3.5. These events are generated by the ring protection control process (Clause 9.1.4).

Ring Protection Control Process: Ring Protection with Inherent, Sub-Layer, or Test Trail monitoring is supported. This is only an overview of the Ethernet Ring Protection Control Process as specified in ITU-T Rec. G.8032/Y.1344. The ETH_FT_Sk provides the TSF protection switching criterion via the ETH/ETH_A_Sk function (SSF). G.8032 specifies the requirements, options and the ring protection protocol supported by the ring protection control process.

The following configuration parameters are defined in G.8032/Y.1344:

ETH_C_MI_RAPS_RPL_Owner_Node configures the node type.
ETH_C_MI_RAPS_RPL_Neighbour_Node configures the adjacency of a node to the RPL Owner.
ETH_C_MI_RAPS_Propagate_TC[1…M] configures the flush logic of an interconnection node.
ETH_C_MI_RAPS_Compatible_Version configures the Backward compatibility logic.
ETH_C_MI_RAPS_Revertive configures the revertive mode.
ETH_C_MI_RAPS_Sub_Ring_Without_Virtual_Channel configures the sub-ring type.

Defects: The function detects dFOP-PM in case the R-APS protocol is used.

Defect correlations: cFOP-PM, dFOP-PM.

MEP Commands

A MEP (Maintenance entity End Point) is an endpoint in a Maintenance Entity Group (per ITU-T Y.1731).

The LIB-4xxx implements Service OAM (SOAM), compliant with IEEE802.1ag and ITU Y.1731 standards. SOAM operates over the LIB-4xxx VLAN configuration.

The OAM functions are based on transmission and reception of OAM frames (i.e., PDU frames). OAM frames are exchanged within a Maintenance Entity (ME) and the points that transmit and receive OAM frames are called Maintenance Entity Group End Points (MEPs). The ME Group has a unique ID and each MEP has a unique ID within the MEG. OAM frames have a unique EtherType of 0x8902 and are transmitted either as Unicast or Multicast within a dedicated range of MAC addresses (01-80-C2-00-00-30 and 01-80-C2-00-00-3F).

ME groups can be nested but cannot overlap. To accommodate nesting, the OAM frame contains a MEG level (i.e., a MEP at a certain level will forward OAM frames of a higher level and block OAM frames at a lower level). The MEG levels are divided into three roles: the 'Customer' role is assigned three MEG levels (7, 6, and 5), the 'Provider' role is assigned two MEG levels (4 and 3), and the 'Operator' role is assigned three MEG levels (2, 1, and 0). Especially with Fault Protection, it is possible to have a MEG Intermediate Point (MIP). A MIP reacts only to link trace and Unicast Loopback PDUs, and forwards all OAM frames.

These LIB-4xxx commands provide Maintenance entity End Point (MEP) functions.
Note: SOAM MEP configuration must be done before configuring Ring Protection (ERPS commands).

>**mep ?**
Available Commands:

MEP config [<inst>] [mep|mip] [down|up] [<port>] [domport|domevc] [<level>] [itu|ieee] [<meg>] [<mep>] [<vid>] [<flow>] [enable|disable]
MEP peer MEP [<inst>] [<mep>] [<mac_addr>] [enable|disable]
MEP cc config [<inst>] [<prio>] [300s|100s|10s|1s|6m|1m|6h] [enable|disable]
MEP lm config [<inst>] [<prio>] [uni|multi] [single|dual] [10s|1s|6m|1m|6h] [<flr>] [enable|disable]
MEP aps config [<inst>] [<prio>] [uni|multi] [laps|raps] [<octet>] [enable|disable]
MEP client config [<inst>] [domport|domevc] [<level>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>]
MEP ais config [<inst>] [<prio>] [1s|1m] [set|clear] [enable|disable]
MEP lck config [<inst>] [<prio>] [1s|1m] [enable|disable]
MEP lt config [<inst>] [<prio>] [<mac_addr>] [<mep>] [<ttl>] [enable|disable]
MEP lb config [<inst>] [set|clear] [<prio>] [uni|multi] [<mac_addr>] [<mep>] [<tosend>] [<size>] [<gap>] [enable|disable]
MEP dm config [<inst>] [<prio>] [uni|multi] [<mep>] [oneway|twoway] [std|prop] [rdtrp|flow] [<gap>] [<count>] [us|ns] [keep|reset] [d2ford1] [enable|disable]
MEP tst config [<inst>] [set|clear] [<prio>] [<mep>] [no_seq|seq] [<rate>] [<size>] [allzero|allone|onezero] [enable|disable]
MEP state [<inst>]
MEP lm state [<inst>]
MEP lm clear <inst>
MEP lt state [<inst>]
MEP lb state [<inst>]
MEP dm state [<inst>]
MEP dm clear <inst>
MEP tst state [<inst>]
MEP tst clear <inst>
>

The available LIB-4xxx Maintenance entity End Point (MEP) commands are explained below.

Command: **Configure MEP / MIP Instance**

Syntax: **mep config** [<inst>] [mep|mip] [down|up] [<port>] [domport|domevc] [<level>] [itu |ieee] [<meg>] [<mep>] [<vid>] [<flow>] [enable|disable]

Description: Display , edit, or define a MEP instance configuration(s). For MEP instance configuration: The parameters are:

<**inst**> : Instance number.

mep|**mip** : Mode of the MEP instance. This entity is either a MEP or a MIP - end point or intermediate point.

down|**up** : Direction of the MEP instance. This entity is either a (Ingress) down or (Egress) up type of MEP.

<**port**> : Port number. The **'port'** is the residence port.

domport|**domevc**: Flow domain; the domain is either Port or EVC.

<**level**> : MEG level (0-7). The **'level'** is the MEG level.

itu|**ieee** : The **'itu**|**ieee'** is the MEG ID format, either:

ITU: ICC format as defined in Y.1731 ANNEX A, or

IEEE: String format Domain Name and Short Name as defined in 802.1ag.

<**meg**> : MEG ID (max. 8 chars). The **'meg'** is the MEG ID - max. 8 char in case of 'ieee' - 6 or 7 char in case of 'itu'.

<**mep**> : This MEP id (0-0x1FFF). The **'mep'** is the MEP ID.

<**vid**> : C-TAG only applicable for Port MEP. The **'vid'** is used for TAGGED OAM in port domain.

<**flow**> : Flow instance number (Port/EVC). The **'flow'** is the related flow instance number (Port number in Port domain - EVC number in EVC domain).

enable|**disable**: enable/disable the MEP.

Example 1:

```
>mep config

MEP Configuration is:
   Inst   Mode   Direction   Port   Dom    Level   Format   Name     Meg id   Mep id   Vid   Flow   Eps    MAC
     1    Mep      Down       1    Port     0     ITU ICC  TRNSTN   meg000     0      0     1     0     00-C0-F2-00-00-02
     2    Mep       Up        2    Port     1     ITU ICC  TRNSTN   meg000     0      1     2     0     00-C0-F2-00-00-03
     3    Mep      Down       3    Port     2     ITU ICC  TRNSTN   meg000     0      2     3     1     00-C0-F2-00-00-04
     4    Mep      Down       4    Eps      3     ITU ICC  TRNSTN   meg000     0      3     4    1-2    00-C0-F2-00-00-05

>
```

Note: The LIB-4xxx supports a maximum of 10 MEPS per port assignable to any VLAN(s) on a port and a maximum of 80 MEPS per LIB-4xxx. The maximum number of MEPs at each CCM interval that can be supported without affecting performance depends on what else is configured on the LIB-4xxx.

Messages: *Invalid parameter error returned from MEP*

Command: **MEP Peer MEP**
Syntax: **mep peer mep** [<inst>] [<mep>] [<mac_addr>] [enable|disable]
Description: Add, edit, or display a Peer MEP ID configuration, where:
<**inst**> : Instance number.
<**mep**> : This MEP id (0-0x1FFF).
<**mac_addr**> : MAC address (xx-xx-xx-xx-xx-xx). This Unicast Peer MAC address will be used when unicast is selected with this peer MEP. Also this MAC is used to create HW checking of receiving CCM PDU (LOC detection) from this MEP.
enable|**disable**: Enable or disable this peer MEP.

Example:

```
>mep peer mep

MEP Peer MEP Configuration is:
     Inst     Peer id              Peer MAC

>MEP>peer mep 1 1 11-22-33-44-55-66 enable
>MEP>peer mep

MEP Peer MEP Configuration is:
     Inst     Peer id              Peer MAC
        1           1     11-22-33-44-55-66

MEP>
```

Command: **MEP Continuity Check Config**
Syntax: **mep cc config** [<inst>] [<prio>] [300s|100s|10s|1s|6m|1m|6h] [enable|disable]
Description: Add, edit or display MEP Continuity Check configuration, where:
<**inst**> : Instance number.
<**prio**> : OAM PDU priority.
300s|**100s**|**10s**|**1s**|**6m**|**1m**|**6h**: OAM period (100s -> 100 PDU per second).
enable|**disable** : enable/disable MEP CC configuration.

Example:

```
MEP>cc config 1 1 10s enable
MEP>cc config

MEP CC Configuration is:
     Inst     Prio     Period
        1        1        10s

MEP>
```

Command: **MEP Loss Measurement Config**
Syntax: **mep lm config** [<inst>] [<prio>] [uni|multi] [single|dual] [300s|100s|10s|1s|6m|1m|6h] [<flr>] [enable|disable]
Description: Add, edit or display MEP Loss Measurement (LM) configuration, where:
<**inst**> : Instance number.
<**prio**> : OAM PDU priority.
uni|**multi** : Set Destination address to unicast or multicast.
single|**dual** : LM is single-ended or dual-ended.
300s|**100s**|**10s**|**1s**|**6m**|**1m**|**6h**: OAM period (100s -> 100 PDU per second).
<**flr**> : Frame loss ratio (in seconds). The valid range is 0-65535.
enable|**disable** : enable/disable MEP Loss Measurement.

Example:
```
MEP>lm config 1 2 uni single 10s 4 enable
MEP>lm config
MEP LM Configuration is:
     Inst     Prio     Cast      Ended     Period     Flr
        1        2      Uni     Single       10s       4
MEP>
```

Command: **MEP Automatic Protection Switching Config**
Syntax: **mep aps config** [<inst>] [<prio>] [uni|multi] [laps|raps] [<octet>] [enable|disable]
Description: Add, edit or display MEP APS configuration. ETH-APS can be either linear APS or Ring APS. The parameters are:
<**inst**> : Instance number.
<**prio**> : OAM PDU priority.
uni|**multi** : Destination address is unicast or multicast.
laps|**raps** : Selection of Linear or Ring APS type (ELPS/LAPS or ERPS/RAPS protocol).
<**octet**> : The last octet in RAPS multicast MAC..
enable|**disable**: enable/disable MEP APS.

Example:
```
MEP>aps config 1 2 uni laps 11 enable
MEP>aps config

MEP APS Configuration is:
     Inst     Prio     Cast     Type    Octet
        1        2      Uni     laps        B

MEP>aps config 1 0 uni raps 11 enable
MEP>aps config

MEP APS Configuration is:
     Inst     Prio     Cast     Type    Octet
        1        0      Uni     raps        B

MEP>
```

Messages: *Invalid parameter error returned from MEP*
MEP instance is not enabled

Command: **MEP Client Config**
Syntax: **mep client config** [<inst>] [domport|domevc] [<level>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>]
Description: Displays the current MEP Client configuration. The displayed parameters are:
<**inst**> : The Instance number.
domport|**domevc**: The Flow domain (the client domain - must be EVC).
<**level**> : The MEP level (0-7). This is the client MEG level - the contained level in the AIS and LCK frames.
<**cflow**> : The client flow instance number (EVC). This is the client flow instance - up to 10 possible client flows (EVC).

Example:
```
>mep client conf

MEP Client Configuration is:
     Inst     Domain     Level                    Flows
        1       Port         0
        2       Port         0
        3       Port         0
        4       Port         0

>
```

Messages: *'instance' required*

Command: **MEP Alarm Indication Signal Config**
Syntax: **mep ais config** [<inst>] [<prio>] [1s|1m] [protection] [enable|disable]
Description: Add, edit or display MEP AIS (Alarm Indication Signal) configuration, where:
<**inst**> : Instance number.
<**prio**> : OAM PDU priority.
1s|**1m** : Transmit period for both AIS and LCK.
1s - to send OAM Frames in the rate of one frame-per-second (fps).
1m - to send OAM frames in the rate of one frame-per-minute (fps).
protection : Whether corresponding AIS leads to protection switching or not.
set : Protection usability set.
clear : Protection usability clear.
enable|**disable**: enable/disable MEP AIS configuration (insertion of AIS PDU transmission) in client layer flows, can be enable/disabled here).

Example:
```
>mep ais config 1 3 1m set enable
>
```

Messages: *Invalid parameter error returned from MEP*
MEP instance is not enabled

Command: **MEP Link Trace Config**

Syntax: **mep lt config** [<inst>] [<prio>] [<mac_addr>] [<mep>] [<ttl>] [enable|disable]

Description: Add, edit or display the MEP LT (Link Trace) configuration, where:

<**inst**> : Instance number.

<**prio**> : OAM PDU priority. The priority (PCP) of the transmitted LTM frame. (The priority to be inserted as PCP bits in TAG, if any).

[<**mac_addr**>]: The target machine's MAC address. The unicast MAC of the target MEP/MIP. MAC address ('xx-xx-xx-xx-xx-xx' or 'xx.xx.xx.xx.xx.xx' or 'xxxxxxxxxxxx', where ***x*** is a hexadecimal digit).

<**mep**> : MEP id (0-0x1FFF) - the peer MEP-ID of target MEP. Only used if 'mac_addr is all zeros.

<**ttl**> : LT Time To Live; the TLL in the transmitted LTM. This is the LTM PDU TTL value as described in Y.1731. This value is decremented each time forwarded by a MIP. The PDU will be dropped if this value decrements to zero before reaching its destination. The valid range is 1-255.

enable|**disable**: enable/disable MEP Link Trace. Link Trace based on transmitting/receiving LTM/LTR PDU can be enabled/disabled. Link Trace is automatically disabled when all 5 transactions are done with 5 sec. interval - waiting 5 sec. for all LTR in the end. The LTM PDU is always transmitted as Multi-cast Class 2.

Example:

```
MEP>lt config 1 2 11-22-33-44-55-66 1 4

'instance' and 'enable|disable' required
MEP>lt config 2 2 11-22-33-44-55-66 1 4 enable
Invalid number of peer's for this configuration
MEP>
>mep lt config 1 1 11-22-33-44-55-66 1 1 enable
>mep lt config

MEP LT Configuration is:
     Inst     Prio     Mep                    MAC     Ttl
        1        1       1     11-22-33-44-55-66       1

>
```

Messages: *'instance' and 'enable|disable' required*
Invalid number of peer's for this configuration
MEP instance is not enabled

Command: **MEP Loopback Config**
Syntax: **mep lb config** [<inst>] [set|clear] [<prio>] [uni|multi] [<mac_addr>] [<mep>] [<tosend>] [<size>] [<gap>] [enable|disable]
Description: Add, edit, or display the MEP Loop Back (LB) configuration, where:

<**inst**> : Instance number
set|**clear** : OAM DEI set/clear ('set|clear' is set or clear of DEI of transmitted LBM frame).
<**prio**> : OAM PDU priority ('prio' is the priority (PCP) of transmitted LBM frame).
uni|**multi** : Destination address is unicast or multicast ('uni|multi' is selecting uni-cast or multi-cast transmission of LBM frame). Select LBM PDU transmitted unicast or multi-cast. The unicast MAC will be configured through 'Peer MEP' or 'Unicast Peer MAC'. Towards MIP only unicast Loop Back is possible.
<**mac_addr**> : MAC address (xx-xx-xx-xx-xx-xx) (the unicast MAC of target MEP/MIP).
<**mep**> : This MEP ID (0-0x1FFF) (the peer MEP-ID of target MEP. Only used if 'mac_addr' is all zeros.
<**tosend**> : Number of LBM to send ('tosend' is the number of Loop Back Messages to send). The valid range is 1-1000.
<**size**> : Size of LBM data field in bytes. Enter the number of bytes in the LBM PDU Data Pattern TLV. The valid range is 1-1400.
<**gap**> : Gap between Loop Back Messages to send in 10ms. The valid range is 1-100 , where '0' is as fast as possible. (The 'gap' is the time gap between LBMs).
enable|**disable**: Enable or disable MEP Loop Back (LB) operation, based on transmitting/receiving LBM/LBR PDU can be enabled/disabled. Loop Back is automatically disabled when all 'To Send' LBM PDU has been transmitted - waiting 5 sec. for all LBR from the end.

Example:

```
MEP>lb config 1 set 4 uni 11-22-33-44-55-66 1 16 100 1 enable
MEP>lb config

MEP LB Configuration is:
Inst     Dei     Prio     Cast     Mep     MAC     ToSend   Size     Gap

MEP>
```

Messages: *'instance' and 'enable|disable' required*
Invalid number of peer's for this configuration
MEP instance is not enabled

Command: **MEP Delay Measurement Config**

Syntax: **mep dm config** [<inst>] [<prio>] [uni|multi] [<mep>] [oneway|twoway] [std|prop] [rdtrp|flow] [<gap>] [<count>] [us|ns] [keep|reset] [d2ford1] [enable|disable]

Description: Add, edit or display the MEP Delay Measurement configuration, where:

<**inst**> : Instance number for this MEP DM config.

<**prio**> : OAM PDU priority ('prio' is the priority (PCP) of transmitted DM frame).

uni|**multi** : Destination address is unicast or multicast ('uni|multi' is selecting uni-cast or multi-cast transmission of DM frame).

<**mep**> : This MEP id (0-0x1FFF). (The 'mep' is the peer MEP-ID of target MEP - only used if 'uni' is selected above).

oneway|**twoway** : DM is one-way or two-way. Enter 'oneway' for one-way (1DM) or enter 'twoway' for two-way (DMM) DM.

std|**prop** : Standard or proprietary way (w/ follow-up packets) to send DM ('std|prop' selects standardized or proprietary DM. The latest is using an off-standard follow-up message carrying the exact HW transmit timestamp).

rdtrp|**flow** : 2/4 timestamps selection. OAM PDU is timestamped four times (Source egress, Destination ingress, Destination egress and Source ingress). Use just the source timestamps (rdtrp) or all timestamps (flow) for the DM calculation.

<**gap**> : Gap between 1DM/DMM to send in 10ms (10-65535). The 'gap' is the interval between transmitting 1DM/DMM PDU - in 10 ms increments.

<**count**> : The number of last records to calculate(10 - 2000). The 'count' is the number of frames used for average calculation on the latest 'count' frames received

us|**ns** : Time resolution; 'us|ns' calculation results are shown in micro or nano seconds.

keep|**reset** : The action to counter when overflow happens ('keep|reset' the action in case of total delay counter overflow - either 'keep' all results or 'reset' all results).

d2ford1 : Enable to use DMM/DMR packets to calculate one-way DM. Select 'd2ford1' to use two-way DMM for calculate one-way delay.

enable|**disable**: Enable or disable MEP Delay Measurement operation. Default is disabled.

Example:

```
MEP>dm config 1 4 uni 1 oneway std rdtrp 10 100 us keep d2ford1 enable
MEP>dm config

MEP DM Configuration is:
     Inst     Prio     Cast     Mep       Way     Prtcl    2-way Calc     Gap
Count   Unit   D2forD1 CNT OV ACT
        1        4      Uni       1   One-way       Std         Rdtrp      10
  100     us   Enabled       keep

MEP>
```

Messages: *'instance' and 'enable|disable' required*
Invalid number of peer's for this configuration
MEP instance is not enabled

Command: **MEP Test Config**

Syntax: **mep tst config** [<inst>] [set|clear] [<prio>] [<mep>] [no_seq|seq] [<rate>] [<size>] [allzero|allone|onezero] [enable|disable]

Description: Configure the MEP Test (Tst) Signal. The Ethernet Test Signal (ETH-Test) functions as a means for performing one-way in-service or out-of-service diagnostic testing between a pair of MEPs. The MEF 30 requirements define default protocol values and the protocol options required for a compliant MEF Service OAM implementation. Note that when performing out-of-service diagnostic testing, the ETH-LCK is used in conjunction with ETH-Test. The parameters are:

<inst> : Instance number for this MEP Test.

set|clear : OAM DEI set/clear (set or clear DEI of transmitted LBM frames).

<prio> : OAM PDU priority. The 'prio' is the priority (PCP) of transmitted TST frame.

<mep> : This MEP ID (0-0x1FFF). (The 'mep' is the peer MEP-ID of a target MEP).

no_seq|seq : TST sequence number transmission.

<rate> : Transmission bit rate of TST frames - in Mbps. The 'rate' is the TST frame transmission bit rate in Mbps'. The valid range is 1-400 Mbps.

<size> : Size of TST data field in bytes. (The 'size' is the size of the un-tagged TST frame - four bytes will be added for each tag.) This is entered as the wanted size (in bytes) of a un-tagged frame containing TST OAM PDU - including CRC (four bytes). For example when 'Size' = 64 => Un-tagged frame size = DMAC(6) + SMAC(6) + TYPE(2) + TST PDU LENGTH(46) + CRC(4) = 64 bytes . The transmitted frame will be four bytes longer for each tag added - 8 bytes in case of a tunnel EVC. The transmitting frame rate will be adjusted according to the actually transmitted frame size to obtain correct transmission bit rate. The valid range is 1-1518 bytes.

allzero|allone|onezero: Data pattern to be filled in TST PDU. This is the pattern contained in the TST frame data TLV ('allzero' = 000 pattern; 'alone' = 111 pattern; 'onezero' = alternating 010 pattern). The 'empty' TST PDU has the size of 12 bytes. In order to achieve the configured frame size a data TLV will be added with a pattern. For example when 'Size' = 64 => Un-tagged frame size = DMAC(6) + SMAC(6) + TYPE(2) + TST PDU LENGTH(46) + CRC(4) = 64 bytes The TST PDU needs to be 46 bytes so a pattern of 46-12=34 bytes will be added.

enable|disable : Enable or disable MEP Test operation.

Example:

```
MEP>tst config 1 set 6 1 seq 9 1000 onezero enable
MEP>tst config

MEP TST Configuration is:
     Inst     Dei     Prio     Mep     rate     Size      Pattern     Sequence
      1       1        6       1        9       1000      0xAA
```

Messages: *Invalid parameter error returned from MEP*
MEP instance is not enabled

Command: **MEP State**
Syntax: **mep state** [<inst>]
Description: Display the current MEP state, where:
<**inst**>: Instance number for this MEP.

Example 1:

```
MEP>state
MEP state is:
     Inst      cLevel       cMeg       cMep       cAis       cLck       cSsf
  aBlk       aTsf   Peer MEP       cLoc       cRdi    cPeriod      cPrio
        1       False      False      False      False      False       True
 False       True          1      False      False      False      False
        2       False      False      False      False      False      False
 False      False

MEP>
```

Example 2:

```
>mep state
MEP state is:
   Inst   cLevel    cMeg    cMep    cAis    cLck    cSsf     aBlk    aTsf   Peer MEP     cLoc     cRdi   cPeriod     cPrio
     1    False    False   False   False   False   True     False   True
     2    False    False   False   False   False   True     False   True

>
```

The MEP state parameters are:

cLevel: Fault Cause indicating that a CCM is received with a lower level than the level configured for this MEP.

cMEG: Fault Cause indicating that a CCM is received with a MEG ID different from configured for this MEP.

cMEP: Fault Cause indicating that a CCM is received with a MEP ID different from all 'Peer MEP ID' configured for this MEP.

cAIS: Fault Cause indicating that AIS PDU is received. Ethernet alarm indication signal function (ETH-AIS) allows a customer who deploys an Ethernet service to tell if a connectivity fault exists at the current level or at a level below.

cLCK: Fault Cause indicating that LCK PDU is received. The Ethernet lock signal function is used to signal administrative locking of a server (sub) layer MEP and interruption of data traffic forwarding toward the MEP waiting for the traffic. The transmission and reception of LCK frames is similar to that of AIS frames except that with cLCK, the condition communicated is an administrative locking condition and not a defect condition.

cSSF: Fault Cause indicating that the server layer is indicating Signal Fail.

aBLK: The consequent action of blocking service frames in this flow is active.

aTSF: The consequent action of indicating Trail Signal Fail towards protection is active.

Peer MEP: This value will become an expected MEP ID in a received CCM.

cLoc: Fault Cause indicating that no CCM has been received (in 3,5 periods) from this peer MEP.

cRdi: Fault Cause indicating that a CCM is received with Remote Defect Indication - from this peer MEP. Both 802.1ag and Y.1731 specify Ethernet Remote Defect Indication function (ETH-RDI).

cPeriod: Fault Cause indicating that a CCM is received with a period different than what is configured for this MEP - from this peer MEP.

cPrio: Fault Cause indicating that a CCM is received with a priority different than what is configured for this MEP from this peer MEP.

Command: **MEP LOCK Config**
Syntax: **mep lck config** [<inst>] [<prio>] [1s|1m] [enable|disable]
Description: Add, edit or display a MEP LCK configuration, where:
<**inst**> : Instance number for this MEP Lock configuration.
<**prio**> : OAM PDU priority ('prio' is the priority (PCP) of transmitted AIS frame).
1s|**1m** : Transmit period for both AIS and LCK; select either:
1s - to send OAM Frames at the rate of 1 frame-per-second (fps), or
1m - to send OAM frames at the rate of 1 frame-per-minute (fpm).
enable|**disable**: enable/disable the MEP LCK capability.

Example:
```
MEP>lck config 1 2 1s enable
Invalid parameter error returned from MEP
MEP>lck config 1 2 1m enable
Invalid parameter error returned from MEP
MEP>lck config
MEP LCK Configuration is:
     Inst     Prio     Period

>
```

Command: **MEP LM State**
Syntax: **mep lm state** [<inst>]
Description: Display the current MEP Loss Measurement (LM) state. Loss Measurement (LM) offers a way for operators to determine the amount of frame loss in an Ethernet network, over an EVC for example. Specifically, it is the ratio between undelivered OAM frames and the total number of OAM frames transmitted during a specific time interval. ITU-T Y.1731 defines two types of LM: 1) Single-Ended, where LM messages are transmitted to another MEP, which includes transmission and reception frame counts in its response message. Here, only the LM initiator is able to derive frame loss from the counters (since it does not include its local counters in the initial LM message); and 2) Dual-Ended. Continuity Check messages are used to carry frame transmission and reception counters. In contrast to the single-ended approach, this approach allows all MEPs inside a ME to derive frame loss, instead of only the initiating node.
The parameters are:
<**inst**>: Instance number to display. With no entry, all LM instances are displayed.

Example:
```
MEP>lm state
MEP LM state is:
Inst     Tx     Rx     Near Count     Far Count     Near Ratio     Far Ratio
1     98760      0              0             0              0          0
2         0      0              0             0              0          0

MEP>
```

Command: **MEP LM Clear**
Syntax: **mep lm clear** <inst>
Description: Clear the current MEP Loss Measurement (LM) state, where:
<**inst**>: Instance number to clear. With no entry, all LM instances are cleared.
Example:

```
MEP> lm clear 2
MEP> lm clear
Missing <inst> parameter

Syntax:
MEP lm clear <inst>
MEP> lm clear 2
MEP>lm state
MEP LM state is:
Inst  Tx          Rx    Near Count  Far Count   Near Ratio  Far Ratio
1     101630      0     0           0           0           0
2     0           0     0           0           0           0

MEP>
```

Command: **MEP LT State**
Syntax: **mep lt state** [<inst>]
Description: Display the current MEP Link Trace (LT) state, where:
<**inst**>: Instance number to display. With no entry, all LT instances are displayed.
Example:

```
>mep lt state
MEP LT state is:
   Inst     Transaction ID     Ttl     Mode     Direction     Relayed       Last MAC    Next MAC

>
```

Command: **MEP LB State**
Syntax: **mep lb state** [<inst>]
Description: Display the current MEP Loop Back state, where:
<**inst**>: Instance number to display. With no entry, all LB instances are displayed.
Example:

```
>mep lb state
MEP LB state is:
     Inst     Transaction ID                   MAC     Received     Out Of Order


>
```

Command: **MEP DM Clear**
Syntax: **mep dm clear** <inst>
Description: Clear the current MEP Delay Measurement state, where:
<**inst**>: Instance number to clear. With no entry, all DM instances are cleared.
Example:

```
>mep dm clear
Missing <inst> parameter

Syntax:
MEP dm clear <inst>
>mep dm clear 1
>
```

Command: **MEP DM State**

Syntax: **mep dm state** [<inst>]

Description: Display the current MEP Delay Measurement (DM) state, which can be used for measuring delay in a Carrier Ethernet network. The unit of measurement is the round trip delay of a frame, measured from its first transmitted bit, until the reception of its last bit. Since a DM frame must be sent back to its originating node, LB messages are used. Frame delay is the difference, in microseconds, between the time an ETH-DM frame is sent and received. (Frame delay variation - the difference between consecutive frame delay values - also called “frame jitter” - is a different parameter.) Two types of DM can be identified:

One-way measurement: The source timstamps the packet on egress and the destination timestamps the packet on ingress. These two timstamps are compared to derive the DM. Consequently, the clocks of the sending and receiving nodes must be synchronized.

Two-way measurement: In contrast to the one-way measurement, this DM type does not require clock synchronization. The initiating node still includes a timestamp in the Ethernet frame. After the destination node performs a loopback on the frame, the initiating node will receive the frame again. On reception, this node will capture the reception timestamp. The difference between the timestamps can be calculated.

The parameters are:

<**inst**>: MEP Instance number to display.

Example:

```
MEP>dm state 1
MEP DM state is:
RxT : Rx Timeout
RxE : Rx Error
AT  : Average Total
AN  : Average last N
AVT : Average Variation Total
AVN : Average Variation last N
OV  : Overflow. The number of statistics overflow.

Inst   Tx     RxT    Rx     RxE    AT     AN     AVT    AVN    Max    Min    OV
One-way(time unit: us)
Far-end-to-near-end
1      0      0      0      0      0      0      0      0      0      0      0
Near-end-to-far-end
1      16824  0      0      0      0      0      0      0      0      0      0
Two-way(time unit: us)
1      0      0      0      0      0      0      0      0      0      0      0
One-way(time unit: ns)
Two-way(time unit: ns)
MEP>
```

Command: **MEP TEST State**
Syntax: **mep tst state** [<inst>]
Description: Displays the MEP Test Signal state. The RX rate is shown in 100 Kbps. The parameters are:
<**inst**>: The MEP Test instance number to display. No **inst** entry will display all instances configured.

Example:
```
MEP>tst state 1
MEP TST state is:
      Inst  TX frame count    RX frame count    RX rate     Test time
      1     0                 0                 0           0

MEP>tst state
MEP TST state is:
      Inst  TX frame count     RX frame count   RX rate     Test time
      1     0                  0                0           0
      2     0                  0                0           0

MEP>
```

Command: **MEP TEST Clear**
Syntax: **mep tst clear** <inst>
Description: Clears the MEP Test Signal state. The parameters are:
<**inst**>: MEP Test Signal instance number to clear.

Example:
```
MEP>tst clear 1
MEP>tst clear
Missing <inst> parameter

Syntax:
MEP tst clear <inst>
MEP>tst clear 2
MEP>
```

Parameter Definitions

Instance: The ID of the MEP.
Domain:
* Port: This is a MEP in the Port Domain. 'Flow Instance' is a Port.
* Evc: This is a MEP in the EVC Domain. 'Flow Instance' is an EVC
Mode:
* MEP: This is a Maintenance Entity End Point.
* MIP: This is a Maintenance entity Intermediate Point.
Direction:
* Ingress: This is a Ingress (down) MEP - monitoring ingress traffic on 'Residence Port'.
* Egress: This is a Egress (up) MEP - monitoring egress traffic on 'Residence Port'.
Residence Port: The port where MEP is monitoring - see 'Direction' description above.
* Level - The MEG level of this MEP.
* Flow Instance The MEP is related to this flow - See 'Domain' description above.
Tagged VID:
* Port MEP: An outer C/S-tag (depending on VLAN Port Type) is added with this VID.
* EVC MEP: An inner C-tag is added with this VID.
* Entering '**0**' means no TAG added.

QoS Commands

QoS (Quality of Service) is a method to guarantee a bandwidth relationship between individual applications or protocols. A communications network transports a multitude of applications and data, including high-quality video and delay-sensitive data such as real-time voice. Networks must provide secure, predictable, measurable, and sometimes guaranteed services. Achieving the required QoS becomes the secret to a successful end-to-end business solution, with QoS providing the set of techniques to manage network resources.

The QCL (QoS Control List) is the list table of QCEs, containing QoS control entries that classify to a specific QoS class on specific traffic objects. Each accessible traffic object contains an identifier to its QCL.
Each privilege determines a specific traffic object to a specific QoS class. The QoS commands include:

>**qos ?**
Available Commands:

1. QoS Configuration [<port_list>]
2. QoS Port Classification Class [<port_list>] [<class>]
3. QoS Port Classification DPL [<port_list>] [<dpl>]
4. QoS Port Classification PCP [<port_list>] [<pcp>]
5. QoS Port Classification DEI [<port_list>] [<dei>]
6. QoS Port Classification Tag [<port_list>] [enable|disable]
7. QoS Port Classification Map [<port_list>] [<pcp_list>] [<dei_list>] [<class>] [<dpl>]
8. QoS Port Classification DSCP [<port_list>] [enable|disable]
9. QoS Port Policer Mode [<port_list>] [enable|disable]
10. QoS Port Policer Rate [<port_list>] [<rate>]
11. QoS Port Policer Unit [<port_list>] [kbps|fps]
12. QoS Port Policer FlowControl [<port_list>] [enable|disable]
13. QoS Port QueuePolicer Mode [<port_list>] [<queue_list>] [enable|disable]
14. QoS Port QueuePolicer Rate [<port_list>] [<queue_list>] [<bit_rate>]
15. QoS Port Scheduler Mode [<port_list>] [strict|weighted]
16. QoS Port Scheduler Weight [<port_list>] [<queue_list>] [<weight>]
17. QoS Port Shaper Mode [<port_list>] [enable|disable]
18. QoS Port Shaper Rate [<port_list>] [<bit_rate>]
19. QoS Port QueueShaper Mode [<port_list>] [<queue_list>] [enable|disable]
20. QoS Port QueueShaper Rate [<port_list>] [<queue_list>] [<bit_rate>]
21. QoS Port QueueShaper Excess [<port_list>] [<queue_list>] [enable|disable]
22. QoS Port TagRemarking Mode [<port_list>] [classified|default|mapped]
23. QoS Port TagRemarking PCP [<port_list>] [<pcp>]
24. QoS Port TagRemarking DEI [<port_list>] [<dei>]
25. QoS Port TagRemarking DPL [<port_list>] [<dpl>] [<dpl>] [<dpl>] [<dpl>]
26. QoS Port TagRemarking Map [<port_list>] [<class_list>] [<dpl_list>] [<pcp>] [<dei>]
27. QoS Port DSCP Translation [<port_list>] [enable|disable]
28. QoS Port DSCP Classification [<port_list>] [none|zero|selected|all]
29. QoS Port DSCP EgressRemark [<port_list>] [disable|enable|remap]
30. QoS DSCP Map [<dscp_list>] [<class>] [<dpl>]
31. QoS DSCP Translation [<dscp_list>] [<trans_dscp>]
32. QoS DSCP Trust [<dscp_list>] [enable|disable]
33. QoS DSCP Classification Mode [<dscp_list>] [enable|disable]
34. QoS DSCP Classification Map [<class_list>] [<dscp>]
35. QoS DSCP EgressRemap [<dscp_list>] [<dscp>]
36. QoS Port Storm Unicast [<port_list>] [enable|disable] [<rate>] [kbps|fps]
37. QoS Port Storm Broadcast [<port_list>] [enable|disable] [<rate>] [kbps|fps]
38. QoS Port Storm Unknown [<port_list>] [enable|disable] [<rate>] [kbps|fps]
39. QoS WRED [<queue_list>] [enable|disable] [<min_th>] [<mdp_1>] [<mdp_2>] [<mdp_3>]
40. QoS QCL Add [<qce_id>] [<qce_id_next>]
    [<port_list>]
    [<tag>] [<vid>] [<pcp>] [<dei>] [<smac>] [<dmac_type>]
    [(etype [<etype>]) |
    (LLC [<DSAP>] [<SSAP>] [<control>]) |
    (SNAP [<PID>]) |
    (ipv4 [<protocol>] [<sip>] [<dscp>] [<fragment>] [<sport>] [<dport>]) |
    (ipv6 [<protocol>] [<sip_v6>] [<dscp>] [<sport>] [<dport>])]
    [<class>] [<dp>] [<classified_dscp>]
41. QoS QCL Delete <qce_id>
42. QoS QCL Lookup [<qce_id>]
43. QoS QCL Status [combined|static|conflicts]
44. QoS QCL Refresh

>

Command: **Show QoS Config**
Syntax: **qos configuration** [<port_list>]
Description: Show the current QoS (Quality of Service) configuration, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports (note that this can be a long config list).

Example:

```
QoS>config 1

QoS Configuration:
==================


QoS Port Classification Map:
============================

Port  PCP  DEI  QoS class  DP level
----  ---  ---  ---------  --------
1     0    0    1          0
      0    1    1          1
      1    0    0          0
      1    1    0          1
      2    0    2          0
      2    1    2          1
      3    0    3          0
      3    1    3          1
      4    0    4          0
      4    1    4          1
      5    0    5          0
      5    1    5          1
      6    0    6          0
      6    1    6          1
      7    0    7          0
      7    1    7          1
QoS Port Storm Control:
=======================

Port  Uc. Mode  Rate       Bc. Mode  Rate       Un. Mode  Rate
----  --------  ---------  --------  ---------  --------  ---------
1     Disabled   500 kbps  Disabled   500 kbps  Disabled   500 kbps

QoS WRED:
=========
Queue  Mode      Min Th  Mdp 1  Mdp 2  Mdp 3
-----  --------  ------  -----  -----  -----
0      Disabled       0      1      5     10
1      Disabled       0      1      5     10
2      Disabled       0      1      5     10
3      Disabled       0      1      5     10
4      Disabled       0      1      5     10
5      Disabled       0      1      5     10

QoS QCL:
========
Number of QCEs: 0
>
```

Command: **QoS Port Classification Class**
Syntax: **qos port classification class** [<port_list>] [<class>]
Description: Set or show the default QoS class. Every incoming frame is classified to a QoS class, which is used throughout the device for providing queuing, scheduling and congestion control guarantees to the frame according to what was configured for that specific QoS class. There is a one to one mapping between QoS class, queue and priority. A QoS class of 0 (zero) has the lowest priority. The parameters are:
<**port_list**>: Port list or 'all'. The default is 'All ports'.
<**class**> : QoS class (0-7)

Example:

```
>qos port classification class

Port  QoS class
----  ---------
1     0
2     0
3     0
4     0
>qos port classification class 1 2
>qos port classification class 2 2
>qos port classification class 3 3
>qos port classification class 4 4
>qos port classification class

Port  QoS class
----  ---------
1     2
2     2
3     3
4     4
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port Classification DPL** (Drop Precedence Level)
Syntax: **qos port classification dpl** [<port_list>] [<dpl>]
Description: Set or show the default Drop Precedence Level, where:
<**port_list**>: Port list or 'all', default: All ports.
<**dpl**> : Drop Precedence Level (**0-3**):
DPL = 0 (zero) corresponds to 'Committed' (Green) frames. Packets with a DPL of **0** are least likely to be dropped
DPL = 1 or higher corresponds to 'Discard Eligible' (Yellow) frames.
DPL = 2 packets with a DPL of 2 are second most likely to be dropped.
DPL = 3 packets with a DPL of 3 are most likely to be dropped.
If congestion occurs within a class, the packets with the higher drop precedence are discarded first. To prevent issues associated with tail drop, more sophisticated drop selection algorithms such as random early detection (RED) can be used.

Example:

```
>qos port classification dpl 2 1
>qos port classification dpl 3 1
>qos port classification dpl

Port  DP level
----  --------
1     1
2     1
3     1
4     0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

All frames are classified to a DP level.

1) If the Port is VLAN aware, if the frame is tagged and then if it is not tagged, then if:

Tagged: From tag classification mapping for port if enabled;

Untagged: Use default QoS class and DP level for the port.

2) If the Port is VLAN unaware, if the frame is tagged and then if it is not tagged, then use default QoS class and DP level for port.

The classified DP level can be overruled by a QCL entry.

Command: **QoS Port Classification PCP** (Priority Code Point)
Syntax: **qos port classification pcp** [<port_list>] [<pcp>]
Description: Set or show the default PCP for an untagged frame. Controls the default PCP value. All frames are classified to a PCP value. If the port is VLAN aware and the frame is tagged, then the frame is classified to the PCP value in the tag. Otherwise the frame is classified to the default PCP value. The parameters are:
<**port_list**>: Port list or 'All', default: All ports.
<**pcp**> : Priority Code Point (0-7)

Example:

```
>qos port classification pcp

Port  PCP
----  ---
1     0
2     0
3     0
4     0
>qos port classification pcp 1 4
>qos port classification pcp 2 5
>qos port classification pcp 3 6
>qos port classification pcp

Port  PCP
----  ---
1     4
2     5
3     6
4     0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port Classification DEI**
Syntax: **qos port classification dei** [<port_list>] [<dei>]
Description: Set or show the default DEI (Drop Eligible Indicator) for an untagged frame, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**dei**> : Drop Eligible Indicator (0-1).

Example:

```
>qos port classification dei

Port  DEI
----  ---
1     0
2     0
3     0
4     0
>qos port classification dei 1-3 1
>qos port classification dei

Port  DEI
----  ---
1     1
2     1
3     1
4     0
>
```

DEI (Drop Eligible Indicator) is a 1-bit field in the VLAN tag. All frames are classified to a DEI value.
If the port is VLAN aware and the frame is tagged, then the frame is classified to the DEI value in the tag.
Otherwise the frame is classified to the default DEI value.

Command: **QoS Port Classification Tag**
Syntax: **qos port classification tag** [<port_list>] [enable|disable]
Description: Set or show if the classification is based on the PCP and DEI values in tagged frames, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
enable : Enable tag classification; use mapped versions of PCP and DEI for tagged frames.
disable : Disable tag classification; use default QoS class and DP level for tagged frames.
(The default is 'Show tag classification mode'.)

Example:

```
>qos port classification tag

Port  Tag class.
----  ----------
1     Enabled
2     Disabled
3     Disabled
4     Disabled
>qos port classification tag 1 disable
>qos port classification tag 2 enable
>qos port classification tag

Port  Tag class.
----  ----------
1     Disabled
2     Enabled
3     Disabled
4     Disabled
>
```

Command: **QoS Port Classification Map**
Syntax: **qos port classification map** [<port_list>] [<pcp_list>] [<dei_list>] [<class>] [<dpl>]
Description: Set or show the port classification map. This map is used when port classification tag is enabled, and the purpose is to translate the Priority Code Point (PCP) and Drop Eligible Indicator (DEI) from a tagged frame to QoS class and DP level. The parameters are:
<**port_list**>: Port list (0-4) or 'All'. The default is 'All ports'.
<**pcp_list**> : PCP list or 'All', default: All PCPs (0-7).
<**dei_list**> : DEI list or 'All', default: All DEIs (0-1).
<**class**> : QoS class (0-7).
<**dpl**> : Drop Precedence Level (0-1). The DPL for frames not classified in another way.

Example:

```
>qos port classification map 1 1 1 1 0
>qos port classification map 2 2 0 0 1
>qos port classification map 3 3 1 1 0
>qos port classification map 1,2

Port  PCP  DEI  QoS class  DP level
----  ---  ---  ---------  --------
1     0    0    1          0
      0    1    1          1
      1    0    0          0
      1    1    1          0
      2    0    2          0
      2    1    2          1
      3    0    3          0
      3    1    3          1
      4    0    4          0
      4    1    4          1
      5    0    5          0
      5    1    5          1
      6    0    6          0
      6    1    6          1
      7    0    7          0
      7    1    7          1
2     0    0    1          0
      0    1    1          1
      1    0    0          0
      1    1    0          1
      2    0    0          1
      2    1    2          1
      3    0    3          0
      3    1    3          1
      4    0    4          0
      4    1    4          1
      5    0    5          0
      5    1    5          1
      6    0    6          0
      6    1    6          1
      7    0    7          0
      7    1    7          1
>
```

Note: This command has no effect if the port is VLAN unaware. Tagged frames received on VLAN unaware ports are always classified to the default QoS class and DP level.

Command: **QoS Port Classification DSCP**
Syntax: **qos port classification** [<port_list>] [enable|disable]
Description: Set or show if the classification is based on DSCP value in IP frames, where:
<**port_list**>: Port list or 'all', default: All ports.
enable : Enable DSCP based QoS Ingress Port classification.
disable : Disable DSCP based QoS Ingress Port classification.
(The default is 'Show DSCP based classification mode'.)

Example:

```
>qos Port Classification DSCP

Port  DSCP based class.
----  -----------------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>qos Port Classification DSCP 1,2,3 enable
>qos Port Classification DSCP

Port  DSCP based class.
----  -----------------
1     Enabled
2     Enabled
3     Enabled
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port Policer Mode**
Syntax: **qos port policer mode** [<port_list>] [enable|disable]
Description: Set or show the port policer mode, where:
<**port_list**>: Port list or 'all'. The default is 'All ports'.
enable : Enable QoS port policer mode.
disable : Disable QoS port policer mode.
(The default is 'Show port policer mode'.)

Example:

```
>QoS Port Policer Mode

Port  Parm      Policer
----  --------  ---------
1     Mode      Disabled
2     Mode      Enabled
3     Mode      Disabled
4     Mode      Disabled
>QoS Port Policer Mode 1-3 enable
>QoS Port Policer Mode

Port  Parm      Policer
----  --------  ---------
1     Mode      Enabled
2     Mode      Enabled
3     Mode      Enabled
4     Mode      Disabled
>
```

Command: **QoS Port Policer Rate**
Syntax: **qos port policer rate** [<port_list>] [<rate>]
Description: Set or show the port policer rate, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
<**rate**> : Rate in kbps or fps (100-13200000).

Example:

```
>QoS Port Policer Rate

Port  Parm      Policer
----  --------  ---------
1     Rate       500 kbps
2     Rate       500 kbps
3     Rate       500 kbps
4     Rate       500 kbps
>QoS Port Policer Rate 1-3 1000
>QoS Port Policer Rate

Port  Parm      Policer
----  --------  ---------
1     Rate      1000 kbps
2     Rate      1000 kbps
3     Rate      1000 kbps
4     Rate       500 kbps
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port Policer Unit**
Syntax: **qos port policer unit** [<port_list>] [kbps|fps]
Description: Set or show the port policer unit, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
kbps : Unit is kilobits per second (the default).
fps : Unit is frames per second.
(The default is 'Show port policer unit'.)

Example:

```
>QoS Port Policer Unit

Port  Parm      Policer
----  --------  ---------
1     Unit      kbps
2     Unit      kbps
3     Unit      kbps
4     Unit      kbps
>QoS Port Policer Unit 1-3 fps
>QoS Port Policer Unit

Port  Parm      Policer
----  --------  ---------
1     Unit      fps
2     Unit      fps
3     Unit      fps
4     Unit      kbps
>
```

Command: **QoS Port Policer FlowControl**
Syntax: **qos port policer flowcontrol** [<port_list>] [enable|disable]
Description: Set or show the port policer flow control. If policer flow control is enabled and the port is in flow control mode, then pause frames are sent instead of discarding frames. The parameters:
<**port_list**>: Port list or 'all', default: All ports.
enable : Enable port policer flow control.
disable : Disable port policer flow control.
(The default is 'Show port policer flow control mode'.)

Example:

```
>QoS Port Policer FlowControl

Port  Parm      Policer
----  --------  ---------
1     Flow Ctl  Disabled
2     Flow Ctl  Disabled
3     Flow Ctl  Disabled
4     Flow Ctl  Disabled
>QoS Port Policer FlowControl 1-3 enable
>QoS Port Policer FlowControl

Port  Parm      Policer
----  --------  ---------
1     Flow Ctl  Enabled
2     Flow Ctl  Enabled
3     Flow Ctl  Enabled
4     Flow Ctl  Disabled
>
```

Command: **QoS Port QueuePolicer Mode**
Syntax: **qos port queuepolicer mode** [<port_list>] [<queue_list>] [enable|disable]
Description: Set or show the port queue policer mode, where:
<**port_list**> : Port list or 'all', default: All ports.
<**queue_list**>: Queue list or 'All'. The default is 'All queues' (0-7).
enable : Enable port queue policer.
disable : Disable port queue policer.
(The default is 'Show port queue policer mode'.)

Example:

```
>qos port queuepolicer mode 1,2

Port  Queue  Mode
----  -----  --------
1     0      Enabled
      1      Enabled
      2      Enabled
      3      Enabled
      4      Enabled
      5      Enabled
      6      Enabled
      7      Enabled
2     0      Enabled
      1      Disabled
      2      Disabled
      3      Disabled
      4      Disabled
      5      Disabled
      6      Disabled
      7      Disabled
>qos port queuepolicer mode 2 enable
>qos port queuepolicer mode 1,2

Port  Queue  Mode
----  -----  --------
1     0      Enabled
      1      Enabled
      2      Enabled
      3      Enabled
      4      Enabled
      5      Enabled
      6      Enabled
      7      Enabled
2     0      Enabled
      1      Enabled
      2      Enabled
      3      Enabled
      4      Enabled
      5      Enabled
      6      Enabled
      7      Enabled
>
```

Command: **QoS Port QueuePolicer Rate**
Syntax: **qos port queuepolicer rate** [<port_list>] [<queue_list>] [<bit_rate>]
Description: Set or show the port queue policer rate, where:
<**port_list**> : Port list or 'All'. The default is All ports.
<**queue_list**>: Queue list or 'All'. The default is 'All queues' (0-7).
<**bit_rate**> : Rate in kilo bits per second (100-13200000).

Example:

```
>qos port queuepolicer rate 1,2

Port  Queue  Rate
----  -----  ---------
1     0       500 kbps
      1       500 kbps
      2       500 kbps
      3       500 kbps
      4       500 kbps
      5       500 kbps
      6       500 kbps
      7       500 kbps
2     0       500 kbps
      1       500 kbps
      2       500 kbps
      3       500 kbps
      4       500 kbps
      5       500 kbps
      6       500 kbps
      7       500 kbps
>qos port queuepolicer rate 1,2 5000
>qos port queuepolicer rate 1,2

Port  Queue  Rate
----  -----  ---------
1     0      5000 kbps
      1      5000 kbps
      2      5000 kbps
      3      5000 kbps
      4      5000 kbps
      5      5000 kbps
      6      5000 kbps
      7      5000 kbps
2     0      5000 kbps
      1      5000 kbps
      2      5000 kbps
      3      5000 kbps
      4      5000 kbps
      5      5000 kbps
      6      5000 kbps
      7      5000 kbps
>
```

Command: **QoS Port Scheduler Mode**
Syntax: **qos port scheduler mode** [<port_list>] [strict|weighted]
Description: Set or show the port scheduler mode, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
strict : Strict port scheduler mode.
weighted: Weighted port scheduler mode.
(The default is 'Show port scheduler mode'.)

Example:

```
>qos port scheduler mode

Port  Mode
----  --------
1     Strict
2     Weighted
3     Strict
4     Strict
>qos port scheduler mode 1 weighted
>qos port scheduler mode

Port  Mode
----  --------
1     Weighted
2     Weighted
3     Strict
4     Strict
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port Scheduler Weight**
Syntax: **qos port scheduler weight** [<port_list>] [<queue_list>] [<weight>]
Description: Set or show the port scheduler weight, where:
<**port_list**> : Port list or 'all'. The default is 'All' ports.
<**queue_list**>: Weighted queue list or 'all'. The default is 'All' weighted queues (0-5).
<**weight**> : Scheduler weight (1-100).

Example:

```
>qos port scheduler weight 1-2

Port  Queue  Weight
----  -----  ---------
1     0      17  (17%)
      1      17  (17%)
      2      17  (17%)
      3      17  (17%)
      4      17  (17%)
      5      17  (17%)
2     0      17  (17%)
      1      17  (17%)
      2      17  (17%)
      3      17  (17%)
      4      17  (17%)
      5      17  (17%)
>qos port scheduler weight 1-2 all 50
>qos port scheduler weight 1-2

Port  Queue  Weight
----  -----  ---------
1     0      50  (17%)
      1      50  (17%)
      2      50  (17%)
      3      50  (17%)
      4      50  (17%)
      5      50  (17%)
2     0      50  (17%)
      1      50  (17%)
      2      50  (17%)
      3      50  (17%)
      4      50  (17%)
      5      50  (17%)
>
```

Command: **QoS Port QueueShaper Mode**
Syntax: **qos port queueshaper mode** [<port_list>] [<queue_list>] [enable|disable]
Description: Set or show the port queue shaper mode, where:
<**port_list**> : Port list or 'all'. The default is 'All' ports.
<**queue_list**>: Queue list or 'All'. The default is 'All' queues (0-7).
enable : Enable port queue shaper.
disable : Disable port queue shaper (default).
(The default is 'Show port queue shaper mode'.)

Example:

```
>qos port queueshaper mode 1-2

Port  Queue  Mode
----  -----  --------
1     0      Disabled
      1      Disabled
      2      Disabled
      3      Disabled
      4      Disabled
      5      Disabled
      6      Disabled
      7      Disabled
2     0      Enabled
      1      Disabled
      2      Disabled
      3      Disabled
      4      Disabled
      5      Disabled
      6      Disabled
      7      Disabled
>qos port queueshaper mode 1-2 2-4 enable
>qos port queueshaper mode 1-2

Port  Queue  Mode
----  -----  --------
1     0      Disabled
      1      Disabled
      2      Enabled
      3      Enabled
      4      Enabled
      5      Disabled
      6      Disabled
      7      Disabled
2     0      Enabled
      1      Disabled
      2      Enabled
      3      Enabled
      4      Enabled
      5      Disabled
      6      Disabled
      7      Disabled
>
```

Command: **QoS Port QueueShaper Rate**
Syntax: **qos port queueshaper rate** [<port_list>] [<queue_list>] [<bit_rate>]
Description: Set or show the port queue shaper rate, where:
<**port_list**> : Port list or 'All'. The default is 'All ports'
<**queue_list**>: Queue list or 'All'. The default is 'All queues' (0-7).
<**bit_rate**> : Rate in kilo bits per second (100-13200000).

Example:

```
>qos port queueshaper rate 1-2

Port  Queue  Rate
----  -----  ---------
1     0       500 kbps
      1       500 kbps
      2       500 kbps
      3       500 kbps
      4       500 kbps
      5       500 kbps
      6       500 kbps
      7       500 kbps
2     0       500 kbps
      1       500 kbps
      2       500 kbps
      3       500 kbps
      4       500 kbps
      5       500 kbps
      6       500 kbps
      7       500 kbps
>qos port queueshaper rate 1-2 2-5 75000
>qos port queueshaper rate 1-2

Port  Queue  Rate
----  -----  ---------
1     0       500 kbps
      1       500 kbps
      2        75 Mbps
      3        75 Mbps
      4        75 Mbps
      5        75 Mbps
      6       500 kbps
      7       500 kbps
2     0       500 kbps
      1       500 kbps
      2        75 Mbps
      3        75 Mbps
      4        75 Mbps
      5        75 Mbps
      6       500 kbps
      7       500 kbps
>
```

Command: **QoS Port QueueShaper Excess**
Syntax: **qos port queueshaper excess** [<port_list>] [<queue_list>] [enable|disable]
Description: Set or show the port queue excess bandwidth mode, where:
<**port_list**> : Port list or 'All'. The default is 'All ports'
<**queue_list**>: Queue list or 'All'. The default is 'All queues' (0-7).
enable : Enable use of excess bandwidth.
disable : Disable use of excess bandwidth.
(The default is 'Show port queue excess bandwidth mode'.)

Example:

```
>qos port queueshaper excess 1-2

Port  Queue  Excess
----  -----  --------
1     0      Disabled
      1      Disabled
      2      Disabled
      3      Disabled
      4      Disabled
      5      Disabled
      6      Disabled
      7      Disabled
2     0      Disabled
      1      Disabled
      2      Disabled
      3      Disabled
      4      Disabled
      5      Disabled
      6      Disabled
      7      Disabled
>qos port queueshaper excess 1-2 2-5 enable
>qos port queueshaper excess 1-2

Port  Queue  Excess
----  -----  --------
1     0      Disabled
      1      Disabled
      2      Enabled
      3      Enabled
      4      Enabled
      5      Enabled
      6      Disabled
      7      Disabled
2     0      Disabled
      1      Disabled
      2      Enabled
      3      Enabled
      4      Enabled
      5      Enabled
      6      Disabled
      7      Disabled
>
```

Command: **QoS Port Shaper Mode**
Syntax: **qos port shaper mode** [<port_list>] [enable|disable]
Description: Set or show the port shaper mode, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
enable : Enable port shaper.
disable : Disable port shaper (the default).
(The default is 'Show port shaper mode'.)

Example:

```
>qos port shaper mode

Port  Mode
----  --------
1     Disabled
2     Enabled
3     Disabled
4     Disabled
>qos port shaper mode 3 enable
>qos port shaper mode

Port  Mode
----  --------
1     Disabled
2     Enabled
3     Enabled
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port Shaper Rate**
Syntax: **qos port shaper rate** [<port_list>] [<bit_rate>]
Description: Set or show the port shaper rate, where:
<**port_list**>: Port list or 'All. The, default is 'All ports'.
<**bit_rate**> : Rate in kilo bits per second (100-13200000). The default is 500 kbps.

Example:

```
>qos port shaper rate

Port  Rate
----  ---------
1      500 kbps
2      500 kbps
3      500 kbps
4      500 kbps
>qos port shaper rate 1 250
>qos port shaper rate 2 1000
>qos port shaper rate

Port  Rate
----  ---------
1      250 kbps
2     1000 kbps
3      500 kbps
4      500 kbps
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port TagRemarking Mode**
Syntax: **qos port tagremarking mode** [<port_list>] [classified|default|mapped]
Description: Set or show the port tag remarking mode, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
classified: Use classified PCP/DEI values.
default : Use default PCP/DEI values.
mapped : Use mapped versions of QoS class and DP level.
(The default is 'Show port tag remarking mode'.)

Example:
```
>qos port tagremarking mode

Port  Mode
----  ----------
1     Classified
2     Default
3     Classified
4     Classified
>qos port tagremarking mode 3 mapped
>qos port tagremarking mode

Port  Mode
----  ----------
1     Classified
2     Default
3     Mapped
4     Classified
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port TagRemarking PCP** (Priority Code Point)
Syntax: **qos port tagremarking pcp** [<port_list>] [<pcp>]
Description: Set or show the default PCP. This value is used when '**port tag remarking mod**e' (above) is set to 'default'. The parameters are:
<**port_list**>: Port list or 'all'. The default is 'All ports'.
<**pcp**> : Priority Code Point (0-7). The default is '0'.

Example:
```
>qos port tagremarking pcp

Port  PCP
----  ---
1     0
2     0
3     0
4     0
>qos port tagremarking pcp 3-4 4
>qos port tagremarking pcp

Port  PCP
----  ---
1     0
2     0
3     4
4     4
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port TagRemarking DEI**
Syntax: **qos port tagremarking dei** [<port_list>] [<dei>]
Description: Set or show the default DEI (Drop Eligible Indicator). This value is used when the 'port tag remarking mode' is set to **'default'**. The parameters are:
<**port_list**>: Port list or 'all'. The default is 'All ports'.
<**dei**> : Drop Eligible Indicator (0-1). The default is '0'.

Example:

```
>qos port tagremarking dei

Port  DEI
----  ---
1     0
2     0
3     0
4     0
>qos port tagremarking dei 2-3 1
>qos port tagremarking dei

Port  DEI
----  ---
1     0
2     1
3     1
4     0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port TagRemarking DPL**
Syntax: **qos port tagremarking dpl** [<port_list>] [<dpl>] [<dpl>] [<dpl>] [<dpl>]
Description: Set or show the 'Drop Precedence level' translation table.
This table is used when **port tag remarking mode** is set to 'mapped', and the purpose is to translate the internal two bit 'Drop Precedence Level' to a one bit 'Drop Precedence Level' used in the mapping process. Up to four values (0 or 1) in increasing order are acccepted.
The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
<**dpl**> : Drop Precedence Level (0-1)
For example, the command '**QoS Port TagRemarking DPL 4 0 0 1 1**' sets the table for port 4 to DP level 0 -> 0, DP level 1 -> 0, DP level 2 -> 1, DP level 3 -> 1.

Example:

```
>qos port tagrem dpl

Port  DPL mapping
----  -----------
1     0  1  1  1
2     0  1  1  1
3     0  1  1  1
4     0  1  1  1
>qos port tagrem dpl 1 1
>qos port tagrem dpl 1

Port  DPL mapping
----  -----------
1     1  1  1  1
>qos port tagrem dpl

Port  DPL mapping
----  -----------
1     1  1  1  1
2     0  1  1  1
3     0  1  1  1
4     0  1  1  1
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port TagRemarking Map**
Syntax: **qos port tagremarking map** [<port_list>] [<class_list>] [<dpl_list>] [<pcp>] [<dei>]
Description: Set or show the port tag remarking map. This map is used when port tag remarking mode is set to 'mapped', and the purpose is to translate the classified QoS class (0-7) and DP level (0-1) to PCP and DEI. The parameters are:
<**port_list**> : Port list or 'All'. The default is 'All' ports.
<**class_list**>: QoS class list or 'All'. The default is 'All' QoS classes (0-7).
<**dpl_list**> : DP level list or 'All'. The default is 'All' DP levels (0-1).
<**pcp**> : Priority Code Point (0-7).
<**dei**> : Drop Eligible Indicator (0-1).

Example:

```
>qos port tagremarking map 1

Port  QoS class  DP level  PCP  DEI
----  ---------  --------  ---  ---
1     0          0         1    0
      0          1         1    1
      1          0         0    0
      1          1         0    1
      2          0         2    0
      2          1         2    1
      3          0         3    0
      3          1         3    1
      4          0         4    0
      4          1         4    1
      5          0         5    0
      5          1         5    1
      6          0         6    0
      6          1         6    1
      7          0         7    0
      7          1         7    1
>qos port tagremarking map 1 5 1 4 0
>qos port tagremarking map 1

Port  QoS class  DP level  PCP  DEI
----  ---------  --------  ---  ---
1     0          0         1    0
      0          1         1    1
      1          0         0    0
      1          1         0    1
      2          0         2    0
      2          1         2    1
      3          0         3    0
      3          1         3    1
      4          0         4    0
      4          1         4    1
      5          0         5    0
      5          1         4    0
      6          0         6    0
      6          1         6    1
      7          0         7    0
      7          1         7    1
>
```

Command: **QoS Port DSCP Translation**
Syntax: **qos port dscp translation** [<port_list>] [enable|disable]
Description: Set or show DSCP ingress translation mode. If translation is enabled for a port, the incoming frame DSCP value is translated and that translated value is used for QoS classification. where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable DSCP ingress translation.
disable : Disable DSCP ingress translation. The default is 'disabled'.
(The default is 'Show DSCP ingress translation mode'.)

Example:
```
>qos port dscp translation

Port  DSCP trans.
----  -----------
1     Disabled
2     Enabled
3     Disabled
4     Disabled
>qos port dscp translation 3 enable
>qos port dscp translation

Port  DSCP trans.
----  -----------
1     Disabled
2     Enabled
3     Enabled
4     Disabled
>
```

Command: **QoS Port DSCP Classification**
Syntax: **qos port dscp classification** [<port_list>] [none|zero|selected|all]
Description: Set or show DSCP classification based on QoS class and DP level. This lets you map new DSCP value based on QoS class and DP level on a per-port basis. The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
none : No DSCP ingress classification.
zero : Classify DSCP if DSCP = 0.
selected : Classify DSCP for which classification mode is 'enable'.
all : Classify all DSCP.
(The default is 'Show port DSCP ingress classification mode'.)

Example:
```
>qos port dscp classification

Port  Ingress class.
----  --------------
1     None
2     DSCP = 0
3     None
4     None
>qos port dscp classification 1 zero
>qos port dscp classification 2 selected
>qos port dscp classification

Port  Ingress class.
----  --------------
1     DSCP = 0
2     Selected
3     None
4     None
>
```

Command: **QoS Port DSCP EgressRemark**
Syntax: **qos port dscp egressremark** [<port_list>] [disable|enable|remap]
Description: Set or show the port DSCP remarking mode, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
disable : Disable DSCP egress rewrite. The default is disabled.
enable : Enable DSCP egress rewrite with the value received from analyzer.
remap : Rewrite DSCP in egress frame with remapped DSCP .
(The default is 'Show port DSCP egress remarking mode'.)

Example:
```
>qos Port DSCP EgressRemark

Port  Rewrite
----  ------------
1     Disabled
2     Enabled
3     Disabled
4     Disabled
>qos Port DSCP EgressRemark 1 enable
>qos Port DSCP EgressRemark

Port  Rewrite
----  ------------
1     Enabled
2     Enabled
3     Disabled
4     Disabled
>
```

Command: **QoS DSCP Map**
Syntax: **qos dscp map** [<dscp_list>] [<class>] [<dpl>]
Description: Set or show DSCP mapping table. This table is used to map QoS class and DP level based on DSCP value. DSCP value used to map QoS class and DPL is either translated DSCP value or incoming frame DSCP value. The parameters are:
<**dscp_list>**: DSCP (0-63 list or 'All').
(**default**: Show DSCP ingress map table (i.e., DSCP->(class, DPL)).
<**class**> : QoS class (0-7).
<**dpl**> : Drop Precedence Level (0-1).

Example:
```
>qos dscp map 1-3
DSCP       QoS Class  DP Level
---------  ---------  --------
1          0          0
2          0          0
3          0          0
>qos dscp map 1 5 1
>qos dscp map 2 3 1
>qos dscp map 3 4 0
>qos dscp map 1-3
DSCP       QoS Class  DP Level
---------  ---------  --------
1          5          1
2          3          1
3          4          0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS DSCP Translation**
Syntax: **qos dscp translation** [<dscp_list>] [<trans_dscp>]
Description: Set or show global ingress DSCP translation table. If port DSCP translation is 'enabled', the translation table is used to translate incoming frames DSCP value and the translated value is used to map QoS class and DP level. The maximum number of supported DSCP values is 64. The DSCP Name can be BE, CSx, EFx, or AFx where:
AF (Assured Forwarding) is provided in four classes for bursty real and non-real time services.
BE: refers to Standard (Best Effort) forwarding.
CS refers to the Class Selector (per RFC 2474).
EF refers to the Expedited Forwarding (RFC 3246). The EF PHB has the characteristics of low delay, low loss and low jitter. These characteristics are suitable for voice, video and other real-time services.
The parameters are:
<**dscp_list**> : DSCP (0-63) list or 'All'.
(The default is 'Show DSCP translation table'.)
<**trans_dscp**>: Translated DSCP: 0-63, BE, CS1-CS7, EF or AF11-AF43.

Example:

```
>QoS dscp translation 1-6
DSCP        Ingr. Trans.
---------   ------------
1           1
2           2
3           3
4           4
5           5
6           6
>QoS dscp translation 1 be
>QoS dscp translation 2 cs1
>QoS dscp translation 3 ef
>QoS dscp translation 1-6
DSCP        Ingr. Trans.
---------   ------------
1           0  (BE)
2           8  (CS1)
3           46 (EF)
4           4
5           5
6           6
>
```

Command: **QoS DSCP Trust**
Syntax: **qos dscp trust** [<dscp_list>] [enable|disable]
Description: Set or show whether a specific DSCP value is trusted. Only frames with trusted DSCP values are mapped to a specific QoS class and DPL. Frames with untrusted DSCP values are treated as a non-IP frame. The parameters are:
<**dscp_list**>: DSCP (0-63) list or 'all'.
enable : Set DSCP as trusted DSCP.
disable : Set DSCP as un-trusted DSCP.
(The default si 'Show DSCP Trust status'.)

Example:

```
>qos dscp trust 1-6
DSCP       Trust
---------  --------
1          Disabled
2          Disabled
3          Disabled
4          Disabled
5          Disabled
6          Disabled
>qos dscp trust 2-5 enable
>qos dscp trust 1-6
DSCP       Trust
---------  --------
1          Disabled
2          Enabled
3          Enabled
4          Enabled
5          Enabled
6          Disabled
>
```

Command: **QoS DSCP Classification Mode**
Syntax: **qos dscp classification mode** [<dscp_list>] [enable|disable]
Description: Set or show DSCP ingress classification mode. If port DSCP classification is 'selected', DSCP will be classified based on QoS class and DP level only for DSCP value with classification mode 'enabled'. DSCP may be translated DSCP if translation is enabled for the port.
The parameters are:
<**dscp_list**>: DSCP (0-63) list or 'all'.
enable : Enable DSCP ingress classification.
disable : Disable DSCP ingress classification.
(The default is 'Show DSCP classification mode'.)

Example:

```
>qos dscp classification mode 0-6
DSCP       Ingr. Classify
---------  --------------
0  (BE)    Enabled
1          Disabled
2          Disabled
3          Disabled
4          Disabled
5          Disabled
6          Disabled
>qos dscp classification mode 0-6 enable
>qos dscp classification mode 0-6
DSCP       Ingr. Classify
---------  --------------
0  (BE)    Enabled
1          Enabled
2          Enabled
3          Enabled
4          Enabled
5          Enabled
6          Enabled
>
```

Command: **QoS DSCP Classification Map**
Syntax: **qos dscp classification map** [<class_list>] [<dpl_list>] [<dscp>]
Description: Set or show DSCP ingress classification table. This table is used to map DSCP from QoS class and DP level. The DSCP which needs to be classified depends on port DSCP classification and DSCP classification mode. Incoming frame DSCP may be translated before using the value for classification. The parameters are:
<**class_list**>: QoS class list or 'All'. The default is 'All' QoS classes (0-7).
<**dpl_list**> : DP level list or 'All'. The default is 'All' DP levels (0-1).
<**dscp**> : Mapped DSCP: 0-63, BE, CS1-CS7, EF or AF11-AF43.

Example:

```
>qos dscp classification map
QoS Class  DSCP
---------  ---------
0          8  (CS1)
1          0  (BE)
2          0  (BE)
3          0  (BE)
4          0  (BE)
5          0  (BE)
6          0  (BE)
7          0  (BE)
>qos dscp classification map 1-3 ef
>qos dscp classification map
QoS Class  DSCP
---------  ---------
0          8  (CS1)
1          46 (EF)
2          46 (EF)
3          46 (EF)
4          0  (BE)
5          0  (BE)
6          0  (BE)
7          0  (BE)
>
```

Note: The **dscp** parameter is the Diffserv Code Point value. It can be a specific value, range of values, or 'Any'. DSCP values are in the range 0-63 including BE, CS1-CS7, EF or AF11-AF43.
Select 'Any', 'Specific', or 'Range'. If 'Specific', specify the DSCP name (e.g., *BE*). If 'Range', specify the DSCP range (e.g., *BE - 63*).

Command: **QoS DSCP EgressRemap**
Syntax: **qos dscp egressremap** [<dscp_list>] [<dscp>]
Description: Set or show DSCP egress remap table. This table is used if the port egress remarking mode is 'remap' and the purpose is to map the DSCP and DP level to a new DSCP value.
The parameters are:
<**dscp_list**>: DSCP (0-63) list or 'All'.
<**dscp**> : Egress remapped DSCP: 0-63, BE, CS1-CS7, EF or AF11-AF43.

Example:

```
>qos dscp egressremap 0-6
DSCP       Egr. Remap
---------  ----------
0  (BE)    0  (BE)
1          1
2          2
3          3
4          4
5          5
6          6
>qos dscp egressremap 6 BE
>qos dscp egressremap 6
DSCP       Egr. Remap
---------  ----------
6          0  (BE)
>qos dscp egressremap 0-6
DSCP       Egr. Remap
---------  ----------
0  (BE)    0  (BE)
1          1
2          2
3          3
4          4
5          5
6          0  (BE)
>
```

Command: **QoS Port Storm Unicast**
Syntax: **qos port storm unicast** [<port_list>] [enable|disable] [<rate>] [kbps|fps]
Description: Set or show the port storm rate limiter for unicast frames, where:
<**port_list**>: Port list or 'All'. The default is "All ports".
enable : Enable storm policing of unicast (Uc. Mode) frames.
disable : Disable storm policing of unicast (Uc. Mode) frames.
<**rate**> : Rate in kbps or fps (100-13200000).
kbps : Unit is kilo bits per second.
fps : Unit is frames per second.

Example:

```
>qos port storm unicast

Port  Uc. Mode  Rate
----  --------  ---------
1     Disabled   500 kbps
2     Disabled   500 kbps
3     Disabled   500 kbps
4     Disabled   500 kbps
5     Disabled   500 kbps
6     Disabled   500 kbps
>qos port storm unicast 1

Port  Uc. Mode  Rate
----  --------  ---------
1     Disabled   500 kbps
>qos port storm unicast 1  enable 100
>qos port storm unicast 1

Port  Uc. Mode  Rate
----  --------  ---------
1     Enabled    100 kbps
>qos port storm unicast

Port  Uc. Mode  Rate
----  --------  ---------
1     Enabled    100 kbps
2     Disabled   500 kbps
3     Disabled   500 kbps
4     Disabled   500 kbps
5     Disabled   500 kbps
6     Disabled   500 kbps
>
```

Uc. Mode = Unicast mode.

Command: **QoS Port Storm Broadcast**
Syntax: **qos port storm broadcast** [<port_list>] [enable|disable] [<rate>] [kbps|fps]
Description: Set or show the port storm rate limiter for broadcast frames, where:
<**port_list**>: Port list or 'All'. The default is "All ports".
enable : Enable storm policing of broadcast (Bc. Mode) frames.
disable : Disable storm policing of broadcast (Bc. Mode) frames.
<**rate**> : Rate in kbps or fps (100-13200000).
kbps : Unit is kilo bits per second.
fps : Unit is frames per second.

Example:

```
>qos port storm broadcast

Port  Bc. Mode  Rate
----  --------  ---------
1     Disabled   500 kbps
2     Disabled   500 kbps
3     Disabled   500 kbps
4     Disabled   500 kbps
5     Disabled   500 kbps
6     Disabled   500 kbps
>qos port storm broadcast  2

Port  Bc. Mode  Rate
----  --------  ---------
2     Disabled   500 kbps
>qos port storm broadcast  2 enable 3000
>qos port storm broadcast  2

Port  Bc. Mode  Rate
----  --------  ---------
2     Enabled   3000 kbps
>qos port storm broadcast

Port  Bc. Mode  Rate
----  --------  ---------
1     Disabled   500 kbps
2     Enabled   3000 kbps
3     Disabled   500 kbps
4     Disabled   500 kbps
5     Disabled   500 kbps
6     Disabled   500 kbps
>
```

Bc. Mode = Broadcast mode.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS Port Storm Unknown**
Syntax: **qos port storm unknown** [<port_list>] [enable|disable] [<rate>] [kbps|fps]
Description: Set or show the port storm rate limiter for unknown (flooded) frames, where:
<**port_list**>: Port list or 'All'. The default is 'All ports'.
enable : Enable storm policing of unknown (Un. Mode) frames.
disable : Disable storm policing of unknown (Un. Mode) frames.
<**rate**> : Rate in kbps or fps (100-13200000).
kbps : Unit is kilo bits per second.
fps : Unit is frames per second.

Example:

```
>qos port storm unknown 3 enable 1500
>qos port storm unknown 3

Port  Un. Mode  Rate
----  --------  ---------
3     Enabled   1500 kbps
>qos port storm unknown

Port  Un. Mode  Rate
----  --------  ---------
1     Disabled   500 kbps
2     Disabled   500 kbps
3     Enabled   1500 kbps
4     Disabled   500 kbps
5     Disabled   500 kbps
6     Disabled   500 kbps
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **QoS WRED**
Syntax: **qos wred** [<queue_list>] [enable|disable] [<min_th>] [<mdp_1>] [<mdp_2>] [<mdp_3>]
Description: Set or show the Weighted Random Early Detection parameters, where:
<**queue_list**>: The WRED queue list or 'All'. The default is 'All WRED queues (0-5)'. This is the queue number (QoS class) for which the configuration below applies.
enable : Enable WRED. Controls whether RED is enabled for this queue.
disable : Disable WRED. Controls whether RED is enabled for this queue.
<**min_th**> : Minimum threshold (0-100). This controls the lower RED threshold. If the average queue filling level is below this threshold, the drop probability is zero.
<**mdp_1**> : Maximum Drop Probability for DP Level 1 (0-100). Controls the drop probability for frames marked with Drop Precedence Level 1 when the average queue filling level is 100%. The default is 1.
<**mdp_2**> : Maximum Drop Probability for DP Level 2 (0-100). Controls the drop probability for frames marked with Drop Precedence Level 2 when the average queue filling level is 100%. The default is 5.
<**mdp_3**> : Maximum Drop Probability for DP Level 3 (0-100). Controls the drop probability for frames marked with Drop Precedence Level 3 when the average queue filling level is 100%. The default is 10.

Example:

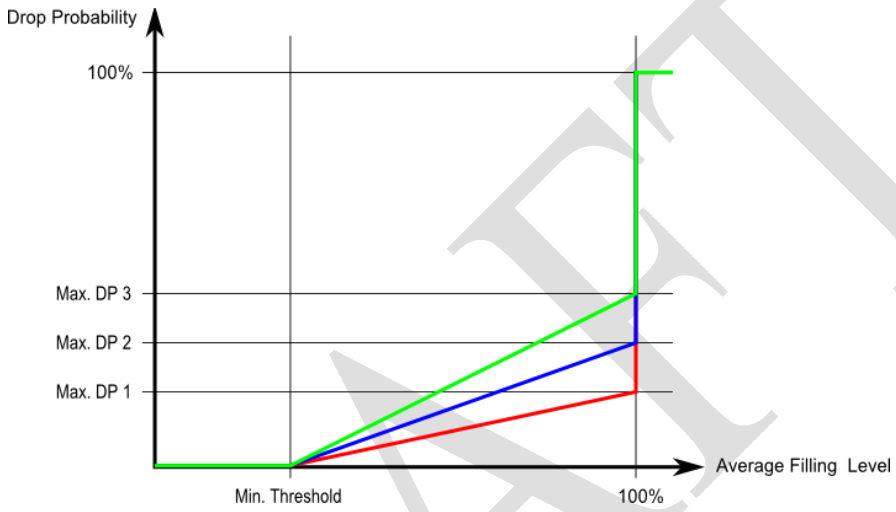
```
>qos wred
Queue  Mode      Min Th  Mdp 1  Mdp 2  Mdp 3
-----  --------  ------  -----  -----  -----
0      Disabled       0      1      5     10
1      Disabled       0      1      5     10
2      Disabled       0      1      5     10
3      Disabled       0      1      5     10
4      Disabled       0      1      5     10
5      Disabled       0      1      5     10
>qos wred 1
Queue  Mode      Min Th  Mdp 1  Mdp 2  Mdp 3
-----  --------  ------  -----  -----  -----
1      Disabled       0      1      5     10
>qos wred 1 enable 2 3 4
>qos wred 1
Queue  Mode      Min Th  Mdp 1  Mdp 2  Mdp 3
-----  --------  ------  -----  -----  -----
1      Enabled        2      3      4     10
>qos wred
Queue  Mode      Min Th  Mdp 1  Mdp 2  Mdp 3
-----  --------  ------  -----  -----  -----
0      Disabled       0      1      5     10
1      Enabled        2      3      4     10
2      Disabled       0      1      5     10
3      Disabled       0      1      5     10
4      Disabled       0      1      5     10
5      Disabled       0      1      5     10
>
```

RED (Random Early Detection) Drop Probability Function

The "**qos wred**" command lets you configure the Random Early Detection (RED) settings for queue 0 to 5. RED cannot be applied to queue 6 and 7. Through different RED configuration for the queues (QoS classes), it is possible to obtain WRED operation between queues. The settings are global for all ports in the switch.

Every incoming frame is classified to a Drop Precedence Level (DP level), which is used throughout the device for providing congestion control guarantees to the frame according to what was configured for that specific DP level. A DP level of 0 (zero) corresponds to 'Committed' (Green) frames and a DP Level of 1 or higher corresponds to 'Discard Eligible' (Yellow) frames.

The figure below shows the drop probability function with related parameters.



Max. DP 1, **Max. DP 2** and **Max. DP 3** are the drop probabilities when the Average queue Filling Level is 100%. (Frames marked with Drop Precedence Level 0 are never dropped.)

Min. Threshold is the Average queue Filling Level where the queues randomly start dropping frames. The drop probability for frames marked with Drop Precedence Level ***n*** increases linearly from zero (at Min. Threshold average queue filling level) to Max. DP ***n*** (at 100% Average queue Filling Level).

Command: **QoS QCL Add**

Syntax: **qos qcl add** [<qce_id>] [<qce_id_next>] [<port_list>]
[<tag>] [<vid>] [<pcp>] [<dei>] [<smac>] [<dmac_type>] [(etype [<etype>]) |
(LLC [<DSAP>] [<SSAP>] [<control>]) | (SNAP [<PID>]) |
(ipv4 [<protocol>] [<sip>] [<dscp>] [<fragment>] [<sport>] [<dport>]) |
(ipv6 [<protocol>] [<sip_v6>] [<dscp>] [<sport>] [<dport>])]
[<class>] [<dp>] [<classified_dscp>]

Description: Add or modify a QoS Control Entry (QCE). If the QCE ID parameter <qce_id> is specified and an entry with this QCE ID already exists, the QCE will be modified. Otherwise, a new QCE will be added. If the QCE ID is not specified, the next available QCE ID will be used. If the next QCE ID parameter <qce_id_next> is specified, the QCE will be placed before this QCE in the list. If the next QCE ID is not specified and if it is a new entry added, the QCE will be placed last in the list. Otherwise if the next QCE ID is not specified and if existing QCE is modified, QCE will be in the same location in the list. To modify and move the entry to last in the list, use the word 'last' for <qce_id_next>. The parameters are:

<**qce_id**> : QCE ID (1-256), default: Next available ID.
<**qce_id_next**> : Next QCE ID: "next_id (1-256) or 'last'".
<**port_list**> : Port List: "port <port_list> or 'all'"; the default is 'All' ports.
<**tag**> : Frame tag: ***untag***|***tag***|***any***.
<**vid**> : VID: 1-4094 or 'any', either a specific VID or range of VIDs.
<**pcp**> : Priority Code Point: specific (0, 1, 2, 3, 4, 5, 6, 7) or range (0-1, 2-3, 4-5, 6-7, 0-3, 4-7) or 'any'.
<**dei**> : Drop Eligible Indicator: 0-1 or 'any'.
<**smac**> : Source MAC address: (xx-xx-xx) or 'any', 24 MS bits (OUI).
<**dmac_type**> : Destination MAC type: unicast|multicast|broadcast|any
etype : Ethernet Type keyword.
<**etype**> : Ethernet Type: 0x600-0xFFFF or 'any' but excluding 0x800(IPv4) and 0x86DD(IPv6).
llc : LLC keyword.
<**dsap**> : Destination Service Access Point: 0x00-0xFF or 'any'.
<**ssap**> : Source Service Access Point: 0x00-0xFF or 'any'.
<**control**> : LLC control: 0x00-0xFF or 'any'.
snap : SNAP keyword.
<**pid**> : Protocol ID (EtherType) or 'any'.
ipv4 : IPv4 keyword.
<**protocol**> : IP protocol number: (0-255, TCP or UDP) or 'any'.
<**sip**> : Source IP address: (a.b.c.d/n) or 'any'.
<**dscp**> : DSCP: (0-63,BE,CS1-CS7,EF or AF11-AF43) or 'any', specific or range.
<**fragment**> : IPv4 frame fragmented: ***yes***|***no***|***any***.
<**sport**> : Source TCP/UDP port:(0-65535) or 'any', specific or port range.
<**dport**> : Dest. TCP/UDP port:(0-65535) or 'any', specific or port range.
ipv6 : IPv6 keyword.
<**sip_v6**> : IPv6 source address: (a.b.c.d/n) or 'any', 32 LS bits.
<**class**> : QoS Class: "class (0-7)", default: basic classification.
<**dp**> : DP Level: "dp (0-3)"; default: basic classification.
<**classified_dscp**>: DSCP: "dscp (0-63, BE, CS1-CS7, EF or AF11-AF43)".

Example:
```
>qos qcl add 2 3 4 s 0 3 any any unicast kw1 0x900 any any any any k
any any k any any EF yes any any k any 1 0 BE
>
```

Messages: *QCL Add failed: classified parameter missing*
Invalid parameter: last

Command: **QoS QCL Delete**
Syntax: **qos qcl delete** <qce_id>
Description: Delete an existing QCE entry from the QCL (QoS Control List), where:
<**qce_id**>: QCE ID (1-256). The default is the next available ID.

Example:
```
>qos qcl delete 1
>qos qcl status

Number of QCEs: 0
>
```

Messages: *QCL Delete failed*

Command: **QoS QCL Lookup**
Syntax: **qos qcl lookup** [<qce_id>]
Description: Lookup a QoS Control List, where:
<**qce_id**>: QCE ID (1-256), default: Next available ID.

Example:
```
>qos qcl lookup

ID   Frame  SMAC     DMAC VID        PCP  DEI  Class DP DSCP  Port
--   -----  -------- ---- ---------  ---  ---  ----- -- ----  -------
1    Any    Any      Any  Any        Any  Any  0     -  -     4

Number of QCEs: 1
>
```

Command: **QoS QCL status**
Syntax: **qos qcl status** [combined|static|conflicts]
Description: Display the current QCL status (if there is any conflict in QCE for various user types).
The parameters are:
combined|**static**|**conflicts**:
combined : Shows the combined status (Static and Conflicts).
static : Shows just the static user configured status.
conflicts : Shows all conflict status.
(default : Shows the combined status)

Example 1:
```
>qos qcl status combined

User          ID   Frame  Class DP DSCP       Conflict Port
----------    --   -----  ----- -- ---------  -------- -------
Static        1    Any    0     -  -          No       4

Number of QCEs: 1
>qos qcl status conflicts

Number of QCEs: 0
>qos qcl status static

User          ID   Frame  Class DP DSCP       Conflict Port
----------    --   -----  ----- -- ---------  -------- -------
Static        1    Any    0     -  -          No       4

Number of QCEs: 1
>
```

Example 2:
```
>qos qcl status combined

User          ID   Frame  Class DP DSCP       Conflict Port
----------    --   -----  ----- -- ---------  -------- -------
Static        1    EType  3     0  0  (BE)    No       1-2
Static        2    Any    0     -  -          No       3
Static        3    Any    0     -  -          No       4

Number of QCEs: 3
>
```

Command: **QoS QCL refresh**
Syntax: **qos qcl refresh**
Description: This command is used to resolve QCE conflict status. Since the same hardware resource is shared by multiple applications, and it may not be available even before MAX QCE entry, this command is available to release the resource in use by other applications and use this command to acquire the resource.

Example:
```
QoS>qcl refresh
QoS>
```

Mirror Commands

To debug network problems, selected traffic can be copied (mirrored) on a mirror port where a frame analyzer can be attached to analyze the frame flow. The traffic to be copied on the mirror port is selected as follows:

- All frames received on a given port (also known as ingress or source mirroring).
- All frames transmitted on a given port (also known as egress or destination mirroring).

Frames from ports that have either source (rx) or destination (tx) mirroring enabled are mirrored on this port.

Port mirror considerations:

- You can select more than one source port at a time, but the more ports you mirror, the less likely the mirroring port is able to handle all the traffic. So if you mirror the traffic of six highly-active ports, the destination port is likely to drop packets, providing an inaccurate mirror of the six source ports' traffic.
- You can mirror the ingress or egress traffic of the source ports or both.
- While the Mirroring feature is enabled, the mirroring port is dedicated to monitoring the traffic from the source ports and can not be used for normal network operations.

These LIB-4xxx commands provide Port mirroring functions:

>**mirror ?**
Available Commands:

Mirror Configuration [<port_list>]
Mirror Port [<port>|disable]
Mirror Mode [<port_cpu_list>] [enable|disable|rx|tx]
>

The LIB-4xxx Port mirroring commands are explained below.

Command: **Show Mirror Configuration**
Syntax: **mirror configuration** [<port_list>]
Description: Show mirror configuration, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
Example:

```
>mirror config

Mirror Configuration:
=====================

Mirror Port: Disabled

Port  Mode
----  --------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>
```

Command: **Mirror Port**
Syntax: **mirror port** [<port>|disable]
Description: Set or show the mirror port, where:
<**port**>|**disable**: Mirror port or 'disable'. The default is 'Show' mirror port.

Example:
```
>mirror port 4
>mirror port
Mirror Port: 4
>mirror port disable
>mirror port
Mirror Port: Disabled
>
```

Command: **Mirror Mode**
Syntax: **mirror mode** [<port_ list>] [enable|disable|rx|tx]
Description: Set or show the mirror mode (Port where the mirrored traffic is sourced from) where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable Rx and Tx mirroring.
disable: Disable Mirroring.
rx : Enable Rx (receive) mirroring.
tx : Enable Tx (transmit) mirroring.
(The default is 'Show mirror mode'.)

Example:
```
>mirror mode

Port  Mode
----  --------
1     Disabled
2     Disabled
3     Disabled
4     Disabled
>mirror mode 1 enable
>mirror mode 2 rx
>mirror mode 3 tx
>mirror mode

Port  Mode
----  --------
1     Enabled
2     Rx
3     Tx
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Firmware Commands

These LIB-4xxx commands provide firmware downloads via TFTP. Note that a TFTP server must be configured and running for the **firmware load** and **firmware ipv6 load** commands to work. After the software image is uploaded, a message announces that the firmware update is initiated. After 1-4 minutes, the firmware is updated and the LIB-4xxx restarts.

You can elect to activate (swap) the image and reboot now, or activate (swap) the image manually later.

Warning: While the LIB-4xxx firmware is being updated, Web access appears to be defunct. The LIB-4xxx front LED flashes Green/Off with a frequency of 10 Hz while the firmware update is in progress. Do not restart or power off the LIB-4xxx at this time or the update will fail and the alternate image will be used to boot. The update procedure must then be restarted from the beginning.

LIB-4xxx supports a two-step firmware upgrade where you reboot manually at a later time. This two-step procedure is the default. You can optionally select 'Activate Image Now' to perform the one-step procedure (where the LIB-4xxx reboots automatically right away). For the two-step procedure, you first upload the firmware image and program to flash. Then you manually activate the Alternate image and reboot the LIB-4xxx.

The LIB-4xxx firmware commands include:

>firmware ?
Available Commands:

Firmware Load <ip_addr_string> <file_name> [<activate>]
Firmware IPv6 Load <ipv6_server> <file_name> [<activate>]
Firmware Information
Firmware Swap
Firmware Peripheral Load <hostname> <file_name>
Firmware Peripheral Versions
>

Command: **Display Firmware Info**
Syntax: **firmware information**
Description: Display information about Active and Alternate firmware images.
Example:

```
>firmware info
Active Image
------------
Image     : managed
Version   : LIB-4424 (standalone) 1.9.4
Date      : 2014-05-26T19:51:18-05:00

Alternate Image
---------------
Image     : managed.bk
Version   : LIB-4424 (standalone) 1.7.4
Date      : 2013-10-15T14:04:37-05:00

>
```

Command: **Load Firmware** using **IPv4**
Syntax: **firmware load** <ip_addr_string> <file_name> [<activate>]
Description: Loads new firmware from a TFTP server and either manually or automatically reboots the LIB-4xxx. The parameters are:
<**ip_addr_string**>: IPv4 host address (a.b.c.d) or a host name string of the TFTP server.
<**file_name**> : Firmware file name to download (must have a *.DAT* file extension).
<**activate**> : ***true***: Activate image (swap) now and reboot now.
false: Activate image (swap) manually later.

Example:
```
>firmware load 192.168.1.30 LIB-4400-v1.1.5.dat false
Downloaded "LIB-4400-v1.1.5.dat", 3613315 bytes
Master initiated software updating starting
Waiting for firmware update to complete
Starting flash update - do not power off device!
Erasing image...
Programming image...
... Erase from 0x40ff0000-0x40ffffff: .
... Program from 0x87ff0000-0x88000000 to 0x40ff0000: .
... Program from 0x87ff000a-0x87ff000c to 0x40ff000a: .
Flash update succeeded.
>
```

If you selected **activate** = **true** you must log in to the LIB-4xxx again after a successful firmware load. You can use the firmware information command to verify the firmware load.

Messages:
Downloaded "LIB-4400-master.dat", 3612248 bytes
W firmware 00:14:45 10/firmware_check#787: Warning: Trailer: TN_PRODUCT_ID mismatch (was LIB-4400, want LIB-4400)
Error: Image error
Download of ND-3284-v1.0.4.dat from 192.168.1.30 failed: File not found.
Download of LIB-4400fw from 192.168.1.30 failed: Operation timed out.
Error: Flash is already updated with this image
Error: Image error
The maximum string length is 5.
W firmware 21:29:45 54/firmware_check#742: Warning: Trailer: TN_PRODUCT_ID mismatch (was LIB-4400, want LIB-4400)

Warning: While the LIB-4xxx firmware is being updated, Web access appears to be defunct. The LIB-4xxx front LED flashes Green/Off with a frequency of 10 Hz while the firmware update is in progress. Do not restart or power off the LIB-4xxx at this time or it may fail to function afterwards.

Note: The **firmware load** and **firmware ipv6 load** commands may not work with SolarWinds TFTP Server version 8.2.7 (September 2005). SolarWinds TFTP Server version 10.4.0.14 works fine for LIB-4xxx binary backups and restores.

Note: You must log in to the LIB-4xxx again after a successful firmware load. You can use the firmware information command to verify the firmware load.

Command: **Load Firmware using IPv6**
Syntax: **firmware ipv6 load** <ipv6_server> <file_name> [<activate>]
Description: Load new firmware from a IPv6-capable TFTP server. The parameters are:
<**ipv6_server**>: The TFTP server's IPv6 address.
<**file_name**> : The name of the Firmware file.
<**activate**> : **true**: Activate image (swap) now and reboot now.
false: Activate image (swap) manually later.

Example 1:
```
>firmware ipv6 load ::192.168.0.1 LIB-4400-v1.1.1 true
>
```

Example 2:
```
>firmware ipv6 load ::192.168.0.1 LIB-4400-v1.1.1 false
>
```

Messages: *Download of LIB-4400-v1.1.1 from ::192.168.0.1 failed: Operation timed out.*
Download of LIB-4400-v1.0.4.dat from 192.168.1.30 failed: Network error

You can use the **firmware information** command to verify the firmware load.

You must log in to the LIB-4xxx again after a successful firmware load. You can use the firmware information command to verify the firmware load.

Note: Use an IPv6 Address such as **::192.0.2.1**. Do not use an IPv6 Link-Local Address such as **fe80::/64**.

Note: The **firmware load** and **firmware ipv6 load** commands do not work with SolarWinds TFTP Server version 8.2.7 (September 2005). SolarWinds TFTP Server version 10.4.0.14 works fine for LIB-4xxx binary backups and restores.

Command: **Firmware Swap**
Syntax: **firmware swap**
Description: Activate the alternate firmware image and reboot. Log in to the LIB-4xxx again when done.
Example:

```
>firm swap
... Erase from 0x40ff0000-0x40ffffff: .
... Program from 0x87ff0000-0x88000000 to 0x40ff0000: .
... Program from 0x87ff000a-0x87ff000c to 0x40ff000a: .
Alternate image activated, now rebooting.
>+M25PXX : Init device with JEDEC ID 0xC22018.
LIB-4400 board detected (VSC7428 Rev. B).

RedBoot(tm) bootstrap and debug environment [ROMRAM]
Non-certified release, version 1_12-TN - built 20:02:55, Feb 20 2012

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Redboot comes with ABSOLUTELY NO WARRANTY.

Platform: VCore-III (MIPS32 24KEc) LUTON26
RAM: 0x80000000-0x88000000 [0x80020eb8-0x87fe1000 available]
FLASH: 0x40000000-0x40ffffff, 256 x 0x10000 blocks
== Executing boot script in 1.000 seconds - enter ^C to abort
RedBoot> fis load -d managed
Image loaded from 0x80040000-0x806f43b0
RedBoot> go

Username:admin
Password:
Login in progress...
Welcome to Net2Edge Ltd. Command Line Interface (v1.0).
Type 'help' or '?' to get help.
```

Messages:
Activate image (swap) now and reboot
Activate image (swap) manually later
Alternate image activated, now rebooting.
Alternate image activation failed.
Do not reset or power off the device!
E misc 00:00:00 26/pic32_spi_init_start#1594: Error: pic32_spi_read_version failed: -2
Error: Incomplete stack update - update aborted
FIRMWARE_ERROR_xxx code
Flashing, please wait...
Rebooting system...
Restarting, please wait...
Slave, only doing local update
Waiting for firmware update to complete
(Still) waiting for firmware update to complete
Warning! Device will automatically reboot. Proceed with update now?
W mirror 00:00:00 26/mirror_conf_read#335: Warning: conf_sec_open failed or size mismatch, creating defaults
W vlan 00:00:00 26/vlan_conf_read_stack#4146: Warning: version mismatch, creating defaults

Command: **Firmware Peripheral Load**
Syntax: **firmware peripheral load** <hostname> <file_name>
Description: Update peripheral device firmware if present. **Note**: Do not reset or power off the device while it is in the process of writing the peripheral device firmware image to flash. Note that the TFTP server must be running and properly configured. The parameters are:
<**hostname**> : IP Address or Hostname of the TFTP server.
<**file_name**>: Firmware file name to be uploaded (e.g., the ***HPIC32-v1.0.1.dat*** file).

Example:
```
>firmware peripheral load 192.168.1.30 HPIC32-v1.0.1.dat
tftp client get failed: 9
>
>firmware peripheral load 192.168.1.30 HPIC32-v1.0.1.dat
tftp client get failed: 1
>
>firmware per load 192.168.1.30 HPIC32-v1.0.1.dat
Starting peripheral device update
Processing section 1...
Processing section 1 complete
ET-FPGA was not updated
Peripheral device update failed
>
```

HPIC (Helper PIC) the PIC specific to the external timing; controls initial board startup.
ET-PIC (External Timing PIC) controls external timing interfaces.
FPGA (field-programmable gate array) co-processor used to offload specific tasks from the main switch.

Messages:
Device flash update complete...\n
Device not present
Do not reset or power off the device!
Erasing device, please wait...
Erasing %s image...
Error: Firmware file is too short
Error: Firmware file contains bad length
Error: cksum mismatch
Error: Firmware update failed
esce_id: %lu not found", esce_id
Flash crc check failed: %04X != %04X
FPGA Version: v%u.%u\n,(version.major, version.minor)
FPGA Version: Not present\n
HPIC App detected...\n
HPIC control data not present
HPIC firmware update failed
Meaning: The peripheral device upgrade failed.
Recovery:
1. Check the filename and version information.
2. Make sure the TFTP Server is configured correctly and running.

Messages:
HPIC is in App mode
HPIC is in BL mode
HPIC usb data not present
illegal esce id: %lu", esce->id
invalid record: record length is odd
invalid record: record length is too long
Must explicitly add case for module ID: %d (at conf->privilege_level[i].crw = 10;
negative status code: %02X
Opening device failed\n
Peripheral Device Firmware Error
Peripheral device upgrade failed at section %d\n
Peripheral device firmware update failed
Peripheral device firmware update in progress
Processing section %d complete, please wait...
Processing section %d complete\n
Programming device, please wait...
Programming device image...\n
Programming device complete, please wait...
Programming device complete...\n
Restarting %s...\n
Restarting %s, please wait...
Starting %s flash update - do not power off device!
unexpected command in response: %02X
Updating, please wait...
%s flash update complete...\n
Writing peripheral device firmware image to flash.
*Meaning: i*nfromational or warning messages.
Recovery:
1. Wait for the message to clear.
2. Continue operation.

Message:
W firmware 00:10:29 59/handler_config_hpic_firmware#243: Warning: firmware file is too short
Meaning: You did not enter a filename for the firmware to be uploaded/upgraded.
Recovery:
1. Enter a valid filename for the firmware to be uploaded.
2. Continue operation.
3. See the “Firmware Peripheral Load” command on page 264.

Message:
Reading FPGA version failed
Reading MAC version failed
Reading MAC Swap/Loopback version failed
Reading PCS version failed
Reading Remote Update version failed
Meaning: The device upgrade failed.
Recovery:
1. Check the filename and version information.
2. Verify the command parameters.
3. Restart the download. If it still fails, then record the error and contact TN technical support.

Command: **Firmware Peripheral Versions**
Syntax: **firmware peripheral versions**
Description: Display the current version of all peripheral devices.
Example:

```
>firm per ver
FPGA Version: v2.3 (0x000C)
HPIC Version: v1.1 (0x0D0C)
ET-PIC Version: v1.1 (0x0604)
>
```

The FPGA Versions that can be reported are:
FPGA (field-programmable gate array) co-processor used to offload specific tasks from the main switch.
HPIC (Helper PIC) the PIC specific to the external timing; controls initial board startup.
ET-PIC (External Timing PIC) controls external timing interfaces.

Messages:
tftp client get failed: 9
FPGA Version: Not present
Force to Factory mode by loading invalid user image address.
altera_fpga_write_reg failed: %d
Meaning: A bad firmware image file was detected.
Recovery:
1. Verify the file.
2. Restart the download.
3. If the download still fails, then record the error and contact TN technical support.

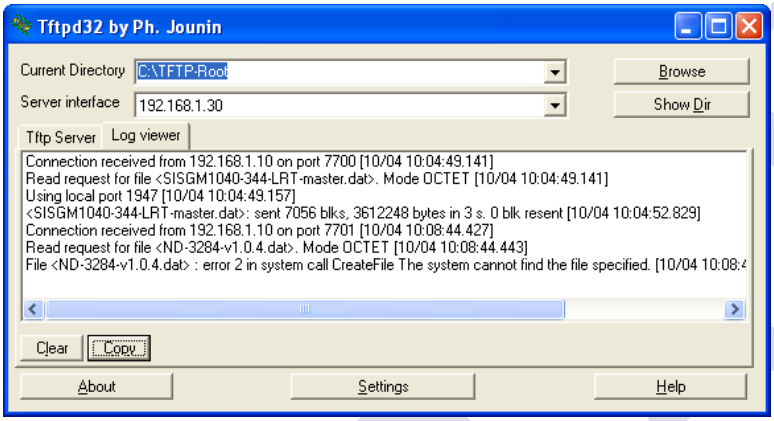
Message:
Attempting load of Application Boot Address: 0x%08X\n
FPGA Running in Factory mode
User Watchdog Timer timeout
nSTATUS asserted by an external device as the result of an error
CRC error during application configuration
External configuration reset (nCONFIG) assertion
FPGA Running in Application mode
Application Boot Address: 0x%08X
FPGA Running in Application mode with Master State Machine User Watchdog Timer Enabled
Application Boot Address: 0x%08X
FPGA Running in unknown/undefined mode
User Configuration area is locked for address 0x%08X
User Configuration device id of 0x%02X does not match image of 0x%02X
User Configuration hw type of 0x%02X does not match image of 0x%02X
1166 // The exception to the rule case: S3820-TST allows for sw_function
1167 // upgrades of 1 (MACSwap Only) and/or 2 (MACSwap & 2544) in same user space.
User Configuration sw function of 0x%02X does not match image of 0x%02X
User Configuration sw function of 0x%02X is locked for image 0x%02X
Meaning: A firmware command error occurred.
Recovery:
1. Verify the command parameters.
2. Retry the operation.
3. Record the specific error message and contact TN Technical Support.

TFTP Server Messages

Message: *Connection received from 192.168.1.10 on port 7700 [10/04 10:04:49.141]*
Meaning: The TFTP server connected to the LIB-4xxx successfully.

Message: *Read request for file <LIB-4400-master.dat>. Mode OCTET [10/04 10:04:49.141]*
Using local port 1947 [10/04 10:04:49.157]
<LIB-4400-master.dat>: sent 7056 blks, 3612248 bytes in 3 s. 0 blk resent [10/04 10:04:52.829]
Connection received from 192.168.1.10 on port 7701 [10/04 10:08:44.427]
Meaning: The TFTP server transferred the file to the LIB-4xxx successfully.

Message: *Read request for file <ND-3284-v1.0.4.dat>. Mode OCTET [10/04 10:08:44.443]*
File <ND-3284-v1.0.4.dat> : error 2 in system call CreateFile The system cannot find the file specified. [10/04 10:08:44.443]
Meaning: The TFTP server failed to transfer the file to the LIB-4xxx.
Example:



Recovery:
1. Make sure the TFTP Server "Current Directory" points to C:\TFTP-Root.
2. Make sure that you have specified the correct file (xxxxxxx.DAT). See "Firmware Commands" on page 269.
3. If the download still fails, then record the error and contact TN technical support.

PTP Commands

PTP (Precision Time Protocol) is a network protocol for synchronizing the clocks of computer systems. PTP defines a procedure allowing many spatially distributed real-time clocks to be synchronized through a "package-compatible" network (normally Ethernet). Note that PTP configuration of the LIB-4xxx MGMT port is not supported.

PTP knows various types of clocks, and acts as a master-to-slave protocol. A clock in an end device is known as an “Ordinary” clock, and a clock in a transmission component like an Ethernet switch is a “Boundary” clock (BC) or “Transparent” clock (TC). A “Master” synchronizes the respective slaves connected to it.

The synchronization process is divided into two phases. First the time difference between the master and the slave is corrected; this is the offset correction. With IEEE1588-2008, two modes are known for the synchronization process: two-step-mode and one-step-mode. The second phase of the synchronization, delay measurement, determines the run time between slave and master. It is determined by the “Delay Request” and “Delay Response” messages in a similar way, and the clocks adjusted accordingly. This can also be done in one-step or in two-step mode. Boundary clocks are required wherever there is a change of the communication technology or other network elements block the propagation of the PTP messages. The IEEE1588-2008 standard knows two types of transparent clocks: End-to-End (E2E) and Peer-to-Peer (P2P). See the IEEE Standards web site at http://ieeexplore.ieee.org/xpl/standards.jsp for current editions and amendments.

Note: at LIB-4xxx v 1.0.2, PTP is available over Ethernet, IPv4 Unicast, IPv4 Multicast.

Note: you must have a PTP clock instance configured for accurate RFC 2544 Latency test step timestamps.PTP must be running on both devices to synchronize the Time of Day.

These LIB-4xxx commands provide IEEE 1588 Precision Time Protocol (PTP) functions:

>**ptp ?**
Available Commands:

PTP Configuration [<clockinst>]
PTP PortState <clockinst> [<port_list>] [enable|disable|internal]
PTP ClockCreate <clockinst> [<devtype>] [<twostep>] [<protocol>] [<oneway>] [<clockid>] [<tag_enable>] [<vid>] [<prio>]
PTP ClockDelete <clockinst> [<devtype>]
PTP DefaultDS <clockinst> [<priority1>] [<priority2>] [<domain>]
PTP CurrentDS <clockinst>
PTP ParentDS <clockinst>
PTP Timingproperties <clockinst> [<utcoffset>] [<valid>] [<leap59>] [<leap61>] [<timetrac>] [<freqtrac>] [<ptptimescale>] [<timesource>]
PTP PortDataSet <clockinst> [<port_list>] [<announceintv>] [<announceto>] [<syncintv>] [<delaymech>] [<minpdelayreqintv>] [<delayasymmetry>] [<ingressLatency>] [<egressLatency>]
PTP LocalClock <clockinst> [update|show|ratio] [<clockratio>]
PTP Filter <clockinst> [<def_delay_filt>] [<period>] [<dist>]
PTP Servo <clockinst> [<displaystates>] [<ap_enable>] [<ai_enable>] [<ad_enable>] [<ap>] [<ai>] [<ad>]
PTP SlaveTableUnicast <clockinst>
PTP UniConfig <clockinst> [<index>] [<duration>] [<ip_addr>]
PTP ForeignMasters <clockinst> [<port_list>]
PTP EgressLatency [show|clear]
PTP MasterTableUnicast <clockinst>
PTP ExtClock Output Mode [<ext_clock_enable>] [<clockfreq_out>]
PTP ExtClock Input Mode [<ext_clock_enable>] [<clockfreq_in>]
PTP ExtClock Impedance [<impedance>]
PTP ExtClock Input Status [<clear>]
>

The LIB-4xxx PTP commands are explained below.

Command: **PTP Configuration**
Syntax: **ptp configuration** [<clockinst>]
Description: Show all PTP Clock and Port configuration and status, where:
<**clockinst**>: clock instance number [0-3] to be displayed.
Example 1: Default (no PTP configured):

```
>ptp config

PTP Configuration:
==================
```

Example 2: PTP Clock instances 1 and 2 configured:

```
>ptp config

PTP Configuration:
==================

PTP Clock Config, Clock instance 1
********************************************************************************

Clock Default Data Set:
ClockId  DeviceType  2StepFlag  Ports  ClockIdentity            Dom
-------  ----------  ---------  -----  -----------------------  ---
1        Ord-Bound   True       12     00:c0:f2:ff:fe:00:00:01  1

ClockQuality            Pri1  Pri2
----------------------  ----  ----
Cl:251 Ac:254 Va:65535  128   128

Protocol   One-Way    VLAN Tag Enable    VID    PCP
---------  ---------  -----------------  -----  ----
Ethernet   False      False              1      0

Clock Current Data Set:
stpRm  OffsetFromMaster    MeanPathDelay
-----  ------------------  ------------------
0       0.000,000,000       0.000,000,000

Clock Parent Data Set:
ParentPortIdentity      port  Pstat  Var  ChangeRate
----------------------  ----  -----  ---  ----------
00:c0:f2:ff:fe:00:00:01 0     False  0    0

GrandmasterIdentity      GrandmasterClockQuality  Pri1  Pri2
-----------------------  -----------------------  ----  ----
00:c0:f2:ff:fe:00:00:01  Cl:251 Ac:254 Va:65535   128   128

Clock Time Properties Data Set:
UtcOffset  Valid  leap59  leap61  TimeTrac  FreqTrac  ptpTimeScale  TimeSource
---------  -----  ------  ------  --------  --------  ------------  ----------
0          False  False   False   False     False     True          160

Servo parameters:
Display  P-enable  I-enable  D-enable  'P'constant  'I'constant  'D'constant
-------  --------  --------  --------  -----------  -----------  -----------
False    True      True      False     10           1000         1000

Filter parameters:
DelayFilter  period  dist
-----------  ------  ----
6            1       2



Unicast Slave Configuration:
index  duration  ip address       grant  CommState
-----  --------  ---------------  -----  ---------
0      100       0.0.0.0          0      IDLE
1      100       0.0.0.0          0      IDLE
2      100       0.0.0.0          0      IDLE
3      100       0.0.0.0          0      IDLE
4      100       0.0.0.0          0      IDLE

Port Data Set(s):
Port  Stat  MDR  PeerMeanPathDel  Anv  ATo  Syv  Dlm  MPR  DelayAsymmetry   IngressLatency   EgressLatency    Ver
----  ----  ---  ---------------  ---  ---  ---  ---  ---  ---------------  ---------------  ---------------  ---

Local Clock Current Time:
PTP Time (1)    : 1970-01-01T00:06:52+00:00 338,528,480
Clock Adjustment method: Software
PTP Clock Config, Clock instance 2
```

```
*******************************************************************************

Clock Default Data Set:
ClockId  DeviceType  2StepFlag  Ports  ClockIdentity            Dom
-------  ----------  ---------  -----  ----------------------  ---
2        P2pTransp   True       12     00:c0:f2:ff:fe:00:00:01  2

ClockQuality            Pri1  Pri2
----------------------  ----  ----
Cl:251 Ac:254 Va:65535  128   128

Protocol   One-Way    VLAN Tag Enable    VID    PCP
---------  ---------  -----------------  -----  ----
IPv4Multi  False      True               1      0

Clock Current Data Set:
stpRm  OffsetFromMaster    MeanPathDelay
-----  ------------------  ------------------
0       0.000,000,000       0.000,000,000

Clock Parent Data Set:
ParentPortIdentity      port  Pstat  Var  ChangeRate
----------------------  ----  -----  ---  ----------
00:c0:f2:ff:fe:00:00:01 0     False  0    0

GrandmasterIdentity      GrandmasterClockQuality  Pri1  Pri2
-----------------------  -----------------------  ----  ----
00:c0:f2:ff:fe:00:00:01  Cl:251 Ac:254 Va:65535   128   128

Clock Time Properties Data Set:
UtcOffset  Valid  leap59  leap61  TimeTrac  FreqTrac  ptpTimeScale  TimeSource
---------  -----  ------  ------  --------  --------  ------------  ----------
0          False  False   False   False     False     True          160

Servo parameters:
Display  P-enable  I-enable  D-enable  'P'constant  'I'constant  'D'constant
-------  --------  --------  --------  -----------  -----------  -----------
False    True      True      False     10           1000         1000

Filter parameters:
DelayFilter  period  dist
-----------  ------  ----
6            1       2


Unicast Slave Configuration:
index  duration  ip address       grant  CommState
-----  --------  ---------------  -----  ---------
0      100       0.0.0.0          0      IDLE
1      100       0.0.0.0          0      IDLE
2      100       0.0.0.0          0      IDLE
3      100       0.0.0.0          0      IDLE
4      100       0.0.0.0          0      IDLE

Port Data Set(s):
Port  Stat  MDR  PeerMeanPathDel  Anv  ATo  Syv  Dlm  MPR  DelayAsymmetry   IngressLatency   EgressLatency    Ver
----  ----  ---  ---------------  ---  ---  ---  ---  ---  ---------------  ---------------  ---------------  ---

Local Clock Current Time:
PTP Time (2)    : 1970-01-01T00:06:52+00:00 563,711,980
Clock Adjustment method: Software
```

Command: **PTP Port State**
Syntax: **ptp portstate** <clockinst> [<port_list>] [enable|disable|internal]
Description: Set or show the PTP port state. Note that PTP configuration of the LIB-4xxx MGMT port is not supported. The parameters are:
<**clockinst**>: clock instance number (0-3).
<**port_list**>: Port list or 'All'. The default is All ports.
enable : Enable PTP port.
disable : Disable PTP port.
internal : Enable PTP port as internal (in a distributed environment).
(The default is 'Show actual port state'.)

Example:

```
>ptp portstate 0
Port  PTP-State  Internal  Link  Port-Timer  Vlan-forw  Phy-timestamper
----  ---------  --------  ----  ----------  ---------  ---------------
   1  mstr       FALSE     Up    In Sync     Forward    FALSE
   2  mstr       FALSE     Up    In Sync     Forward    FALSE
>ptp portstate 1
Port  PTP-State  Internal  Link  Port-Timer  Vlan-forw  Phy-timestamper
----  ---------  --------  ----  ----------  ---------  ---------------
   3  dsbl       FALSE     Down  In Sync     Discard    FALSE
   4  dsbl       FALSE     Down  In Sync     Discard    FALSE
>ptp portstate 2
Port  PTP-State  Internal  Link  Port-Timer  Vlan-forw  Phy-timestamper
----  ---------  --------  ----  ----------  ---------  ---------------
>
```

Messages: *Clock instance 1 : does not exist*
Clock instance 1 : does not exist or timestamp feature not available

Command: **PTP Port Data Set**

Syntax: **ptp portdataset** <clockinst> [<port_list>] [<announceintv>] [<announceto>] [<syncintv>] [<delaymech>] [<minpdelayreqintv>] [<delayasymmetry>] [<ingresslatency>] [<egresslatency>]

Description: Set or show PTP port data set, where:

<**clockinst**> : clock instance number [0..3].
<**port_list**> : Port list or 'all', default: All ports.
<**announceintv**> : [-3..4] Log2 of mean announce interval in seconds.
<**announceto**> : [-1..10] Log2 of announce receipt timeout in seconds.
<**syncintv**> : [-7..4] Log2 of sync interval in seconds.
<**delaymech**> : The 'delaymech' parameter takes the following values:
e2e : The port is configured to use the delay request-response mechanism.
p2p : The port is configured to use the peer delay mechanism.
<**minpdelayreqintv**>: [-7..5] Log2 of min delay req interval in seconds.
<**delayasymmetry**> : path delay asymmetry measured in ns (nano seconds).
<**ingresslatency**> : ingress latency measured in ns (nano seconds).
<**egresslatency**> : egress latency measured in ns (nano seconds).

Example 1:

```
>ptp portdataset 1 1 1 1 1 e2e 2 10 10 10
>ptp portdataset 1
Port  Stat  MDR  PeerMeanPathDel  Anv  ATo  Syv  Dlm  MPR  DelayAsymmetry   Ingr
essLatency   EgressLatency    Ver
----  ----  ---  ---------------  ---  ---  ---  ---  ---  ---------------  ----
-----------  ---------------  ---
1     mstr  3     0.000,000,000   1    3    0    e2e  3     0.000,000,000    0.0
00,000,000    0.000,000,000   2
>
```

Example 2:

```
>ptp portdataset 1 1 1 1 1 e2e 2 10 10 10
>ptp portdataset 1
Port  Stat  MDR  PeerMeanPathDel  Anv  ATo  Syv  Dlm  MPR  DelayAsymmetry   IngressLatency   EgressLatency    Ver
----  ----  ---  ---------------  ---  ---  ---  ---  ---  ---------------  ---------------  ---------------  ---
1     mstr  3     0.000,000,000   1    3    0    e2e  3     0.000,000,000    0.0              00,000,000
0.000,000,000   2
>
```

Messages: *Clock instance 1 : does not exist*

Command: **PTP Clock Create**

Syntax: **ptp clockcreate** <clockinst> [<devtype>] [<twostep>] [<protocol>] [<oneway>] [<clockid>] [<tag_enable>] [<vid>] [<prio>]

Description: Create or show a PTP clock instance data, where:

<**clockinst**> : The clock instance number [0..3].

<**devtype**> : The 'devtype' parameter takes the following values:

ord : Ordinary/Boundary clock.
p2p : Peer-to-peer transparent clock.
e2e : End-to-end transparent clock.
mst : Master only clock.
slv : Slave only clock.

(default: Show actual init parameters)

<**twostep**> : The 'twostep' parameter takes the following values:

true : Follow-up messages are used.
false : No follow-up messages are used.

<**protocol**> : The protocol parameter takes the following values:

ethernet : The clock uses multicast Ethernet protocol.
ip4multi : The clock uses IPv4 multicast protocol.
ip4uni : The clock uses IPv4 unicast protocol.

Note : IPv4 unicast protocol only works in Master only and Slave only clocks.
See parameter <devtype>.
In a unicast Slave only clock you must also configure which master clocks to request Announce and Sync messages from. See the 'UniConfig' command.

<**oneway**> : The oneway parameter takes the following values:

true : The clock slave uses one-way measurements, i.e., no delay requests.
false : The clock slave uses two-way measurements.

<**clockid**> : 8 byte clock identity (xx:xx:xx:xx:xx:xx:xx:xx).

<**tag_enable**>: The 'tag_enable' parameter takes the following values:

true : The ptp frames are tagged with the VLAN tag specified in the VID field.
Note : Packets are only tagged if the port is configured for vlan tagging, i.e.,: Port Type != Unaware and PortVLAN mode == None.
false : The ptp frames are sent untagged.

<**vid**> : The VID parameter takes the following values:

0 - 4094 : The range of VIDs ptp can use to send tagged frames.

<**prio**> : The Prio parameter takes the following values:

0 - 7 : The range of Priorities ptp can use in the tagged frames.

Example:

```
>ptp clockcreate 1 ord
>ptp clockcreate 2 p2p
>ptp clockcreate 1
ClockId  DeviceType  2StepFlag  Ports  ClockIdentity            Dom
-------  ----------  ---------  -----  -----------------------  ---
1        Ord-Bound   False      6      00:c0:f2:ff:fe:00:00:01  1

ClockQuality               Pri1  Pri2
-------------------------  ----  ----
Cl:251 Ac:Unknwn Va:65535  128   128

Protocol   One-Way    VLAN Tag Enable    VID    PCP
---------  ---------  -----------------  -----  ----
Ethernet   False      False              0      0
```

```
>ptp clockcreate 2
ClockId  DeviceType  2StepFlag  Ports  ClockIdentity            Dom
-------  ----------  ---------  -----  ----------------------  ---
2        P2pTransp   False      6      00:c0:f2:ff:fe:00:00:01  2

ClockQuality               Pri1  Pri2
-------------------------  ----  ----
Cl:251 Ac:Unknwn Va:65535  128   128

Protocol   One-Way    VLAN Tag Enable    VID    PCP
---------  ---------  -----------------  -----  ----
Ethernet   False      False              0      0
>
```

Messages:
Cannot create clock instance 1 : a Ord-Bound clock type already exists

Command: **PTP Clock Delete**
Syntax: **ptp clockdelete** <clockinst> [<devtype>]
Description: Delete an existing PTP clock instance, where:
<**clockinst**>: clock instance number [0-3]
<**devtype**> : The devtype parameter takes the following values:

- ***ord*** : Ordinary/Boundary clock
- ***p2p*** : Peer-to-peer transparent clock
- ***e2e*** : End-to-end transparent clock
- ***mst*** : Master only clock
- ***slv*** : Slave only clock

(The default is ‘ Show actual init parameters’.)

Example:

```
>ptp clockdelete 1
ClockId  DeviceType  2StepFlag  Ports  ClockIdentity            Dom
-------  ----------  ---------  -----  ----------------------  ---
1        Ord-Bound   False      6      00:c0:f2:ff:fe:00:00:01  1

ClockQuality            Pri1  Pri2
----------------------  ----  ----
Cl:251 Ac:254 Va:65535  128   128

Protocol   One-Way    VLAN Tag Enable    VID    PCP
---------  ---------  -----------------  -----  ----
Ethernet   False      False              0      0
>
```

Command: **PTP Default DS**
Syntax: **ptp defaultds** <clockinst> [<priority1>] [<priority2>] [<domain>]
Description: Set or show PTP clock Default Data Set priority1 and priority2 as used in the Best Master Clock (BMC) algorithm. The lower values take precedence. (The BMC algorithm determines which clock is the highest quality clock within the network.) The parameters are:
<**clockinst**>: clock instance number [0..3].
<**priority1**>: [0-255] Clock priority 1 for PTP BMC algorithm.
<**priority2**>: [0-255] Clock Priority 2 for PTP BMC algorithm.
<**domain**> : [0-127] PTP clock domain ID (0 = default) for PTP.

Example:
```
>ptp defaultds 1 5 25 0
>ptp defaultds 1
ClockId  DeviceType  2StepFlag  Ports  ClockIdentity            Dom
-------  ----------  ---------  -----  -----------------------  ---
1        Ord-Bound   False      6      00:c0:f2:ff:fe:56:0a:40  0

ClockQuality               Pri1  Pri2
-------------------------  ----  ----
Cl:251 Ac:Unknwn Va:65535  5     25

Protocol   One-Way    VLAN Tag Enable    VID    PCP
---------  ---------  -----------------  -----  ----
Ethernet   False      False              0      0
>
```

Command: **PTP Current DS**
Syntax: **ptp currentds** <clockinst>
Description: Show PTP clock Current Data set, where:
<**clockinst**>: clock instance number [0-3].

Example:
```
>ptp currentds 1
stpRm  OffsetFromMaster    MeanPathDelay
-----  ------------------  ------------------
0       0.000,000,000       0.000,000,000
>
```

Command: **PTP Parent DS**
Syntax: **ptp parentds** <clockinst>
Description: Show PTP clock Parent Data set, where:
<**clockinst**>: clock instance number [0-3].

Example:
```
>ptp parentds 1
ParentPortIdentity      port  Pstat  Var  ChangeRate
----------------------  ----  -----  ---  ----------
00:c0:f2:ff:fe:00:00:01 0     False  0    0

GrandmasterIdentity      GrandmasterClockQuality  Pri1  Pri2
-----------------------  -----------------------  ----  ----
00:c0:f2:ff:fe:00:00:01  Cl:251 Ac:254 Va:65535   5     25
>
```

Command: **PTP Timing Properties**

Syntax: **ptp timingproperties** <clockinst> [<utcoffset>] [<valid>] [<leap59>] [<leap61>] [<timetrac>] [<freqtrac>] [<ptptimescale>] [<timesource>]

Description: Set or show existing PTP clock Timing properties Data set. The parameters are:

<**clockinst**> : clock instance number [0..3]

<**utcoffset**> : PTP clock offset between UTC and TAI in seconds.

<**valid**> : The offset 'valid' parameter takes the following values:
- false : The UTC offset is not valid.
- true : The UTC offset is valid.

<**leap59**> : The leap59 parameter takes the following values:
- false : no leap59 in current day.
- true : last minute of current day contains 59 sec.

<**leap61**> : The leap61 parameter takes the following values:
- false : no leap61 in current day.
- true : last minute of current day contains 61 sec.

<**timetrac**> : The timetraceable parameter takes the following values:
- false : timing is not traceable.
- true : timing is traceable..

<**freqtrac**> : The freqtraceable parameter takes the following values:
- false : frequency is not traceable.
- true : frequency is traceable.

<**ptptimescale**>: The timescale parameter takes the following values:
- false : timing is not a PTP time scale
- true : timing is a PTP time scale.

<**timesource**> : [0-255] Time source (160 = internal oscillator).
- ***16*** : ATOMIC_CLOCK (0x10)
- ***32*** : GPS (0x20)
- ***48*** : TERRESTRIAL_RADIO (0x30)
- ***64*** : PTP (0x40)
- ***80*** : NTP (0x50)
- ***96*** : HAND_SET (0x60)
- ***144*** : OTHER (0x90)
- ***160*** : INTERNAL_OSCILLATOR (0xA0)

Example:

```
>ptp timingproperties 0 60 true false false false false false 160
>ptp timingproperties 0
UtcOffset  Valid  leap59  leap61  TimeTrac  FreqTrac  ptpTimeScale  TimeSource
---------  -----  ------  ------  --------  --------  ------------  ----------
60         True   False   False   False     False     False         160
>
```

Command: **PTP Port DataSet**

Syntax: **ptp portdataset** <clockinst> [<port_list>] [<announceintv>] [<announceto>] [<syncintv>] [<delaymech>] [<minpdelayreqintv>] [<delayasymmetry>] [<ingressLatency>] [<egressLatency>]

Description: Set or show PTP port data set, where:

<**clockinst**> : clock instance number (0-3).
<**port_list**> : Port list or 'all', default: All ports.
<**announceintv**> : [-3..4] Log2 of mean announce interval in seconds.
<**announceto**> : [-1..10] Log2 of announce receipt timeout in seconds.
<**syncintv**> : [-7..4] Log2 of sync interval in seconds.
<**delaymech**> : The delaymech parameter takes the following values:
e2e: The port is configured to use the delay request-response mechanism
p2p: The port is configured to use the peer delay mechanism
<**minpdelayreqintv**>: [-7..5] Log2 of minimum delay required interval in seconds.
<**delayasymmetry**> : path delay asymmetry measured in ns (nano seconds).
<**ingresslatency**> : ingress latency measured in ns (nano seconds).
<**egresslatency**> : egress latency measured in ns (nano seconds).

Example:

```
>ptp portdataset 1 1 1 1 1 e2e 1 10 10 10
>ptp portdataset 1
Port  Stat  MDR  PeerMeanPathDel  Anv  ATo  Syv  Dlm  MPR  DelayAsymmetry   Ingr
essLatency   EgressLatency    Ver
----  ----  ---  ---------------  ---  ---  ---  ---  ---  ---------------  ----
-----------  ---------------  ---
1     mstr  1     0.000,000,000   1    1    1    e2e  1     0.000,000,010    0.0
00,000,010    0.000,000,010   2
>
```

Command: **PTP Local Clock**
Syntax: **ptp localclock** <clockinst> [update|show|ratio] [<clockratio>]
Description: Update or show PTP current time, or set master clock ratio, where:
<**clockinst**> : clock instance number (0-3).
update|**show**|**ratio**: PTP local clock.
update : The local clock is synchronized to the LIB-4xxx internal system clock.
show : The local clock current time is shown.
ratio : Set the local master clock frequency ratio in units of 0.1 PPB (parts per billion).
(ratio > 0 => faster clock, ratio < 0 => slower clock).
<**clockratio**> : [-10.000.000..+10.000.000] Clock frequency ratio in 0.1 PPB (parts per billion).

Example:
```
>ptp localclock 1 show 100
PTP Time (1)    : 1970-01-04T03:08:58+00:00 576,423,480
Clock Adjustment method: Software
>ptp localclock 0 update
>ptp localclock 0
PTP Time (0)    : 1970-01-01T00:43:24+00:00 888,389,556
Clock Adjustment method: Internal Timer
>ptp localclock 0 show
PTP Time (0)    : 1970-01-01T00:47:07+00:00 348,600,876
Clock Adjustment method: Internal Timer
>ptp localclock 0 ratio -5
>ptp localclock 0 show
PTP Time (0)    : 1970-01-01T00:48:07+00:00 149,773,276
Clock Adjustment method: Internal Timer
>
```

Frequency accuracy (FFR) is the difference in frequency between the server clock and the recovered client clock over a time interval. Frequency accuracy targets vary (e.g., ± 32 ppm for Stratum 4 & 4E, ± 4.6 ppm for Stratum 3 and 3E, or ± 50 ppb for GSM & WCDMA-FDD).

Command: **PTP Filter**
Syntax: **ptp filter** <clockinst> [<def_delay_filt>] [<period>] [<dist>]
Description: Set or show PTP clock filter data, where:
<**clockinst**> : clock instance number (0-3).
<**def_delay_filt**>: [1..6] Log2 of timeconstant in delay filter.
<**period**> : [1..1000] Measurement period in number of sync events. **Note**: In configurations with Timestamp enabled PHYs, the period is automatically increased, if (period*dist < SyncPackets pr sec/4), i.e., a maximum of 4 adjustments are made per second.
<**dist**> : [1..10] Distance between servo update ***n*** number of measurement periods;
If Distance is 1 the offset is averaged over the 'period',
If Distance is >1 the offset is calculated using 'min' offset.

Example:
```
>ptp filter 1 3 50 3
>ptp filter 1
DelayFilter  period  dist
-----------  ------  ----
3            50      3
>
```

Command: **PTP Servo**

Syntax: **ptp servo** <clockinst> [<displaystates>] [<ap_enable>] [<ai_enable>] [<ad_enable>] [<ap>] [<ai>] [<ad>]

Description: Set or show PTP clock servo data. The default clock servo uses a PID regulator to calculate the current clock rate:

clockAdjustment = OffsetFromMaster/ P constant + Integral(OffsetFromMaster)/ I constant + Differential OffsetFromMaster)/ D constant

The **P**roportional–**I**ntegral–**D**erivative controller (PID controller) is a control loop feedback mechanism (controller) used in industrial control systems as a feedback controller. The PID controller calculates an "error" value as the difference between a measured process variable and a desired setpoint. The PID controller tries to minimize the error by adjusting the process control inputs.

The PID controller calculation involves three separate constant parameters: the Proportional, the Integral, and the Derivative values (denoted P, I, and D). These values can be interpreted in terms of time, where: **P** depends on the present error, **I** on the accumulation of past errors, and **D** is a prediction of future errors, based on current rate of change. The parameters are:

<**clockinst**> : clock instance number (0-3).

<**displaystates**>: The 'displaystates' parameter takes the following values:
true : Display clock state and measurements.
false : Do not display clock state and measurements.

<**ap_enable**> : true : Enable the 'P' component in the PID regulator.
false : Disable the 'P' component in the PID regulator.

<**ai_enable**> : true : Enable the 'I' component in the PID regulator.
false : Disable the 'I' component in the PID regulator.

<**ad_enable**> : true : Enable the 'D' component in the PID regulator.
false : Disable the 'D' component in the PID regulator.

<**ap**> : [1 - 1000] The 'P' (proportional) component in the PID regulator.

<**ai**> : [1 - 10000] The 'I' (integral) component in the PID regulator.

<**ad**> : [1 - 10000] The 'D' (derivative) component in the PID regulator.

Example:

```
>ptp servo 1 true true true false
>ptp servo 1
Display  P-enable  I-enable  D-enable  'P'constant  'I'constant  'D'constant
-------  --------  --------  --------  -----------  -----------  -----------
True     True      True      False     0            0            0
>
>ptp servo 1
Display  P-enable  I-enable  D-enable  'P'constant  'I'constant  'D'constant
-------  --------  --------  --------  -----------  -----------  -----------
False    True      True      True      3            80           40
>
```

Command: **PTP Slave Table Unicast**
Syntax: **ptp slavetableunicast** <clockinst>
Description: Show the Unicast slave table of the requested unicast masters, where:
<**clockinst**>: clock instance number (0-3).
Example:

```
>ptp slavetableunicast 1
ip_addr     stat    mac_addr         port   sourceportidentity    grant
----------- ----    ---------------  ----   ------------------    ------
>
```

Command: **PTP UniConfig**
Syntax: **ptp uniconfig** <clockinst> [<index>] [<duration>] [<ip_addr>]
Description: Set or show the Unicast Slave configuration, where:
<**clockinst**>: clock instance number (0-3).
<**index**> : [0 - 4] Index in the slave table.
<**duration**> : [10 - 1000] Number of seconds for which the Announce/Sync messages are requested.
<**ip_addr**> : IPv4 address of requested master clock.
Example:

```
>ptp uniconfig 1 1 30 192.168.1.30
>ptp uniconfig 1
index  duration  ip_address       grant  CommState
-----  --------  ---------------  -----  ---------
0      100       0.0.0.0          0      IDLE
1      30        192.168.1.30     0      IDLE
2      100       0.0.0.0          0      IDLE
3      100       0.0.0.0          0      IDLE
4      100       0.0.0.0          0      IDLE
>
```

Command: **PTP Foreign Masters**
Syntax: **ptp foreignmasters** <clockinst> [<port_list>]
Description: Show PTP port foreign masters data set, where:
<**clockinst**>: clock instance number (0-3).
<**port_list**>: Port list or 'All'. The default is All ports.
Example:

```
>ptp foreignmasters 1 all
Port  ForeignmasterIdentity   ForeignmasterClockQality  Pri1  Pri2  Qualif  Best
----  --------------------   ------------------------  ----  ----  ------  ----
>
```

Command: **PTP Egress Latency**
Syntax: **ptp egresslatency** [show|clear]
Description: Show or clear the One-step egress latency observed in systems where the time stamping is done in software. The parameters are:
show|**clear**: PTP Ingress latency, either:
show : Show the observed Egress latency, or
clear : Clear the observed Egress latency.

Example:
```
>ptp egresslatency show
min              mean             max              count
---------------  ---------------  ---------------  ------
 0.000,000,000   0.000,000,000   0.000,000,000  0
>ptp egresslatency clear
Observed Egress Latency counters cleared
```

Note: you must have a PTP clock instance configured for accurate RFC 2544 Latency test step timestamps. PTP must be running on both devices to synchronize the Time of Day.

Command: **PTP Master Table Unicast**
Syntax: **ptp mastertableunicast** <clockinst>
Description: Show the Unicast master table of the slaves that have requested unicast communication, where:
<**clockinst**>: clock instance number (0-3).

Example:
```
>ptp mastertableunicast 1
ip_addr          mac_addr           port  Ann  Sync
---------------  -----------------  ----  ---  -----
>
```

Command: **PTP ExtClock Output Mode**
Syntax: **ptp extClock output mode** [<ext_clock_enable>] [<clockfreq_out>]
Description: Update or show the IEEE 1588 SMB Output, where:
<**ext_clock_enable**>:
enable : Enable the external SMB.
disable : Disable the external SMB.
<***clockfreq_out***> : External clock output frequency (1 - 25000000 Hz). Note that the ouput frequency is rounded down if not divisable by 4 ns.

Example:
```
>ptp extClock output mode
PTP ExtClock Output Mode: State: Enabled, Frequency: 1 Hz
>ptp extClock output mode enable 80000
>ptp extClock output mode
PTP ExtClock Output Mode: State: Enabled, Frequency: 80000 Hz
>
```

Command: **PTP ExtClock Input Mode**
Syntax: **ptp extClock Input Mode** [<ext_clock_enable>] [<clockfreq_in>]
Description: Update or show the IEEE 1588 SMB Input, where:
<**ext_clock_enable**>:
enable : Enable the external SMB.
disable : Disable the external SMB.
<**clockfreq_in**> : External clock input frequency, either:
[1PPS|8KHz|64KHz|1.544MHz|2.048MHz|10MHz|19.44MHz|25MHz]

Example:
```
>ptp extclock input mode
PTP ExtClock Input Mode: State: Enabled, Frequency: 64 KHz
>ptp extclock input mode enable 8KHz
>ptp extclock input mode
PTP ExtClock Input Mode: State: Enabled, Frequency: 8 KHz
>ptp extclock input mode 25MHz
>ptp extclock input mode
PTP ExtClock Input Mode: State: Disabled, Frequency: 25 MHz
>
```

Command: **PTP ExtClock Impedance**
Syntax: **ptp extclock impedence** [<impedance>]
Description: Update or show External I/O Impedance, where:
<**impedance**>:
50 : 50 ohm external I.O impedence.
75 : 75 ohm external I.O impedence.
Hi-Z : not impedance termination driven, "tri-stated" or "floating".

Example:
```
>ptp extclock impedence
PTP ExtClock Impedance: 50 Ohms
>ptp extclock imp 75
>ptp extclock imp
PTP ExtClock Impedance: 75 Ohms
>ptp extclock imp Hi-Z
>ptp extclock imp
PTP ExtClock Impedance: Hi-Z
>
```

Command: **PTP ExtClock Input Status**
Syntax: **ptp extClock input status** [<clear>]
Description: Show current IEEE 1588 Input status, where:
<clear> : Clear (reset to zero) statistics.

Example:
```
>ptp extclock input status
IEEE 1588 Input Status:

Input Frequency: 0
>
```

PTP Clock Configuration Parameters

Clock Instance - Indicates the Instance of a particular Clock Instance (0-3). Enter a Clock Instance number to set (define) the Clock details.

Device Type - Indicates the Type of the Clock Instance. There are five Device Types.

1. Ord-Bound = clock's Device Type is Ordinary-Boundary Clock.
2. P2p Transp = clock's Device Type is Peer to Peer Transparent Clock.
3. E2e Transp = clock's Device Type is End to End Transparent Clock.
4. MastrOnly = clock's Device Type is Master Only.
5. SlaveOnly = clock's Device Type is Slave Only.

Note: Device Type = Inactive is the state of an unused instance which is not displayed.

Port List - Set for each port configured for this Clock Instance.

2 Step Flag - Static member: defined by the system, ***true*** if two-step Sync events and Pdelay_Resp events are used .

Clock Identity - shows unique clock identifier.

One Way - If true, one way measurements are used. This parameter applies only to a slave. In one-way mode, no delay measurements are performed (i.e., this applies only if frequency synchronization is needed). The master always responds to delay requests.

Protocol - Transport protocol used by the PTP protocol engine, either:

* ethernet PTP over Ethernet multicast
* ip4multi PTP over IPv4 multicast
* ip4uni PTP over IPv4 unicast

Note: IPv4 unicast protocol only works in Master only and Slave only clocks. See the 'Device Type' parameter. In a unicast Slave only clock, you must also configure which master clocks to request Announce and Sync messages from. See "Unicast Slave Configuration".

VLAN Tag Enable - Enables the VLAN tagging for the PTP frames.
Note: Packets are only tagged if the port is configured for VLAN tagging (i.e., Port Type = Unaware and PortVLAN mode = None).

VID - VLAN Identifier used for tagging the PTP frames.

PCP - Priority Code Point value used for PTP frames.

MVR Commands

Multicast VLAN Registration (MVR) is a protocol for Layer 2 (IP) networks that enables multicast-traffic from a source VLAN to be shared with subscriber-VLANs. Using MVR saves bandwidth by preventing duplicate multicast streams being sent in the core network, instead the stream(s) are received on the MVR-VLAN and forwarded to the VLANs where hosts have requested them.

The MVR feature enables multicast traffic forwarding on the Multicast VLAN. In a multicast television application, a PC or a television with a set-top box can receive the multicast stream. Multiple set-top boxes or PCs can be connected to one subscriber port, which is a switch port configured as an MVR receiver port. When a subscriber selects a channel, the set-top box or PC sends an IGMP join message to Switch A to join the appropriate multicast. Uplink ports that send and receive multicast data to and from the multicast VLAN are called MVR source ports.

The available MVR commands are:

>**mvr?**
Available Commands:

MVR Configuration
MVR Mode [enable|disable]
MVR VLAN Setup [<mvid>] [add|del|upd] [(Name <mvr_name>)]
MVR VLAN Mode [<vid>|<mvr_name>] [dynamic|compatible]
MVR VLAN Port [<vid>|<mvr_name>] [<port_list>] [source|receiver|inactive]
MVR VLAN LLQI [<vid>|<mvr_name>] [mvr_param_llqi]
MVR VLAN Channel [<vid>|<mvr_name>] [add|del|upd] [channel] [channel_bound] [(Name <grp_name>)]
MVR VLAN Priority [<vid>|<mvr_name>] [priority] [tagged|untagged]
MVR Immediate Leave [<port_list>] [enable|disable]
MVR Status [<vid>] [clear]
MVR Groups [<vid>]
MVR SFM [<vid>] [<port_list>]
>

Each of the available MVR commands is explained below.

Command: **Show MVR Configuration**
Syntax: **mvr config**
Description: Show the current MVR configuration.
Example 1: (default):

```
>mvr config

MVR Configuration:
==================

MVR Mode: Disabled

MVR Interface Setting
VID   Name                             Mode        Tagging   Priority  LLQI
----  -------------------------------  ----------  --------  --------  -----

MVR Immediate Leave Setting
Port  Immediate Leave
----  ---------------
1     Disabled
2     Disabled
3     Disabled
4     Disabled

>
```

Messages:
W mvr 03:10:02 57/mvr_stacking_set_intf_entry#1937: Warning: MVR delete VLAN-1failed in isid-1
W mvr 03:10:02 57/mvr_stacking_set_intf_entry#1937: Warning: MVR delete VLAN-1 failed in isid-1

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show MVR Mode**
Syntax: **mvr mode** [enable|disable]
Description: Set or show the system MVR mode, where:
enable : Enable MVR mode.
disable : Disable MVR mode.
(default: Show MVR mode)

Example:

```
>mvr mode
MVR Mode: Disabled
>mvr mode enable
>mvr mode
MVR Mode: Enabled
```

Note that MVR mode and MVR Port mode must both be enabled for full LIB-4xxx MVR functionality.

Command: **MVR VLAN Setup**

Syntax: **mvr vlan setup** [<mvid>] [add|del|upd] [(Name <mvr_name>)]

Description: Set or show per MVR VLAN configuration, where:
<**mvid**> : MVR VLAN ID (1-4094).
add : Add operation.
del : Delete operation.
upd : Update operation.
name : MVR Name keyword.
<**mvr_name**>: MVR VLAN name (up to 32 characters).

Example:

```
>mvr vlan setup
MVR Interface Setting
VID   Name                             Mode        Tagging   Priority  LLQI
----  -------------------------------  ----------  --------  --------  -----

>mvr vlan setup 1 add Name one
>mvr vlan setup
MVR Interface Setting
VID   Name                             Mode        Tagging   Priority  LLQI
----  -------------------------------  ----------  --------  --------  -----
1     one                              Dynamic     Tagged    0         5
[Port Setting of one(VID-1)]
Inactive Port: 1-4
[Channel Setting of one(VID-1)]
<Empty Channel Table>
>
```

Messages:
Input MVR VID doesn't exist!
W mvr 20:55:15 10/mvr_stacking_set_intf_entry#1685: Warning: MVR delete VLAN-1 failed in isid-1
W mvr 22:01:59 46/_mvr_vlan_warning_handler#4112: Warning: Please adjust the management VLAN ports overlapped with MVR source ports!

Command: **MVR VLAN Mode**
Syntax: **mvr vlan mode** [<vid>|<mvr_name>] [dynamic|compatible]
Description: Set or show per MVR VLAN mode, where:
<**vid**>|<**mvr_name**>: MVR VLAN ID (1-4094) or Name (up to 32 characters).
dynamic : Dynamic MVR mode.
compatible: Compatible MVR mode.
(The default is 'Show MVR VLAN mode'.)

Example:
```
>mvr vlan mode
MVR Interface Setting
VID   Name                              Mode
----  --------------------------------  ----------
1     one                               Dynamic
>mvr vlan mode 1 compatible
>mvr vlan mode
MVR Interface Setting
VID   Name                              Mode
----  --------------------------------  ----------
1     one                               Compatible
>
```

Messages: *Input MVR VID doesn't exist!*
Invalid parameter: 1

Command: **MVR VLAN Port**
Syntax: **mvr vlan port** [<vid>|<mvr_name>] [<port_list>] [source|receiver|inactive]
Description: Set or show per MVR VLAN port role, where:
<**vid**>|<**mvr_name**>: MVR VLAN ID (1-4094) or Name (up to 32 characters).
<**port_list**> : Port list or 'All'. The default is 'All' ports.
source : MVR source port.
receiver : MVR receiver port.
inactive : Disable MVR.
(default: Show MVR port role)

Example:
```
> mvr vlan port
MVR Interface Setting
VID   Name
----  --------------------------------
1     one
[Port Setting of one(VID-1)]
Inactive Port: 1-4
>
```

Messages: *Input MVR VID doesn't exist!*
Invalid parameter: one

Command: **MVR VLAN LLQI**

Syntax: **mvr vlan llqi** [<vid>|<mvr_name>] [mvr_param_llqi]

Description: Set or show per MVR VLAN LLQI (Last Listener Query Interval), where:

<**vid**>|<**mvr_name**>: MVR VLAN ID (1-4094) or Name (up to 32 characters).
mvr_param_llqi : ***-1*** : The Default Value (5)
0~31744 : Last Listener Query Interval in tenths of seconds.
The default is 'Show MVR Interface Last Listener Query Interval'.

Example:

```
>mvr vlan llqi
MVR Interface Setting
VID   Name                             LLQI
----  -------------------------------  -----
1     one                              5
>mvr vlan llqi 1 3

>mvr vlan llqi

MVR Interface Setting

VID   Name                             LLQI

----  -------------------------------  -----

1     one                              3

>
```

Messages: *Input MVR VID doesn't exist!*
Invalid parameter: Name

Command: **MVR VLAN Channel**
Syntax: **mvr vlan channel** [<vid>|<mvr_name>] [add|del|upd] [channel] [channel_bound] [(Name <grp_name>)]
Description: Set or show per MVR VLAN channel, where:
<**vid**>|<**mvr_name**>: MVR VLAN ID (1-4094) or Name (up to 32 characters).
add : Add operation.
del : Delete operation.
upd : Update operation.
channel : IPv4/IPv6 multicast group address.
channel_bound : The boundary IPv4/IPv6 multicast group address for the channel.
name : MVR Name keyword.
<**grp_name**> : MVR Channel name (up to 32 characters).

Example 1:
```
>mvr vlan channel
MVR Interface Setting
VID   Name
----  --------------------------------
1     one
[Channel Setting of one(VID-1)]
<Empty Channel Table>
>
```

Example 2:
```
>mvr vlan setup 1
MVR Interface Setting
VID   Name                             Mode        Tagging   Priority  LLQI
----  -------------------------------  ----------  --------  --------  -----
1     mvrvid01                         Dynamic     Tagged    0         5
[Port Setting of mvrvid01(VID-1)]
Inactive Port: 1-4
[Channel Setting of mvrvid01(VID-1)]
<Empty Channel Table>
>
```

Messages:
>W mvr 03:24:04 46/_mvr_vlan_warning_handler#4230: Warning: Please adjust the management VLAN ports overlapped with MVR source ports!

Command: **MVR VLAN Priority**

Syntax: **mvr vlan priority** [<vid>|<mvr_name>] [priority] [tagged|untagged]

Description: Set or show per MVR VLAN priority and VLAN tag, where:

<**vid**>|<**mvr_name**>: MVR VLAN ID (1-4094) or Name (up to 32 characters).
priority : CoS priority value ranges from 0 - 7.
tagged : Tagged IGMP/MLD frames will be sent.
untagged : Untagged IGMP/MLD frames will be sent.

Example:

```
>mvr vlan priority 1 1 tagged
>mvr vlan priority
MVR Interface Setting
VID   Name                             Tagging   Priority
----  -------------------------------  --------  --------
1     one                              Tagged    1
>
```

Messages: *Input MVR VID doesn't exist!*
Invalid parameter: 1

Command: **MVR Immediate Leave**

Syntax: **mvr immediate leave** [<port_list>] [enable|disable]

Description: Set or show MVR immediate leave per port, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable Immediate Leave.
disable : Disable Immediate Leave.
(The default is 'Show MVR Immediate Leave'.)

Example:

```
>mvr immediate leave
MVR Immediate Leave Setting
Port  Immediate Leave
----  ---------------
1     Disabled
2     Disabled
3     Disabled
4     Disabled

>mvr immediate leave all enable
>mvr immediate leave
MVR Immediate Leave Setting
Port  Immediate Leave
----  ---------------
1     Enabled
2     Enabled
3     Enabled
4     Enabled

>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **MVR Status**
Syntax: **mvr status** [<vid>] [clear]
Description: Show/Clear MVR operational status, where:
<**vid**>: VLAN ID (1-4094).
clear : Clear log.
Example:

```
>mvr status
IPv4  Querier  Rx          Tx          Rx          Rx          Rx          Rx
VID   Status   Query       Query       V1 Join     V2 Join     V3 Join     V2 Leave
----  -------  ----------  ----------  ----------  ----------  ----------  ----------

1     IDLE     0           0           0           0           0           0


IPv6  Querier  Rx          Tx          Rx          Rx          Rx
VID   Status   Query       Query       V1 Report   V2 Report   V1 Done
----  -------  ----------  ----------  ----------  ----------  ----------
1     IDLE     0           0           0           0           0

>
```

Command: **Show MVR Groups**
Syntax: **mvr group** [<vid>]
Description: Show the existing MVR group addresses, if any are configured, where:
<**vid**>: VLAN ID (1-4094)
Example:

```
>mvr group 1
>mvr group 2
>
```

Command: **MVR SFM**
Syntax: **mvr sfm** [<vid>] [<port_list>]
Description: Show SFM (including SSM) related information for MVR, where:
<**vid**> : VLAN ID (1-4094).
<**port_list**>: Port list or 'All'. The default is 'All' ports.
Example:

```
>mvr sfm
>mvr sfm 1 1
>
```

SFM is Source-Filtered Multicast and SSM is Source-Specific Multicast per IETF RFC 3569. For details see http://www.ietf.org/rfc/rfc3569.txt.

ERPS Commands

The ERP instance is an entity that is responsible for the protection of a subset of the VLANs that transport traffic over the physical Ethernet ring. Each ERP instance is independent of other ERP instances that may be configured on the physical Ethernet ring. The LIB-4xxx implements the ITU G.8032 standard for ERPS, which uses the APS automatic protection protocol for protection in ring and interconnected ring topology. The LIB-4xxx supports G.8032v1 in a single ring topology and G.8032v2 in multiple rings/ladder topologies.

ERPS specifies protection switching mechanisms and a protocol for Ethernet layer network (ETH) rings. Ethernet Rings can provide wide-area multipoint connectivity more economically due to their reduced number of links. The mechanisms and protocol defined in this Recommendation achieve highly reliable and stable protection; and never form loops, which would fatally affect network operation and service availability.

Each Ethernet Ring Node is connected to adjacent Ethernet Ring Nodes participating in the same Ethernet Ring, using two independent links. A ring link is bounded by two adjacent Ethernet Ring Nodes, and a port for a ring link is called a ring port. The minimum number of Ethernet Ring Nodes in an Ethernet Ring is two.

The ring protection switching architecture fundamentals are a) the principle of loop avoidance, and b) the use of learning, forwarding, and Filtering Database (FDB) mechanisms defined in the ETH_FF (Ethernet flow forwarding) function.

Loop avoidance in an Ethernet Ring is achieved by guaranteeing that, at any time, traffic may flow on all but one of the ring links. This particular link is called the Ring Protection Link (RPL), and under normal conditions this ring link is blocked (i.e., not used for service traffic). One designated Ethernet Ring Node, the 'RPL Owner Node', is responsible for blocking traffic at one end of the RPL. Under an Ethernet ring failure condition, the RPL Owner Node is responsible for unblocking its end of the RPL (unless the RPL has failed) allowing the RPL to be used for traffic. The other Ethernet Ring Node adjacent to the RPL, the 'RPL Neighbour Node', may also participate in blocking or unblocking its end of the RPL. The event of an Ethernet Ring failure results in protection switching of the traffic. This is achieved under the control of the ETH_FF functions on all Ethernet Ring Nodes. An APS protocol is used to coordinate the protection actions over the ring.

Note: The SOAM MEP configuration must be successfully completed before configuring Ethernet Ring Protection Switching (ERPS) using the commands in this section. See the "MEP Commands" on page 216.

These LIB-4xxx commands provide Ethernet Ring Protection Switching (ERPS) functions:

>**erps ?**
Available Commands:

Erps command [fs|ms|clear] <port> <group-id>
Erps version [v1|v2] <group-id>
Erps add <group-id> <east_port> <west_port> [major|sub] [interconnected] [virtual_channel] [<major-ring-id>]
Erps reversion [revertive|nonrevertive] <group-id>
Erps vlan add <vid> <group-id>
Erps vlan delete <vid> <group-id>
Erps mep <east_sf_mep> <west_sf_mep> <east_raps_mep> <west_raps_mep> <group-id>
Erps rpl neighbour <rpl_port> <group-id>
Erps rpl owner <rpl_port> <group-id>
Erps rpl neighbour clear <group-id>
Erps rpl owner clear <group-id>
Erps holdoff-timeout <hold_timeout> <group-id>
Erps guard-timeout <guard_timeout> <group-id>
Erps wtr-timeout <wtr_timeout> <group-id>
Erps delete <group-id>
Erps topologychange [propagate|nopropagate] <group-id>
Erps configuration [<group-id>] [statistics|clear]
>

The LIB-4xxx ERPS commands are explained below.

Command: **Configure / Clear ERPS Instance**

Syntax: **erps command** [fs|ms|clear] <port> <group-id>

Description: Used to configure an existing Ethernet Ring Protection Switch (ERPS) instance.
Invokes an administrative command for a given protection group for a port. A port can be administratively configured to be in either Manual switch or Forced switch state or None (neither Forced or Manual).
FS (Forced Switch) forces a block on the ring port where the command is issued.
MS (Manual Switch): in the absence of a failure or FS, a MS selection forces a block on the ring port where the command is issued.
Clear: clears the active local administrative selection (e.g., Forced Switch or Manual Switch state). The Clear command is used for these operations:

a) Clearing an active local administrative command (e.g., forced switch or manual switch),
b) Triggering reversion before the WTR or WTB timer expires in case of revertive operation, and
c) Triggering reversion in case of non-revertive operation.

<**port**> = a valid port number (1- 12); forces a block on the ring port issuing this command.
<**group-id**> = Protection Group ID number (1 - 64)

Example:
```
>erps command fs 1 1
>erps command fs 1 1
>
```

Messages: *given protection group does not exists*
incorrect error code = 4294967295

Command: **ERPS Configuration**
Syntax: **erps config** [<group-id>] [statistics|clear]
Description: Display or delete a specified ERPS protection group, or display / clear a protection group's R-APS statistics. The parameters are:
<**group-id**> : the Protection Group ID.
[**statistics**] : displays the R-APS statistics of the specified ERPS protection group.
[**clear**] : clears the R-APS statistics of the specified ERPS protection group.
Example: for each ERPS ID:

```
>erps config 1

 ERPS ID  Port_1   Port_0      Node Role          RPL Block         RPL Port

   1       2        1         RPL Owner       1             RPL Blocked

    Protected VLANS:
 None
    Protection Group State             :Active
    Port 0 SF Mep                      :1
    Port 1 SF Mep                      :2
    Port 0 APS MEP                     :1
    Port 1 APS MEP                     :2
    WTR Timeout                        :1
    WTB Timeout                        :5500
    Hold-Off Timeout                   :0
    Guard Timeout                      :500
    Node Type                          :Major-Interconnected
    Reversion                          :Revertive
    Version                            :ERPS-V2 compatible
    ERPSv2 Admin Command               :None

    FSM State                          :PENDING
    Port 0 Link Status                 :Link Up
    Port 1 Link Status                 :Link Up
    Port 0 Block Status                :BLOCKED
    Port 1 Block Status                :UNBLOCKED
    R-APS Transmission                 :STOPPED
    R-APS Port 0 Reception             :NONE
    R-APS Port 1 Reception             :NONE
    FOP Alarm                          :OFF
>erps config 1 statistics
W erps 07:30:08 13/cli_parse_erps_statistics#998: Warning: ALL statistics|clear]

    RAPS PDU's Received:               0
    RAPS PDU's dropped:                0
    local SF Occurred:                 0
    local SF cleared:                  0
    remote SF received:                0
    remote FS received:                0
    NR Messages sent:                  0
>
```

Messages: *W erps 04:32:34 54/cli_parse_erps_statistics#998: Warning: ALL statistics|clear]*

Command: **Set ERPS Version**
Syntax: **erps version** [v1|v2] <group-id>
Description: Specifies the protocol version for a given protection group, where:
[**v1**|**v2**] : specifies the protocol version for a given protection group (the ERPS protocol version to be supported).
v1 : G.8032 v1 supported a single ring topology. The v1 protocol is robust enough to work for unidirectional failure and multiple link failure scenarios in a ring topology. It allows mechanism to force switch (FS) or manual switch (MS) to take care of field maintenance scenario.
v2 : G.8032 v2 supports multiple rings/ladder topology. The v2 protocol also introduced other features such as Revertive/ Non-revertive mode after condition, that is causing the switch, is cleared, Administrative commands - Forced Switch (FS), Manual Switch (MS) for blocking a particular ring port, Flush FDB (Filtering database), and support of multiple ERP instances on a single ring.
<**group_id**> : protection group ID (1 - 64).

Example:
```
>erps version v2 1
>
```

Messages: *given protection group does not exists*

Command: **Add ERPS Group**
Syntax: **erps add** <group-id> <east-port> <west-port> [major|sub] [interconnected] [virtual_channel] [<major-ring-id>]
Description: Create a new Ethernet ring protection group, where:
<**group-id**> : protection group id (1 - 64).
<**east_port**> : protection group east port (east port of a protection group).
<**west_port**> : protection group west port (west_port can be 0 for sub-rings).
[**major**|**sub**] : ring type (i.e., major-ring or sub-ring).
[**interconnected**] : interconnection node or not. Set for interconnected node.
[[**virtual_channel**] : Virtual channel present or not. Set for virtual channel.
[<**major-ring-id**>] : major ring group ID for interconnected sub-ring (major ring of a sub-ring, when configuring as an interconnected node).

Example:
```
>erps add 1 1 1 interconnected virtual_channel 1

 east and west ports are same
>erps add 1 1 2 interconnected virtual_channel 1
>erps add 1 2 3 interconnected virtual_channel 1
>
```

Messages:
east and west ports are same
given protection group already crated

Command: **Configure ERPS Reversion**
Syntax: **erps reversion** [revertive|nonrevertive] <group-id>
Description: Use to configure reversion characteristics for a specified, existing node, where:
[**revertive**|**nonrevertive**] : enabling or disabling reversion for a given group
<**group_id**> : protection group ID (1 - 64)

Example:
```
>erps reversion revertive 1
>erps reversion revertive 2
```

Messages: *given protection group does not exists*

Command: **Add ERPS VLAN**
Syntax: **erps vlan add** <vid> <group-id>
Description: Use to associate a specified VLAN to a protection group, where:
<**vid**> : vlan to be protected; VLAN ID 1-4094.
<**group-id**> : protection group-id to which the VID belongs (1 - 64).

Example:
```
>erps vlan add 1 1
>
```

Messages: *incorrect error code = 11* if the VLAN already exists.

Command: **Delete ERPS VLAN from a Group**
Syntax: **erps vlan delete** <vid> <group-id>
Description: Use for disassociating a given VLAN to a protection group, where:
<**vid**> : Protected VLAN to be deleted; VLAN ID 1-4094.
<**group-id**> : Protection Group ID to which the VID belongs (1 - 64).

Example:
```
>erps vlan delete 2 2
>erps vlan delete 1 1
>
```

Messages: *vlans can not be deleted for this protection group*

Command: **Associate ERPS MEP with a Group**
Syntax: **erps mep** <east_sf_mep> <west_sf_mep> <east_raps_mep> <west_raps_mep> <group-id>
Description: Use for associating Port 0/1 MEP to a protection group, where:
<**east_sf_mep**> : SF MEP ID for Port 0. This is the SF Mep_ID for finding out Continuity Check errors on Port 0.
<**west_sf_mep**> : SF MEP ID for Port 1. This is the SF Mep_ID for finding out Continuity Check errors on Port 1.
<**east_raps_mep**>: CC/RAPS MEP ID for Port 0. This is the Mep_ID for transmitting R-APS frames on Port 0
<**west_raps_mep**>: CC/RAPS MEP ID for Port 1. This is the Mep_ID for transmitting R-APS frames on Port 1.
<**group_id**> : protection Group ID for which MEP is associating (Protection Group ID in the range of 1-64).

Note that ERPS MEPs are referenced by Instance number instead of MEP ID number. The MEP Instance number must be entered. The MEP Instance number may or may not match the MEP ID.

Example:
```
>ERPS mep 1 2 1 2 3
>
```
where:
MEP instance 1 for east SF and 2 for west SF
MEP instance 1 for east RAPS and 2 for west RAPS
ERPS instance is 3
RAPS and SF should use the same MEP

Messages:
given protection group does not exists
group association failed
incorrect error code = 36
Invalid <group-id> parameter: 0
mep association failed

Command: **Select ERPS RPL Neighbour**
Syntax: **erps rpl neighbour** <rpl_port> <group-id>
Description: Selection of RPL neighbour for a protection group, where:
(**east**|**west**) : selects east or west as RPL neighbour.
<**group-id**> : protection Group ID for selecting RPL Block.
<**rpl_port**>: RPL Block.
<**group-id**>: Protection Group ID (1 - 64).

Example:
```
>erps rpl neighbour 1 1
>erps rpl neighbour 2 0
>erps rpl neighbour 2 1
>
```

Messages:
given port is not configured either east or west for this group
given protection group does not exists
incorrect error code = 37
node is configured as neighbour for given group, can not set as rpl

Command: **Clear ERPS RPL Neighbour**
Syntax: **erps rpl neighbour clear** <group-id>
Description: Make this node a non-neighbour for a protection group, where:
<**group-id**> : protection group id for selecting RPL Block (protection group ID 1 - 64).

Example:
```
>erps rpl neighbour clear 1
>
```

Command: **Select ERPS RPL Owner**
Syntax: **erps rpl owner** <rpl_port> <group-id>
Description: Selection of RPL Block for a protection group; by default this node is considered an RPL Owner. The parameters are:
(**east**|**west**) : selected east or west as RPL Block.
<**group-id**> : protection group id for selecting RPL Block.
<**rpl_port**>: RPL Block.
<**group-id**>: protection group ID (1 - 64).

Example:
```
>erps rpl owner 1 1
>erps rpl owner 0 1
>erps rpl owner 1 0
>erps rpl owner 1 2
>erps rpl owner 1 1
>
```

Messages:
```
failed in setting rpl block
given protection group does not exists
incorrect error code = 30
Invalid <group-id> parameter: 0
node is configured as neighbour for given group, can not set as rpl
this node is rpl owner for given protection group
```

Command: **Clear ERPS RPL Owner**
Syntax: **erps rpl owner clear** <group-id>
Description: Make a node a non-RPL Block for a protection group. On clearing, this node is no longer an RPL owner for the given group.
(**east**|**west**) : select east or west as RPL Block.
<**group-id**> : protection Group ID for selecting RPL Block (1-64).
Example:
```
>erps rpl owner clear 1
>
```

Command: **Set ERPS Holdoff Timeout**
Syntax: **erps holdoff-timeout** <hold-timeout> <group-id>
Description: Used to configure the hold-off timeout time for an existing protection group, where:
<**hold_timeout**> :hold-off timeout in milliseconds (0-10,000) in increments of 100 ms.
<**group-id**> : protection group id for configuring hold-off time (1 - 64).
Example:
```
>erps holdoff-timeout 300 1
>erps holdoff-timeout 5000 2
>
```
Messages: *given protection group does not exists*
hold off should be configured in multiples of 100 ms
Invalid <hold_timeout> parameter: 1

Command: **Set ERPS Guard Timeout**
Syntax: **erps guard-timeout** <guard_timeout> <group-id>
Description: Used to configure the guard timeout time for an existing protection group, where:
<**guard_timeout**>: the guard timeout in increments of 10 ms (milliseconds) in the range of 10 ms - 2000 ms (2 seconds).
<**group-id**>protection group id for configuring guard time (1-64).
Example:
```
>erps guard-timeout 100 1
>
```

Command: **Set ERPS WTR Timeout**
Syntax: **erps wtr-timeout** <wtr_timeout> <group-id>
Description: Used to configure wait-to-restore timeout for a protection group, in minutes, in the range of 1 to 12 minutes. The parameters are:
<**wtr_timeout**> : the WTR timeout period. The valid range is 1 - 12 minutes.
<**group-id**> : protection Group ID for configuring the WTR time.
Example:
```
>erps wtr-timeout 8 1
>
```

Command: **Delete ERPS Group**
Syntax: **erps delete** <group-id>
Description: Used for deletion of an existing protection group, where:
<**group-id**> : Protection Group ID (1 - 64) to be deleted.
Example:
```
>erps delete 1
>
```

Command: **Change ERPS Topology**
Syntax: **erps topologychange** [propagate|nopropagate] <group-id>
Description: Used for specifying topology change propagation parameters for a given protection group. Topology change propagation, when enabled, sends a *Topology_Change* signal when a flush FDB action is triggered by the ERP Control Process of a Sub-Ring's ERP Instance.
The *Topology_Change* signal is disabled after a period of 10 ms. The parameters are:
[**propagate**|**nopropagate**] : enable or disable topology change propagation for a specified Protection group.
<**group_id**> : the Protection Group ID (1 - 64) to be changed.
Example:
```
>erps topologychange propagate 1
>erps topologychange nopropagate 1
```
Messages: *given protection group does not exists*

LOAM Commands

OAM (Operation Administration and Maintenance) is a protocol described in ITU-T Y.1731 used to implement carrier ethernet functionality (e.g., CC and RDI). The Link OAM (LOAM) Link Event Configuration commands let you view and edit the current Link OAM Link Event configuration.

Enabling Link OAM provides network operators the ability to monitor the health of the network and quickly determine the location of failing links or fault conditions.

The Ethernet OAM protocol is used for monitoring and troubleshooting Ethernet networks. The LIB-4xxx supports the Link OAM standard IEEE 802.3–2005 Clause 57 which defines mechanisms for monitoring and troubleshooting Ethernet access links. Specifically it defines tools for discovery, remote failure indication, remote and local loopback, and status and performance monitoring. The LIB-4xxx supports Link OAM instance at every port. You can enable LOAM on any port(s). Consider the following when configuring LOAM on the LIB-4xxx:

1. By default LOAM is disabled and set to Passive mode.
2. The LOAM unidirectional link feature is not supported.
3. The LOAM discovery process is interoperable with other vendor devices and should be able to perform LOAM loopback and event notifications with other vendor devices.
4. The LOAM loopback is supported on all ports and can perform line rate loopback of all the data plane traffic only.
5. The LOAM Dying gasp is supported; if all ports have LOAM operational, then the priority of sending a dying gasp will be over the uplink ports.
6. Link events include Errored Symbol Period, Errored Frame Event, and Errored Frame Period Event.
7. The LOAM counter statistics are available via all management interfaces, and an option to reset the LOAM counters is also available.
8. SNMP traps are generated for dying gasp events.

The LIB-4xxx commands provide Ethernet Link OAM (LOAM) functions:

>**loam ?**
Available Commands:

LOAM Control [<port_list>] [enable|disable]
LOAM Mode [<port_list>] [active|passive]
LOAM Mib-retrieval-support [<port_list>] [enable|disable]
LOAM Variable-retrieve [<port_list>] [local-info|remote-info]
LOAM Remote_loopback_support [<port_list>] [enable|disable]
LOAM Remote_loopback_oper [<port_list>] [enable|disable]
LOAM Link_monitoring_support [<port_list>] [enable|disable]
LOAM Frame_error_event [<port_list>] [<error_window>] [<error_threshold>]
LOAM Symbol_period_error_event [<port_list>] [<error_window>] [<error_threshold>]
LOAM Frame_error_seconds_summary_event [<port_list>] [<error_window>] [<error_threshold>]
LOAM Status [<port_list>]
LOAM Link_monitor_status [<port_list>]
LOAM Statistics [<port_list>] [clear]
>

The LIB-4xxx LOAM commands are explained below.

Command: **Set / Show LOAM Control**
Syntax: **loam control** [<port_list>] [enable|disable]
Description: Configure or display the existing Link OAM Control capability, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable Link OAM (LOAM).
disable: Disable Link OAM (LOAM) (default).

Example:
```
>loam control

Port  Port Mode
----  -----------
1     disabled
2     disabled
3     disabled
4     disabled
>loam control 2,3 enable
>loam control

Port  Port Mode
----  -----------
1     disabled
2     enabled
3     enabled
4     disabled
>
```

Messages: *Requested configuration is already configured on port(1/4)*

Command: **Set / Show LOAM Mode**
Syntax: **loam mode** [<port_list>] [active|passive]
Description: Configure or display how the existing Link OAM mode, where:
<**port_list**>: Port list or 'all'. The default is 'all' ports.
active : Enable Link OAM Active mode (disables LOAM Passive mode).
passive: Enable Link OAM Passive mode (disables LOAM Active mode) (default).

Example:
```
>loam mode

Port  Port Mode
----  -----------
1     passive
2     passive
3     passive
4     passive
>loam mode 2,3 active
>loam mode

Port  Port Mode
----  -----------
1     passive
2     active
3     active
4     passive
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LOAM MIB Retrieval Support**
Syntax: **loam mib-retrival-support** [<port_list>] [enable|disable]
Description: Configure or display the MIB retrieval support, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
enable : Enable MIB retrieval support; the DTE supports polling of various Link OAM-based MIB variables' contents.
disable: Disable MIB retrieval support. The default is all ports 'disabled'.

Example:

```
>loam mib-retrival-support

Port  MIB retrival support
----  ----------------------
1     disabled
2     disabled
3     disabled
4     disabled
>loam mib-retrival-support 2,3 enable
>loam mib-retrival-support

Port  MIB retrival support
----  ----------------------
1     disabled
2     enabled
3     enabled
4     disabled
>
```

Messages:

>E link_oam 22:53:06 61/eth_link_oam_mgmt_port_mib_retrival_oper_set#849: Error: Unable to retrive the mode of the port(1/43)

>E link_oam 23:02:10 61/eth_link_oam_mgmt_port_mib_retrival_oper_set#910: Error: Error:7 occured while building MIB variable on port(1/0)

>**loam mib-retrival-support all enable**
Requested configuration is already configured on port(1/1)

Recovery: 1. Verify your selection. 2. Enter the command again. 3. Contact TN Tech Support.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LOAM variable-retrieve**
Syntax: **loam variable-retrieve** [<port_list>] [local-info|remote-info]
Description: Set or show MIB retrieval support, where:
<**port_list**>: Port list (e.g., 1-4 on the LIB-4400) or All'. The default is 'All' ports.
local-info : Enable MIB retrieval support.
remote-info: Disable MIB retrieval support.
Example: >**loam variable-retrieve**
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Messages: *Invalid request on this port* (ports 5-11)
E link_oam 05:23:39 50/eth_link_oam_mgmt_port_mib_retrival_oper_set#910: Error: Error:7 occured while building MIB variable on port(1/0)
Requested operation is already in progress

Command: **Set / Show LOAM Remote Loopback Support**
Syntax: **loam remote_loopback_support** [<port_list>] [enable|disable]
Description: Set or show remote loopback support, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
enable : Enable remote loopback support.
disable: Disable remote loopback support.
Example:

```
>loam remote_loopback_support

Port  Remote LoopBack support
----  -------------------------
1     disabled
2     disabled
3     disabled
4     disabled
>loam remote_loopback_support 2,3 enable
>loam remote_loopback_support

Port  Remote LoopBack support
----  -------------------------
1     disabled
2     enabled
3     enabled
4     disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LOAM Remote Loopback Operation**
Syntax: **loam remote_loopback_oper** [<port_list>] [enable|disable]
Description: Define or display remote loopback operation. Run the command **loam remote_loopback_oper** on a port in active mode to initiate loopback on the remote. The parameters are:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
enable : Enable remote loopback operation.
disable: Disable remote loopback operation.

Example:
```
>loam mode 4 active
>loam control 4 enable
>Loam remote_loopback_oper
>loam remote_loopback_support 1-4 enable
>
```

Messages: *Link OAM is not enabled on the port(x/y)*
Requested configuration is not supported with the current OAM mode on port(x/y)
Requested operation is already in progress

Command: **Set / Show LOAM Link Monitoring Support**
Syntax: **loam link_monitoring_support** [<port_list>] [enable|disable]
Description: Set or show link monitoring support, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
enable : Enable link monitoring support; the DTE supports event notification that permits the inclusion of diagnostic information. Traps are then sent based on the Link Event Configuration settings.
disable: Disable link monitoring support.

Example:
```
>loam link_monitoring_support

Port  Link Monitoring support
----  -------------------------
1     enabled
2     enabled
3     enabled
4     enabled
>loam link_monitoring_support 4 disable
>loam link_monitoring_support

Port  Link Monitoring support
----  -------------------------
1     enabled
2     enabled
3     enabled
4     disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LOAM Frame Error Event**
Syntax: **loam frame_error_event** [<port_list>] [<error_window>] [<error_threshold>]
Description: Set or show Frame Error Event parameters, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports
error_window: Duration of the monitoring period in terms of seconds.
Range (1 - 60 seconds). The default is 1 second.
error_threshold: Number of permissible errors frames in the period defined by
error_window. Range (0 - 0xffffffff) frames. The default is 0 frames.
Upbound value is not specified in the standard.

Example:

```
>loam frame_error_event
Port-No      Error_Window  Error_Threshold
-----------  ------------  ----------------
 1              1                0
 2              1                0
 3              1                0
 4              1                0
>loam frame_error_event 2 20 100
>loam frame_error_event
Port-No      Error_Window  Error_Threshold
-----------  ------------  ----------------
 1              1                0
 2              20               100
 3              1                0
 4              1                0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LOAM Symbol Period Error Event**
Syntax: **loam symbol_period_error_event** [<port_list>] [<error_window>] [<error_threshold>] [<rx_threshold>]
Description: Set or show parameters for Symbol Period Error Event, where:
<**port_list**>: Port list or 'all'. The default is 'All' ports.
error_window: Duration of the monitoring in terms of seconds. The valid range is 1 - 60 seconds. The default is 1 second.
error_threshold: Number of error symbols allowed in the period defined by 'error_window'. The valid range is 0 - 0xffffffff symbols. The default is 0 symbols.
CRC errors are treated as symbol errors. Upbound value is not specified in the standard.

Example:
```
>loam symbol_period_error_event
Port-No      Error_Window  Error_Threshold
-----------  ------------  ----------------
 1              1                0
 2              1                0
 3              1                0
 4              1                0
>loam symbol_period_error_event 2 5 200
>loam symbol_period_error_event
Port-No      Error_Window  Error_Threshold
-----------  ------------  ----------------
 1              1                0
 2              5                200
 3              1                0
 4              1                0
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show LOAM Frame Error Seconds Summary Event**
Syntax: **loam frame_error_seconds_summary_event** [<port_list>] [<error_window>] [<error_threshold>]
Description: Set or show the parameters for Frame Error Seconds Summary Event, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.
error_window: Duration of the monitoring period in units of seconds.
Range: 10 - 900 seconds. Default: 10 seconds.
error_threshold: Number of permissible Error Frame Seconds in the period defined by 'error_window'. Range: 0 - 0xffff errored seconds. Default: 1 errored second.
Upbound value is not specified in the standard.

Example:
```
>loam frame_error_seconds_summary_event
Port-No      Error_Window  Error_Threshold
-----------  ------------  ----------------
 1              60             1
 2              60             1
 3              60             1
 4              60             1
>loam frame_error_seconds_summary_event 2 30 50
>loam frame_error_seconds_summary_event
Port-No      Error_Window  Error_Threshold
-----------  ------------  ----------------
 1              60             1
 2              30             50
 3              60             1
 4              60             1
>
```

Messages: *Error In Configuration*

Command: **Show Current LOAM Status**
Syntax: **loam status** [<port_list>]
Description: Display the current Link OAM port status, where:
<**port_list**>: Port list (1-4) or 'All'. The default is 'All' ports.
Example:

```
>loam status 1

Port :                                1
PDU permission:                       Any
Discovery state:                      SEND_ANY_STATE
Remote MAC Address:                   00:c0:f2:22:1f:d1

                                    Local client          Remote Client
                                    --------------------  -------------


Operational status:
port status:                        operational             operational
Mode:                               active                  passive
Unidirectional operation support:   disabled                disabled
Remote loopback support:            disabled                disabled
Link monitoring support:            enabled                 enabled
MIB retrival support:               enabled                 enabled
MTU Size:                           1500                    1500
Multiplexer state:                  Forwarding              Forwarding
Parser state:                       Forwarding              Forwarding
OUI:                                00:c0:f2                00:c0:f2
PDU revision :                          1                   -------
>
```

Command: **Show Current LOAM Link Monitor Status**
Syntax: **loam link_monitor_status** [<port_list>]
Description: Show the current Link OAM port link monitoring status, where:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:

```
>loam link_monitor_status 1

Port :                                          1
Sequence number :                               0
Symbol period error event Timestamp:            0
Symbol period error event window:               0
Symbol period error event threshold:            0
Symbol period errors:                           0
Total symbol period errors:                     0
Total symbol period error events:               0

Frame error event Timestamp:                    0
Frame error event window:                       0
Frame error event threshold:                    0
Frame errors:                                   0
Total frame errors:                             0
Total frame error events:                       0

Frame period error event Timestamp:             0
Frame period error event window:                0
Frame period error event threshold:             0
Frame period errors:                            0
Total frame period errors:                      0
Total frame period error events:                0

Error Frame Seconds Summary Event Timestamp:    0
Error Frame Seconds Summary Event window:       0
Error Frame Seconds Summary  Event Threshold:   0
Error Frame Seconds Summary Errors:             0
Total Error Frame Seconds Summary Errors:       0
Total Error Frame Seconds Summary Events:       0
>
```

Parameter Descriptions:

Port - The switch port number.

Event Name - the name of the Link Event which is being configured.

Window - represents the window period in the order of 100 msec. for the observation of various link events.

Period Threshold - represents the threshold value for the window period for the appropriate Link event so as to notify the peer of this error.

RxPacket Threshold - represents the threshold value for the window period for the errors in the received packets so as to notify the peer of this error.

Error Frame Event - counts the number of errored frames detected during the specified period. The period is specified by a time interval (Window in order of 100msec). This event is generated if the errored frame count is equal to or greater than the specified threshold for that period (Period Threshold). Errored frames are frames that had transmission errors as detected at the Media Access Control sublayer.

Event Seconds Summary - the Errored Frame Seconds Summary Event TLV counts the number of errored frame seconds that occurred during the specified period. The period is specified by a time interval. This event is generated if the number of errored frame seconds is equal to or greater than the specified threshold for that period. An errored frame second is a one second interval wherein at least one frame error was detected. Errored frames are frames that had transmission errors as detected at the Media Access Control sublayer.

Symbol Period Error Event - the Errored Symbol Period Event counts the number of symbol errors that occurred during the specified period. The period is specified by the number of symbols that can be received in a

time interval on the underlying physical layer. This event is generated if the symbol error count is equal to or greater than the specified threshold for that period.

Frame Period Error Event - the Errored Frame Period Event TLV counts the number of errored frames detected during the specified period. The period is specified by a number of received frames. This event is generated if the errored frame count is greater than or equal to the specified threshold for that period (e.g., if the errored frame count is greater than or equal to 10 for the last 1,000,000 frames received). Errored frames are frames that had transmission errors as detected at the Media Access Control sublayer.

Command: **Show Current LOAM Statistics**
Syntax: **loam statistics** [<port_list>] [clear]
Description: Show Link OAM port statistics, where:
<**port_list**>: Port list or 'all', default: All ports
clear : Clear log; resets counters to 0 and begins incrementing immediately.

Example:
```
>loam statistics 1

1
PDU stats
---------
Information PDU TX:                          2733
Information PDU RX:                          0
Variable request PDU RX:                     0
Variable request PDU TX:                     0
Variable response PDU RX:                    0
Variable response PDU TX:                    0
Loopback PDU RX:                             0
Loopback PDU TX:                             0
Link Unique event notification PDU TX:       0
Link Unique event notification PDU RX:       0
Link Duplicate event notification PDU TX:    0
Link Duplicate event notification PDU RX:    0
Unsupported PDU RX:                          0
Unsupported PDU TX:                          0
Link Fault PDU TX:                           0
Link Fault PDU RX:                           0
Dying gasp PDU TX:                           0
Dying gasp PDU RX:                           0
Critical event PDU TX:                       0
Critical event PDU RX:                       0
>
```

Parameter Descriptions:
The displayed counters represent the total number of OAM frames received and transmitted for the selected port. Discontinuities of these counters can occur at re-initialization of the management system.

Receive Total and Transmit Total

Rx and Tx OAM Information PDU's: The number of received and transmitted OAM Information PDU's. Discontinuities of this counter can occur at re-initialization of the management system.

Rx and Tx Unique Error Event Notification: A count of the number of unique Event OAMPDUs received and transmitted on this interface. Event Notifications may be sent in duplicate to increase the probability of successfully being received, given the possibility that a frame may be lost in transit. Duplicate Event Notification transmissions are counted by Duplicate Event Notification counters for Tx and Rx respectively. A unique Event Notification OAMPDU is indicated as an Event Notification OAMPDU with a Sequence Number field that is distinct from the previously transmitted Event Notification OAMPDU Sequence Number.

Rx and Tx Duplicate Error Event Notification: A count of the number of duplicate Event OAMPDUs received and transmitted on this interface. Event Notification OAMPDUs may be sent in duplicate to increase the probability of successfully being received, given the possibility that a frame may be lost in transit. A duplicate Event Notification OAMPDU is indicated as an Event Notification OAMPDU with a Sequence Number field that is identical to the previously transmitted Event Notification OAMPDU Sequence Number.

Rx and Tx Loopback Control: A count of the number of Loopback Control OAMPDUs received and transmitted on this interface.

Rx and Tx Variable Request: A count of the number of Variable Request OAMPDUs received and transmitted on this interface.

Rx and Tx Variable Response: A count of the number of Variable Response OAMPDUs received and transmitted on this interface.

Rx and Tx Org Specific PDU's

A count of the number of Organization Specific OAMPDUs transmitted on this interface.

Rx and Tx Unsupported Codes: A count of the number of OAMPDUs transmitted on this interface with an unsupported op-code.

Rx and Tx Link fault PDU's: A count of the number of Link fault PDU's received and transmitted on this interface.

Rx and Tx Dying Gasp: A count of the number of Dying Gasp events received and transmitted on this interface (Last Gasp). The LIB-4xxx is equipped with the last gasp circuit for triggering a notification in the event of a power failure. This will be useful for sending a notification. The uplink ports have highest priority to send the notifications of last gasp. The last gasp can be in the form of IEEE802.3 2008 Clause 57 Dying gasp event and/or an SNMP trap to NMS system. The management interface provides an option to choose the preferred mode of notification (either a SNMP trap or an IEEE 802.3 2008 clause 57 event).

Rx and Tx Critical Event PDU's: A count of the number of Critical event PDU's received and transmitted on this interface.

Loop Protect Commands

The LIB-4xxx Loop Protect commands are used to define and display loop protection at the device and port level.

Loop protection increases the efficiency of STP, RSTP, and MSTP by preventing ports from going into a forwarding state that would result in a loop opening up in the network. In spanning tree topologies, a loop-free network is supported by the exchange of a BPDU. Peer STP applications running on the switch interfaces use BPDUs to communicate. The exchange of BPDUs ultimately determines which interfaces block traffic (preventing loops) and which interfaces become root ports and forward traffic. However, a blocking interface can transition to the forwarding state erroneously if the interface stops receiving BPDUs from its designated port on the segment. This transition error can occur with a hardware error on the switch or a software configuration error between the switch and its neighbor.

With loop protection enabled, the spanning tree topology detects root ports and blocked ports, and ensures that both keep receiving BPDUs. If a loop protection enabled interface quits receiving BPDUs from its designated port, it reacts as it would react to a problem with the physical connection on this interface. Rather than transition the interface to a forwarding state, it instead transitions it to a 'loop inconsistent' state. The interface recovers, and then it transitions back to the spanning tree blocking state when it receives a BPDU.

Loop protection is most effective when enabled in the entire switched network. You should generally enable loop protection on all switch interfaces that could become a root or designated port.

Note: If you will be using the Loop Protection function, enable Loop Protection here, both globally and at the port level, as one of the first overall configuration steps.

The available Loop Protect commands are listed below.

>**loop ?**
Available Commands:

Loop Protect Configuration
Loop Protect Mode [enable|disable]
Loop Protect Transmit [<transmit-time>]
Loop Protect Shutdown [<shutdown-time>]
Loop Protect Port Configuration [<port_list>]
Loop Protect Port Mode [<port_list>] [enable|disable]
Loop Protect Port Action [<port_list>] [shutdown|trap|log|shut_log|shut_trap|log_trap|all]
Loop Protect Port Transmit [<port_list>] [enable|disable]
Loop Protect Status [<port_list>]

Each of the available Loop Protect commands are explained below.

Command: **Show Loop Protection Configuration**
Syntax: **loop protect config**
Description: Displays the current Loop Protection settings.
Example:

```
>loop protect config

Loop Protection Configuration:
==============================

Loop Protection  : Enabled
Transmission Time: 5
Shutdown Time    : 180
>
```

Command: **Set / Show Loop Protect Mode**
Syntax: **loop protect mode** [enable|disable]
Description: Controls whether loop protection is enabled as a whole - globally (at the device level) or at the port level. Set or show the Loop Protection mode, where:
enable : Enable Loop Protection.
disable: Disable Loop Protection.
Example:

```
>loop protect mode
Loop Protection  : Enabled
>loop protect mode disable
>loop protect mode
Loop Protection  : Disabled
>
```

Command: **Set / Show Transmit Loop Protect**
Syntax: **loop protect transmit** [<transmit-time>]
Description: Set or show the Loop Protection transmit interval. This is the interval between each loop protection PDU sent on each port. Valid values are 1 to 10 seconds. The default is 5 seconds.
Example:

```
>loop protect transmit
Transmission Time: 5
>loop protect transmit 7
>loop protect transmit
Transmission Time: 7
>
```

Command: **Set / Show Loop Protect Shutdown Time**

Syntax: **loop protect shutdown** [<shutdown-time>]

Description: Set or show the Loop Protection shutdown time. Shutdown time interval (0-604800 seconds).
A value of zero disables re-enabling the port. This is the period (in seconds) for which a port will be kept disabled in the event a loop is detected (and the port action shuts down the port). Valid values are 0 to 604800 seconds (7 days). A value of zero will keep a port disabled. The default is 180 seconds (3 minutes).

Example:

```
>loop protect shutdown
Shutdown Time    : 180
>loop protect shutdown 2000
>loop protect shutdown
Shutdown Time    : 2000
>
```

Note: A loop port can be link uped by disabling Loop Protection with "Shutdown Time" set to 0 (zero).

Command: **Show Loop Protect Port Config**

Syntax: **loop protect port configuration** [<port_list>]

Description: Display the current Loop Protection port configuration, where:
<**port_list**>: Port list or 'all'; the default is 'All' ports.

Example 1:

```
>loop protect port config

Port  Mode      Action        Transmit
----  --------  ------------  --------
1     Enabled   Shutdown      Enabled
2     Enabled   Shutdown      Enabled
3     Enabled   Shutdown      Enabled
4     Enabled   Shutdown      Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show Loop Protect Port Mode**

Syntax: **loop protect port mode** [<port_list>] [enable|disable]

Description: Set or show the Loop Protection port mode. This controls whether the port is actively generating loop protection PDU's, or whether it is just passively looking for looped PDU's.

The parameters are:

<**port_list**>: Port list or 'All'. The default is ‘All’ ports.

enable : Enable Loop Protection mode (default).

disable: Disable Loop Protection mode.

Example:

```
>loop protect port mode

Port  Mode
----  --------
1     Enabled
2     Enabled
3     Enabled
4     Enabled
>loop protect port mode 2 disable
>loop protect port mode

Port  Mode
----  --------
1     Enabled
2     Disabled
3     Enabled
4     Enabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Loop Protect Port Action**

Syntax: **loop protect port action** [<port_list>] [shutdown|trap|log|shut_log|shut_trap|log_trap|all]

Description: Set or show the Loop Protection port action. This command configures the action performed when a loop is detected on a port. For each port, the valid values are:

<**port_list**>: Port list or 'All'. The default is 'All' ports.

shutdown : Shut down the port (only).

trap : Trap the event (only).

log : Log the event (only).

shut_log : Shut down the port and log the event.

shut_trap : Shut down the port and send Traps.

log_trap : Send Trap and Log the event.

all : Shut down the port , send a trap, and log the event.

Example:

```
>loop protect port action

Port  Action
----  ------------
1     Shutdown
2     Shutdown
3     Shutdown
4     Shutdown
>loop protect port action 2-3 trap
>loop protect port action 4 log
>loop protect port action

Port  Action
----  ------------
1     Shutdown
2     Trap Only
3     Trap Only
4     Log Only
>
```

Messages:

Loop Detected: %s %ld %s", "Port", iport2uport(pstate->port), "shut down"
Loop Detected: %s %ld %s", "Port", iport2uport(pstate->port), ""
Loop Detected: %s %ld %s", "Port", iport2uport(pstate->port), "trap"
Loop Detected: %s %ld %s", "Port", iport2uport(pstate->port), "trap + shut down"

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Loop Protect Port Transmit**
Syntax: **loop protect port transmit** [<port_list>] [enable|disable]
Description: Set or show the Loop Protection port transmit mode, where:
<**port_list**>: Port list or 'all'; the default is 'All' ports.
enable : Enable Loop Protection.
disable: Disable Loop Protection.

Example:

```
>loop protect port transmit

Port  Transmit
----  --------
1     Enabled
2     Enabled
3     Enabled
4     Enabled
>loop protect port transmit 2-4 disable
>loop protect port transmit

Port  Transmit
----  --------
1     Enabled
2     Disabled
3     Disabled
4     Disabled
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Show Loop Protect Status**
Syntax: **loop protect status** [<port_list>]
Description: Display the current Loop Protection status information for ports that are enabled and configured (not shut down). The parameters are:
<**port_list**>: Port list or 'All'. The default is 'All' ports.

Example:

```
>loop protect status

Port  Action        Transmit  Loops     Status    Loop  Time of Last Loop
----  ------------  --------  --------  --------  ----  ------------------
1     Shutdown      Enabled          0  Up        -     -
2     Shutdown      Enabled          0  Up        -     -
3     Shutdown      Enabled          0  Down      -     -
4     Shutdown      Enabled          0  Down      -     -
>
```

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

IPMC Commands

These LIB-4xxx IPMC (IP MultCast) commands provide Multicast Listener Discovery (MLD) and Internet Group Management Protocol (IGMP) snooping functions.

IPMC (IP MultCast) refers to communication protocols and systems that operate over an IP network, including the Internet, enabling voice (VoIP), instant messaging (IM), whiteboarding, application sharing, and other forms of multimedia communication.

IGMP (Internet Group Management Protocol) is a communications protocol used to manage the membership of Internet Protocol multicast groups in IPv4. IGMP is used by IPv4 hosts and adjacent multicast routers to establish multicast group memberships. It is an integral part of the IP multicast specification, like ICMP for unicast connections. IGMP can be used for online video and gaming, and allows more efficient use of resources when supporting these uses.

MLD (Multicast Listener Discovery) is a component of the Internet Protocol Version 6 (IPv6) suite. MLD is used by IPv6 routers for discovering multicast listeners on a directly attached link, much like IGMP is used in IPv4. The protocol is embedded in ICMPv6 instead of using a separate protocol. MLDv1 is similar to IGMPv2 and MLDv2 is similar to IGMPv3. The MLD protocol is described in RFC 3810 which has been updated by RFC 4604. Windows Vista and later support MLDv2. The Linux kernel has supported MLDv2 since v 2.5.68.

The LIB-4xxx IPMC commands include:

>**ipmc ?**
Available Commands:

IPMC Configuration [mld|igmp]
IPMC Mode [mld|igmp] [enable|disable]
IPMC Flooding [mld|igmp] [enable|disable]
IPMC Leave Proxy [mld|igmp] [enable|disable]
IPMC Proxy [mld|igmp] [enable|disable]
IPMC SSM [mld|igmp] [(Range <prefix> <mask_len>)]
IPMC VLAN Add [mld|igmp] <vid>
IPMC VLAN Delete [mld|igmp] <vid>
IPMC State [mld|igmp] [<vid>] [enable|disable]
IPMC Querier [mld|igmp] [<vid>] [enable|disable]
IPMC Compatibility [mld|igmp] [<vid>] [auto|v1|v2|v3]
IPMC Fastleave [mld|igmp] [<port_list>] [enable|disable]
IPMC Throttling [mld|igmp] [<port_list>] [limit_group_number]
IPMC Filtering [mld|igmp] [<port_list>] [add|del] [group_addr]
IPMC Router [mld|igmp] [<port_list>] [enable|disable]
IPMC Status [mld|igmp] [<vid>]
IPMC Groups [mld|igmp] [<vid>]
IPMC Version [mld|igmp] [<vid>]
IPMC SFM [mld|igmp] [<vid>] [<port_list>]
IPMC Parameter RV [mld|igmp] [<vid>] [ipmc_param_rv]
IPMC Parameter QI [mld|igmp] [<vid>] [ipmc_param_qi]
IPMC Parameter QRI [mld|igmp] [<vid>] [ipmc_param_qri]
IPMC Parameter LLQI [mld|igmp] [<vid>] [ipmc_param_llqi]
IPMC Parameter URI [mld|igmp] [<vid>] [ipmc_param_uri]

The LIB-4xxx IPMC commands are explained below.

Command: **Show Current IPMC Configuration**
Syntax: **ipmc configuration** [**mld**|**igmp**]
Description: Display the current IPMC snooping configuration, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
Example 1: IPMC Configuration - IGMP:

```
>ipmc config igmp

IGMP Configuration:
===================

IGMP Mode: Enabled
IGMP SSM Range: 232.0.0.0/8
IGMP Leave Proxy: Enabled
IGMP Proxy: Enabled
IGMP Flooding Control: Enabled

IGMP Interface Setting

VID   State     Querier   Compatibility  RV   QI     QRI    LLQI   URI
----  --------  --------  -------------  ---  -----  -----  -----  -----
2     Enabled   Enabled   IGMP-Auto      2    125    100    10     1

IGMP Port Status ( Router-Port  Fast-Leave  Throttling )

Port  Router    Dynamic Router  Fast Leave  Group Throttling Number
----  --------  --------------  ----------  -----------------------
1     Enabled   Yes             Disabled    2
2     Enabled   Yes             Disabled    2
3     Enabled   Yes             Disabled    2
4     Enabled   Yes             Disabled    2

IGMP Group Filtering Setting

Port  Filtering Groups
----  ------------------------------------
1     No Filtering Group
2     No Filtering Group
3     No Filtering Group
4     No Filtering Group
>
```

Messages: IGMP Interface Setting section displays "(*Please create IGMP Interfaces*)" if none currently exist.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Example 2: IPMC Configuration - MLD:

```
>ipmc configuration mld

MLD Configuration:
==================

MLD Mode: Enabled
MLD SSM Range: ff3e::/96
MLD Leave Proxy: Enabled
MLD Proxy: Enabled
MLD Flooding Control: Enabled

MLD Interface Setting

VID   State     Querier   Compatibility  RV   QI     QRI    LLQI   URI
----  --------  --------  -------------  ---  -----  -----  -----  -----
3     Enabled   Enabled   MLD-Auto       2    125    100    10     1

MLD Port Status ( Router-Port  Fast-Leave  Throttling )

Port  Router    Dynamic Router  Fast Leave  Group Throttling Number
----  --------  --------------  ----------  -----------------------
1     Enabled   Yes             Enabled     3
2     Enabled   Yes             Enabled     3
3     Enabled   Yes             Enabled     3
4     Enabled   Yes             Enabled     3

MLD Group Filtering Setting

Port  Filtering Groups
----  ------------------------------------
1     No Filtering Group
2     No Filtering Group
3     No Filtering Group
4     No Filtering Group
>
```

Messages: The MLD Interface Setting section displays "(*Please create MLD Interfaces*)" if none currently exist.

Note that the FPGA port (port 12 or LIB-4424 port 24) is "hidden" when the Shared port is set to Internal mode.

Command: **Set / Show IPMC Mode**
Syntax: **ipmc mode** [**mld**|**igmp**] [**enable**|**disable**]
Description: Set or show the IPMC snooping mode, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
enable : Enable IPMC snooping.
disable: Disable IPMC snooping.
(The default is 'Show global IPMC snooping mode'.)

Example:

```
>ipmc mode mld enable
>ipmc mode mld
MLD Mode: Enabled
>ipmc mode mld enable
>ipmc mode igmp enable
>ipmc mode
IGMP Mode: Enabled

MLD Mode: Enabled
```

Command: **Set / Show IPMC Flooding**
Syntax: **ipmc flooding** [**mld**|**igmp**] [**enable**|**disable**]
Description: Set or show the IPMC unregistered addresses flooding operation, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
enable : Enable IPMC flooding.
disable: Disable IPMC flooding.
(default: Show IPMC flooding mode)

Example:
```
>ipmc flooding
IGMP Flooding Control: Enabled

MLD Flooding Control: Enabled
>ipmc flooding mld disable
>ipmc flooding mld
MLD Flooding Control: Disabled
>
```

Command: **Set / Show IPMC Leave Proxy**
Syntax: **ipmc leave proxy** [**mld**|**igmp**] [**enable**|**disable**]
Description: Set or show the mode of IPMC Leave Proxy, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
enable : Enable IPMC Leave Proxy.
disable: Disable IPMC Leave Proxy.
(default: Show IPMC Leave Proxy mode)

Example:
```
>ipmc leave proxy
IGMP Leave Proxy: Disabled

MLD Leave Proxy: Disabled
>ipmc leave proxy igmp enable
>ipmc leave proxy
IGMP Leave Proxy: Enabled

MLD Leave Proxy: Disabled
>
```

Command: **Set / Show IPMC Proxy**
Syntax: **ipmc proxy** [**mld**|**igmp**] [**enable**|**disable**]
Description: Set or show the mode of IPMC Proxy, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
enable : Enable IPMC Proxy.
disable: Disable IPMC Proxy.
(default: Show IPMC Proxy mode)

Example:
```
>ipmc proxy
IGMP Proxy: Disabled

MLD Proxy: Disabled
>ipmc proxy enable
Please specify IPMC version: [mld|igmp]
>ipmc proxy mld enable
>ipmc proxy
IGMP Proxy: Disabled

MLD Proxy: Enabled
>
```

Command: **Set / Show IPMC SSM**
Syntax: **ipmc ssm** [**mld**|**igmp**] [(**Range** <**prefix**> <**mask_len**>)]
Description: Set or show the IPMC SSM Range, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
range : SSM Range keyword. Addresses in the range 232.0.0.0/8 (232.0.0.0 to 232.255.255.255) are reserved for SSM by IANA.
<**prefix**> : IPv4/IPv6 multicast group address, accordingly.
<**mask_len**>: Mask length for IPv4 (4 ~ 32)/IPv6(8 ~ 128) ssm range, accordingly

Example:
```
>ipmc ssm
IGMP SSM Range: 232.0.0.0/8

MLD SSM Range: ff3e::/96
>
```

Command: **Add IPMC VLAN**
Syntax: **ipmc vlan add** [mld|igmp] <vid>
Description: Add the IPMC snooping VLAN interface, where:
mld|**igmp**: **mld** : IPMC for IPv6 MLD, or
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094).

Example:
```
>ipmc vlan add mld 1
>
```

Messages: *Please specify IPMC version: [mld|igmp]*

Command: **Delete IPMC VLAN**
Syntax: **ipmc vlan delete** [mld|igmp] <vid>
Description: Delete the IPMC snooping VLAN interface, where:
mld|**igmp**: **mld** : IPMC for IPv6 MLD, or
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094).

Example:
```
>ipmc vlan delete mld 1
>
```

Messages: *Please specify IPMC version: [mld|igmp]*
Messages: *(Please create MLD Interfaces)* displays in the "MLD Interface Setting" section of the **ipmc configuration mld** command output. Use the **ipmc vlan add** command as needed (see above).

Command: **Set / Show IPMC State**
Syntax: **ipmc state** [**mld**|**igmp**] [<**vid**>] [**enable**|**disable**]
Description: Set or show the IPMC snooping state for VLAN, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'Any'. The default is 'Show All' VLANs.
enable : Enable MLD snooping.
disable: Disable MLD snooping.

Example:

```
>ipmc state

IGMP Interface Setting

VID   State
----  --------
1     Disabled


MLD Interface Setting

VID   State
----  --------
1     Disabled
>ipmc state mld 1000 enable
Non-Existing MLD Interface ID 1000
>ipmc state mld 1 enable
>ipmc state

IGMP Interface Setting

VID   State
----  --------
1     Disabled


MLD Interface Setting

VID   State
----  --------
1     Enabled
>
```

Messages: *Non-Existing MLD Interface ID 1000*
(Please create IGMP Interfaces)
(Please create MLD Interfaces)

Command: **Set / Show IPMC Querier**
Syntax: **ipmc querier** [**mld**|**igmp**] [<**vid**>] [**enable**|**disable**]
Description: Set or show the IPMC snooping querier mode for VLAN, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'Any'. The default is 'Show All' VLANs.
enable : Enable IPMC querier.
disable : Disable IPMC querier.

Example:

```
>ipmc querier

IGMP Interface Setting

VID   Querier
----  --------
1     Enabled


MLD Interface Setting

VID   Querier
----  --------
1     Enabled
>ipmc querier igmp 1 disable
>ipmc querier

IGMP Interface Setting

VID   Querier
----  --------
1     Disabled


MLD Interface Setting

VID   Querier
----  --------
1     Enabled
>
```

Messages: *Non-Existing MLD Interface ID 1000*
(Please create IGMP Interfaces)
(Please create MLD Interfaces)

Command: **Set / Show IPMC Compatibility**
Syntax: **ipmc compatibility** [**mld**|**igmp**] [<**vid**>] [**auto**|**v1**|**v2**|**v3**]
Description: Set or show the IPMC Compatibility, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'any'. The default is show all VLANs.
auto : Auto Compatibility (Default Value).
v1 : Forced Compatibility of IGMPv1 or MLDv1.
v2 : Forced Compatibility of IGMPv2 or MLDv2.
v3 : Forced Compatibility of IGMPv3.
(default: Show IPMC Interface Compatibility)

Example:

```
>ipmc compatibility

IGMP Interface Setting

VID   Compatibility
----  -------------
1


MLD Interface Setting

VID   Compatibility
----  -------------
1     MLD-Auto
>ipmc compatibility igmp 1 v2
>ipmc compatibility

IGMP Interface Setting

VID   Compatibility
----  -------------
1


MLD Interface Setting

VID   Compatibility
----  -------------
1     MLD-Auto
>
```

Messages: *Non-Existing MLD Interface ID 1000*
(Please create IGMP Interfaces)
(Please create MLD Interfaces)

Command: **Set / Show IPMC Fastleave**
Syntax: **ipmc fastleave** [**mld**|**igmp**] [<**port_list**>] [**enable**|**disable**]
Description: Set or show the IPMC snooping fast leave port mode.
Multicast snooping Fast Leave processing allows the switch to remove an interface from the forwarding-table entry without first sending out group specific queries to the interface.
The VLAN interface is 'pruned' from the multicast tree for the multicast group specified in the original leave message. Fast-leave processing ensures optimal bandwidth management for all hosts on a switched network, even when multiple multicast groups are in use simultaneously. This processing applies to IGMP and MLD. (Fast leave is enabled at the port level. Pruning happens per VLAN per port. See the IGMP group table which is indexed by VLAN and group.)
The parameters are:
mld : IPMC for IPv6 MLD.
igmp : IPMC for IPv4 IGMP.
<**port_list**> : Port list or 'All'. The default is 'All' ports.
enable : Enable IPMC fast leave.
disable : Disable IPMC fast leave.
(The default is 'Show IPMC fast leave mode'.)

Example:

```
>ipmc fastleave 1

IGMP Port Status ( Fast-Leave )

Port  Fast Leave
----  ----------
1     Disabled


MLD Port Status ( Fast-Leave )

Port  Fast Leave
----  ----------
1     Disabled
>ipmc fastleave mld 1 enable
>ipmc fastleave 1

IGMP Port Status ( Fast-Leave )

Port  Fast Leave
----  ----------
1     Disabled


MLD Port Status ( Fast-Leave )

Port  Fast Leave
----  ----------
1     Enabled
>
```

Command: **Set / Show IPMC Throttling**
Syntax: **ipmc throttling** [**mld**|**igmp**] [<**port_list**>] [**limit_group_number**]
Description: Throttling can be enabled to limit the number of multicast groups to which a switch port can belong. Set or show the IPMC port throttling status, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**port_list**>: Port list (1-5) or 'All'. The default is 'All' ports.
0 : No limit.
1~10 : Group learn limit.
(The default is 'Show current IPMC Port Throttling'.)

Example:

```
>ipmc throttling 1

IGMP Port Status ( Throttling )

Port  Group Throttling Number
----  ----------------------
1     Unlimited


MLD Port Status ( Throttling )

Port  Group Throttling Number
----  ----------------------
1     Unlimited
>ipmc throttling mld 1 5
>ipmc throttling 1

IGMP Port Status ( Throttling )

Port  Group Throttling Number
----  ----------------------
1     Unlimited


MLD Port Status ( Throttling )

Port  Group Throttling Number
----  ----------------------
1     5
>
```

Command: **Set / Show IPMC Filtering**
Syntax: **ipmc filtering** [**mld**|**igmp**] [<**port_list**>] [**add**|**del**] [**group_addr**]
Description: Set or show the IPMC port group filtering list, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**port_list**>: Port list (1-5) or 'All'. The default is 'All' ports.
add : Add new port group filtering entry.
del : Delete existing port group filtering entry.
(The default is 'Show IPMC port group filtering list'.)
group_addr : IPv4/IPv6 multicast group address, accordingly.

Example:

```
>ipmc filtering 1

IGMP Group Filtering Setting

Port  Filtering Groups
----  ------------------------------------
1     No Filtering Group


MLD Group Filtering Setting

Port  Filtering Groups
----  ------------------------------------
1     No Filtering Group
>
```

The value of 'Group IPv4 Address' must be a valid IP address in dotted decimal notation ('**x**.**y**.**z**.**w**').
The following restrictions apply:
1) **x** must be a decimal number between 224 and 239.
2) **y**, **z**, and **w** must be decimal numbers between 0 and 255.

Command: **Set / Show IPMC Router Port Mode**
Syntax: **ipmc router** [**mld**|**igmp**] [<**port_list**>] [**enable**|**disable**]
Description: Set or show the IPMC snooping router port mode, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**port_list**>: Port list (1-5) or 'All'. The default is 'All' ports.
enable : Enable IPMC router port.
disable : Disable IPMC router port.
(The default is 'Show IPMC router port mode')

Example:

```
>ipmc router 1

IGMP Port Status ( Router-Port )

Port  Router    Dynamic Router
----  --------  --------------
1     Disabled  No


MLD Port Status ( Router-Port )

Port  Router    Dynamic Router
----  --------  --------------
1     Disabled  No
>ipmc router mld 1 enable
>ipmc router 1

IGMP Port Status ( Router-Port )

Port  Router    Dynamic Router
----  --------  --------------
1     Disabled  No


MLD Port Status ( Router-Port )

Port  Router    Dynamic Router
----  --------  --------------
1     Enabled   Yes
>
```

Command: **Show Current IPMC Status**
Syntax: **ipmc status** [**mld**|**igmp**] [<**vid**>]
Description: Display the current IPMC operational status, accordingly, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'any'. The default is 'Show all VLANs'.

Example:

```
>ipmc status mld any
      Querier  Rx          Tx          Rx          Rx          Rx
VID   Status   Query       Query       V1 Report   V2 Report   V1 Done
----  -------  ----------  ----------  ----------  ----------  ----------
1     ACTIVE   0           4           0           0           0
>
```

Messages: *Please specify IPMC version: [mld|igmp]*

Command: **Show IPMC Groups**
Syntax: **ipmc groups** [**mld**|**igmp**] [<**vid**>]
Description: Show IPMC group addresses, accordingly, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'any'. The default is 'Show all' VLANs.

Example:
```
>ipmc groups
Please specify IPMC version: [mld|igmp]
>ipmc groups mld
>ipmc groups
Please specify IPMC version: [mld|igmp]
>ipmc groups igmp 1
>ipmc groups igmp 1 ?
Description:
------------
Show IPMC group addresses, accordingly.

Syntax:
-------
IPMC Groups [mld|igmp] [<vid>]

Parameters:
-----------
mld|igmp:
mld : IPMC for IPv6 MLD
igmp: IPMC for IPv4 IGMP

<vid>   : VLAN ID (1-4094) or 'any', default: Show all VLANs
>ipmc groups mld 1
>
```

Command: **Show IPMC Version**
Syntax: **ipmc version** [**mld**|**igmp**] [<**vid**>]
Description: Show IPMC Versions, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'Any'. The default is 'Show all' VLANs

Example:
```
>ipmc version
Please specify IPMC version: [mld|igmp]
>ipmc version 1
Please specify IPMC version: [mld|igmp]
>ipmc version igmp 1
>ipmc version mld
VID   Query Version  Host Version
----  -------------  ------------
1     DEFAULT        DEFAULT
>
```

Command: **Show IPMC SFM**
Syntax: **ipmc sfm** [**mld**|**igmp**] [<**vid**>] [<**port_list**>]
Description: Show SFM (including SSM) related information for IPMC, where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'any'. The default is Show all VLANs.
<**port_list**>: Port list or 'all'. The default is 'All' ports.
Example:

```
>ipmc sfm
Please specify IPMC version: [mld|igmp]
>ipmc sfm mld 1 1
>
```

Command: **Set / Show IPMC Parameter RV**
Syntax: **ipmc parameter rv** [**mld**|**igmp**] [<**vid**>] [**ipmc_param_rv**]
Description: Set or show the IPMC Robustness Variable (RV), where:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'Any'. The default is 'Show all VLANs'.
ipmc_param_rv:
-1 : Default Value (2).
1~255 : Robustness Variable.
(The default is 'Show IPMC Interface Robustness Variable'.)
Example:

```
>ipmc parameter rv

IGMP Interface Setting

VID   RV
----  ---
1     2
10    2
20    2
100   2
200   2


MLD Interface Setting

VID   RV
----  ---
1     2
10    2
20
100
200
>
```

Messages: *(Please create IGMP Interfaces)* if none exist.
(Please create MLD Interfaces) if none exist.

Command: **Set / Show IPMC Parameter QI**
Syntax: **ipmc parameter qi** [**mld**|**igmp**] [<**vid**>] [**ipmc_param_qi**]
Description: Set or show the IPMC Query Interval. The Query Interval (QI) is the interval between General Queries sent by the Querier. The default query interval is 125 seconds. The parameters are:
mld : IPMC for IPv6 MLD.
igmp : IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'Any'. The default is 'Show all VLANs'.
ipmc_param_qi:
-1 : Default Value (125).
1~31744 : Query Interval in seconds.
(The default is 'Show IPMC Interface Query Interval'.).

Example:

```
>ipmc parameter qi mld 1 31744
>ipmc parameter qi

IGMP Interface Setting

VID   QI
----  -----
(Please create IGMP Interfaces)


MLD Interface Setting

VID   QI
----  -----
1     31744
>
```

Messages: *(Please create IGMP Interfaces)* if none exist.
(Please create MLD Interfaces) if none exist.

Command: **Set / Show IPMC Parameter QRI**
Syntax: **ipmc parameter qri** [**mld**|**igmp**] [<**vid**>] [**ipmc_param_qri**]
Description: Set or show the IPMC Query Response Interval.
The QRI is the maximum response time used to calculate the Max Resp Code inserted into the periodic General Queries. The valid range is 0 to 31744 tenths of a second. The default query response interval is 100 tenths of a second (10 seconds). The parameters are:
mld : IPMC for IPv6 MLD.
igmp : IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'any'. The default is Show all VLANs.
ipmc_param_qri:
-1 : Default Value (100).
0~31744 : Query Response Interval in tenths of seconds.
(The default is 'Show IPMC Interface Query Response Interval'.)

Example:

```
>ipmc parameter qri

IGMP Interface Setting

VID   QRI
----  -----
1


MLD Interface Setting

VID   QRI
----  -----
1     100
>
```

Messages: *(Please create IGMP Interfaces)* if none exist.
(Please create MLD Interfaces) if none exist.

Command: **Set / Show IPMC Parameter LLQI**
Syntax: **ipmc parameter llqi** [**mld**|**igmp**] [<**vid**>] [**ipmc_param_llqi**]
Description: Set or show the IPMC Last Listener Query Interval. The Last Member Query Time is the time value represented by the Last Member Query Interval, multiplied by the Last Member Query Count. The valid range is 0 to 31744 in tenths of a second. The default last member query interval is 10 tenths of a second (1 second). The parameters are:
mld : IPMC for IPv6 MLD.
igmp: IPMC for IPv4 IGMP.
<**vid**> : VLAN ID (1-4094) or 'any'. The default is 'Show all VLANs'.
ipmc_param_llqi:
-1 : Default Value (10).
0~31744 : Last Listener Query Interval in tenths of seconds.
(The default is 'Show IPMC Interface Last Listener Query Interval'.)

Example:

```
>ipmc parameter llqi

IGMP Interface Setting

VID   LLQI
----  -----
1


MLD Interface Setting

VID   LLQI
----  -----
1     10
>
```

Messages: *(Please create IGMP Interfaces)* if none exist.
(Please create MLD Interfaces) if none exist.

Command: **Set / Show IPMC Parameter URI**
Syntax: **ipmc parameter uri** [**mld**|**igmp**] [<**vid**>] [**ipmc_param_uri**]
Description: Set or show the IPMC Unsolicited Report Interval. The Unsolicited Report Interval (URI) is the time between repetitions of a host's initial report of membership in a group.
The valid range is 0 to 31744 seconds. The default unsolicited report interval is 1 second.
The parameters are:
mld : IPMC for IPv6 MLD
igmp: IPMC for IPv4 IGMP
<**vid**> : VLAN ID (1-4094) or 'any'. The default is 'Show all VLANs'.
ipmc_param_uri:
-1 : Default Value (1)
0-31744 : Unsolicited Report Interval in seconds.
(The default is 'Show IPMC Interface Unsolicited Report Interval'.)

Example:

```
>ipmc parameter uri

IGMP Interface Setting

VID   URI
----  -----
1

MLD Interface Setting

VID   URI
----  -----
1     1
>
```

Messages: *(Please create IGMP Interfaces)* if none exist.
(Please create MLD Interfaces) if none exist.

VCL Commands

A VLAN Control List (VCL) is used for assigning a particular flow to a particular VLAN. VCLs can enforce VLAN security that is based on a variety of information.

The LIB-4xxx VCL (VLAN Control List) commands let you configure the LIB-4xxx for MAC-based VLAN, Protocol-based VLAN, and/or IP Subnet-based VLAN mappings.

MAC-based VLAN commands let you add and delete MAC-based VLAN entries and assign the entries to different ports. This page shows only static entries. A MAC address-based VLAN decides the VLAN for forwarding an untagged frame based on the source MAC address of the frame.

Protocol-based VLAN commands let you configure the LIB-4xxx for Protocol-to-Group and/or Group-to-VLAN settings. With a protocol-based VLAN, traffic is handled on the basis of its protocol. This basically "segregates" (or forwards) traffic from a port, depending on the particular protocol of that traffic; traffic of any other protocol is not forwarded on the port. For example, it is possible to connect to a given switch:

- a host generating ARP traffic to port 1,
- a network with IPX traffic to port 2, and
- a router forwarding IP traffic to port 3

If a protocol-based VLAN is created that supports IP and contains all three ports, this will prevent IPX traffic from being forwarded to ports 1 and 3, and prevent ARP traffic from being forwarded to ports 2 and 3, but will still allow IP traffic to be forwarded on all three ports.

IP Subnet-based VLAN commands let you define a VLAN membership by the subnet to which a device's IP address belongs. You can add, update, and delete IP subnet-based VLAN entries and assign the entries (membership) to different ports. VLANs are layer 2 constructs, compared with IP subnets which are layer 3 constructs. In an environment employing VLANs, a one-to-one relationship often exists between VLANs and IP subnets, but it is possible to have multiple subnets on one VLAN. VLANs and IP subnets provide independent Layer 2 and Layer 3 constructs that map to each other, and this correspondence helps in network design. Note that this involves only static entries.

The LIB-4xxx VCL commands include:

>**vcl ?**
Available Commands:

VCL Macvlan Configuration
VCL Macvlan Add <mac_addr> <vid> [<port_list>]
VCL Macvlan Del <mac_addr>
VCL Status [combined|static|nas|all]
VCL ProtoVlan Protocol Add Eth2 <ether_type>|arp|ip|ipx|at <group_id>
VCL ProtoVlan Protocol Add Snap <oui>|rfc_1042|snap_8021h <pid> <group_id>
VCL ProtoVlan Protocol Add Llc <dsap> <ssap> <group_id>
VCL ProtoVlan Protocol Delete Eth2 <ether_type>|arp|ip|ipx|at
VCL ProtoVlan Protocol Delete Snap <oui>|rfc_1042|snap_8021h <pid>
VCL ProtoVlan Protocol Delete Llc <dsap> <ssap>
VCL ProtoVlan Vlan Add [<port_list>] <group_id> <vid>
VCL ProtoVlan Vlan Delete [<port_list>] <group_id>
VCL ProtoVlan Conf
VCL IPVlan Configuration [<vce_id>]
VCL IPVlan Add [<vce_id>] <ip_addr_mask> <vid> [<port_list>]
VCL IPVlan Delete <vce_id>
>

The LIB-4xxx sFlow commands are explained below.

Command: **Show VCL MAC VLAN Config**
Syntax: **vcl macvlan configuration**
Description: Show the existing VCL MAC-based VLAN configuration.
Example:

```
>vcl macvlan con

MAC Address        VID   Ports
-----------------  ----  -----
00-00-00-00-00-00  100   1-4
>
```

Command: **Add / Change VCL MAC VLAN Entry**
Syntax: **vcl macvlan add** <mac_addr> <vid> [<port_list>]
Description: Add or modify VCL MAC-based VLAN entry. The parameters are:
<**mac_addr**> : MAC address ('xx-xx-xx-xx-xx-xx' or 'xx.xx.xx.xx.xx.xx' or 'xxxxxxxxxxxx', where x is a hexadecimal digit) .
<**vid**> : VLAN ID (1-4094).
<**port_list**>: Port list (1-4) or 'All'. The default is 'All' ports.
Example:

```
>vcl macvlan add 00-00-00-00-00-00 100
>vcl macvlan config

MAC Address        VID   Ports
-----------------  ----  -----
00-00-00-00-00-00  100   1-4
>
```

Messages:

```
>vcl macvlan add 11-22-33-44-55-66 2 1,2,3
cli_cmd_vcl_macvlan_add: Error while adding MAC-based VLAN entry
```

Command: **Delete VCL MAC VLAN Entry**
Syntax: **vcl macvlan del** <mac_addr>
Description: Delete an existing VCL MAC-based VLAN entry, where:
<**mac_addr**>: MAC address ('xx-xx-xx-xx-xx-xx' or 'xx.xx.xx.xx.xx.xx' or 'xxxxxxxxxxxx', x is a hexadecimal digit).
Example:

```
>vcl macvlan conf

MAC Address        VID   Ports
-----------------  ----  -----
00-00-00-00-00-00  100   1-4
00-00-77-00-8d-0f  10    1-4
>vcl macvlan del 00-00-00-00-00-00
>vcl macvlan conf

MAC Address        VID   Ports
-----------------  ----  -----
00-00-77-00-8d-0f  10    1-4
>
```

Command: **Show VCL Status**
Syntax: **vcl status** [combined|static|nas|all]
Description: Display existing VCL MAC-based VLAN users configuration, where:
combined|**static**|**nas**|**all**: VCL User configuration to display.

Example:
```
>vcl status

Entry  VCL MAC User  MAC Address        VID   Ports
-----  ------------  -----------------  ----  -----
1      Static        00-00-00-00-00-00  100   1-5
       Combined      00-00-00-00-00-00  100   1-5
>
```

Command: **Add VCL ProtoVLAN Protocol Eth2**
Syntax: **vcl protovlan protocol add eth2** <ether_type>|arp|ip|ipx|at <group_id>
Description: Add a VCL protocol-based VLAN Ethernet-II protocol to the group mapping, where:
<**ether_type**>|**arp**|**ip**|**ipx**|**at**: an Ether Type in the range of 0x0600 - 0xFFFF.
arp : use 0x0806 - ARP (Address Resolution Protocol)
ip : use 0x0800 - IP (Internet Protocol)
ipx : use 0x8137 - IPX (Internet Packet Exchange)
at : use 0x88A2 - ATA over Ethernet
<**group_id**> : Protocol group ID.

Example:
```
>vcl protovlan protocol add eth2 ip 1
>
```

Command: **Add VCL ProtoVLAN Protocol SNAP**
Syntax: **vcl protovlan protocol add snap** <oui>|rfc_1042|snap_8021h <pid> <group_id>
Description: Add VCL protocol-based VLAN SNAP protocol to group mapping, where:
<oui>|rfc_1042|snap_8021h: OUI value (Hexadecimal 00-00-00 to FF-FF-FF).
oui: : organizationally unique identifier in the format of xx-xx-xx where each pair (xx) in string is a hexadecimal value ranges from 0x00-0xff.
rfc_1042 : use IETF RFC 1042 as the method of encapsulating the Internet Protocol (IP) datagrams and Address Resolution Protocol (ARP) requests.
snap_8021h : Set the encapsulation transformation method to 802.1h (the default setting).
<**pid**> : PID value (0x0-0xFFFF). If OUI is 00-00-00, valid range of PID is from 0x0600 - 0xFFFF.
<**group_id**> : Protocol group ID.

Example:
```
>vcl protovlan protocol add snap 11-22-33 0x800 1

>
```

Command: **Add VCL ProtoVlan Protocol LLC**
Syntax: **vcl protovlan protocol add llc** <dsap> <ssap> <group_id>
Description: Add VCL protocol-based VLAN LLC protocol to group mapping, where:
<**dsap**> : DSAP value (0x00-0xFF). The DSAP is the Destination Service Access Point.
<**ssap**> : SSAP value (0x00-0xFF). The SSAP is the Source Service Access Point.
<**group_id**>: Protocol group ID.

Example:
```
>vcl protovlan protocol add llc 0x11 0x22 1
>
```

Command: **Delete VCL ProtoVLAN Protocol Eth2**
Syntax: **vcl protovlan protocol delete eth2** <ether_type>|arp|ip|ipx|at>
Description: Delete an existing VCL protocol-based VLAN Ethernet-II protocol from the group mapping. The parameters are:
<**ether_type**>|arp|ip|ipx|at: Ether Type (0x0600 - 0xFFFF).

Example:
```
>VCL ProtoVlan Conf
Protocol Type  Protocol (Value)          Group ID
-------------  ----------------------    --------
LLC_Other      DSAP:0x11; SSAP:0x22      1
LLC SNAP       OUI-11:22:33; PID:0x800   1
EthernetII     ETYPE:0x900               1

>vcl protovlan protocol delete eth2 0x900
>VCL ProtoVlan Conf
Protocol Type  Protocol (Value)          Group ID
-------------  ----------------------    --------
LLC_Other      DSAP:0x11; SSAP:0x22      1
LLC_SNAP       OUI-11:22:33; PID:0x800   1


>
```

The SSAP is the Source Service Access Point and the DSAP is the Destination Service Access Point.

Command: **Delete VCL Proto VLAN Protocol SNAP Mapping**
Syntax: **vcl protovlan protocol delete snap** <oui>|rfc_1042|snap_8021h <pid>
Description: Delete VCL protocol-based VLAN SNAP protocol to group mapping. The parameters are:
<**oui**>|rfc_1042|snap_8021h: OUI value (Hexadecimal 00-00-00 to FF-FF-FF).
oui: : organizationally unique identifier in the format of xx-xx-xx where each pair (xx) in string is a hexadecimal value ranges from 0x00-0xff.
rfc_1042 : use IETF RFC 1042 as the method of encapsulating the Internet Protocol (IP) datagrams and Address Resolution Protocol (ARP) requests.
snap_8021h : Set the encapsulation transformation method to 802.1h (the default setting).
<**pid**> : PID value (0x0-0xFFFF). If OUI is 00-00-00, valid range of PID is from 0x0600-0xFFFF.

Example:
```
>vcl protovlan protocol delete snap 11-22-33 0x900
Deleting Protocol to Group mapping Failed
>
```

Messages: *Deleting Protocol to Group mapping Failed*

Command: **Delete VCL ProtoVlan Protocol LLC**
Syntax: **vcl protovlan protocol delete llc** <dsap> <ssap>
Description: Delete VCL protocol-based VLAN LLC protocol to group mapping. The parameters are:
<**dsap**>: DSAP value (0x00-0xFF).
<**ssap**>: SSAP value (0x00-0xFF).

Example:
```
>vcl protovlan protocol delete llc 1 2
Deleting Protocol to Group mapping Failed
>
```

Command: **Add VCL ProtoVlan VLAN**
Syntax: **vcl protovlan vlan add** [<port_list>] <group_id> <vid>
Description: Add VCL protocol-based VLAN group to VLAN mapping, where:
<**port_list**>: Port list or 'all'; the default is 'All' ports.
<**group_id**> : Protocol group ID.
<**vid**> : VLAN ID (1-4094).

Example:
```
>vcl protovlan vlan add 1 1x 1
>
```

Messages: *Invalid Group Id. Group Id consists of alphabets (a-z or A-Z) or a combination of aplhabets and integers(0-9).*

Command: **Delete VCL ProtoVlan VLAN**
Syntax: **vcl protovlan vlan delete** [<port_list>] <group_id>
Description: Delete VCL protocol-based VLAN group to VLAN mapping, where:
<**port_list**>: Port list or 'all'. the default is 'All' ports.
<**group_id**> : Protocol group ID.

Example:
```
>vcl protovlan vlan delete 1 1
>
```

Command: **VCL ProtoVlan Configuration**
Syntax: **vcl protovlan vlan conf**
Description: Show VCL protocol-based VLAN entries.

Example 1:
```
>VCL ProtoVlan Conf
Protocol Type  Protocol (Value)          Group ID
-------------  ------------------------  --------
LLC_Other      DSAP:0x11; SSAP:0x22      1
LLC_SNAP       OUI-11:22:33; PID:0x800   1
EthernetII     ETYPE:0x900               1


>
```

Example 2:
```
>vcl pro con
Protocol Type  Protocol (Value)          Group ID
-------------  ------------------------  --------
LLC_Other      DSAP:0xff; SSAP:0xff      s2grp
LLC_SNAP       OUI-00:e0:2b; PID:0x1     sgrp
EthernetII     ETYPE:0x800               etype0x800

Group ID          VID   Ports
---------------   ----  -----
sgrp2             20    4
>
```

The SSAP is the Source Service Access Point and the DSAP is the Destination Service Access Point.

Command: **Show VCL IPVlan Configuration**
Syntax: **vcl ipvlan config** [<vce_id>]
Description: Displays the current VCL IP Subnet-based VLAN configuration, where:
<**vce_id**>: Unique VCE ID for each VCL entry.
Example 1: The default display:

```
>vcl ipvlan config

VCE ID  IP Address       Mask Length  VID   Ports
------  ---------------  -----------  ----  -----
>
```

Example 1: A configured display:

```
>vcl ipvlan config

VCE ID  IP Address       Mask Length  VID   Ports
------  ---------------  -----------  ----  -----
1       192.168.1.30     24           1     1-3
2       192.168.1.30     24           1     1,2
3       192.168.1.40     24           2     1,2
>
```

Command: **Add / Modify VCL IPVlan**
Syntax: **vcl ipvlan add** [<vce_id>] <ip_addr_mask> <vid> [<port_list>]
Description: Add a new or modify an existing VCL IP Subnet-based VLAN entry.
IP subnet-based VLAN entries can be configured from the CLI. With this method, a VLAN membership is defined by the subnet to which a device's IP address belongs.
This command lets you add a new IP subnet-based VLAN entry and assign port members. VLANs are layer 2 constructs, compared with IP subnets which are layer 3 constructs. In an environment employing VLANs, a one-to-one relationship often exists between VLANs and IP subnets, but it is possible to have multiple subnets on one VLAN. VLANs and IP subnets provide independent Layer 2 and Layer 3 constructs that map to each other, and this correspondence helps in network design. Note that this command adds/edits only static entries.
The parameters are:
<**vce_id**> : A unique VCE ID for each VCL entry
<**ip_addr_mask**>: Source IP address and mask (Format: a.b.c.d/n). Enter a valid IP address in dotted decimal notation ('x.y.z.w') where x, y, and z are decimal numbers from 0 to 255, and the mask length is from 1-32.
<**vid**> : VLAN ID (1-4094) of an existing VLAN.
<**port_list**> : Port list or 'All'. The default is 'All' ports (1-5).

Example:

```
>vcl ipvlan add 1 192.168.1.30/24 1 1,2,3
>vcl ipvlan add 2 192.168.1.30/24 1 1,2
>vcl ipvlan add 3 192.168.1.40/24 2 1,2
>vcl ipvlan config

VCE ID  IP Address       Mask Length  VID   Ports
------  ---------------  -----------  ----  -----
1       192.168.1.30     24           1     1-3
2       192.168.1.30     24           1     1,2
3       192.168.1.40     24           2     1,2
>
```

Messages: *Add failed. IP Subnet-based VLAN entry already configured with different subnet*

Command: **Delete VCL IPVlan**
Syntax: **vcl ipvlan delete** <vce_id>
Description: This command lets you delete one or more existing IP subnet-based VLAN entries and their assigned port memberships.

Example:
```
>vcl ipvlan delete 1
>vcl ipvlan delete 2
>vcl ipvlan delete 3
>vcl ipvlan config
>
```

Messages: *IP Subnet-based VLAN deletion failed - matching entry not found*

EtherSAT Loopback Commands

The MEF recently established a new project to produce a 'latching loopback' protocol and functionality for use in service activation applications. This new loopback is significantly different than the LBM / LBR protocol and functionality of ITU-T Y.1731 and IEEE 802.1ag (as well as the 802.1Qaw encapsulation method).

The MEF SAT (Service Activation Testing) is implemented early in the Ethernet Service lifecycle; when a new customer order is received, MEF SAT (along with MEF LLB and ITU Y.1564) can be used to provision and turn up the circuit in order to verify the performance to the SLA (via FM and PM).

Ethernet Service Activation Test methodology involves:

- Verify a new service after provisioning is complete, but before it is released to the customer.
- Check that the configuration is correct.
- Verify performance meets the Service Acceptance Criteria (SAC) to ensure CoS Performance objectives are attained.

For the EtherSAT commands see the *EtherSAT User Guide* manual.

Sync-E Commands

Recommendation ITU-T G.8262/Y.1362 outlines requirements for timing devices used in synchronizing network equipment using synchronous Ethernet. This Recommendation defines the requirements for clocks (e.g., bandwidth, frequency accuracy, pull-in, hold-in, and pull-out ranges, noise generation, noise tolerance, noise transfer, transient response, holdover performance, etc.).

Synchronous Ethernet (Sync-E) as defined by ITU-T G.8261 allows for the transfer of high-quality network timing from a traceable reference, to all network elements. Because this is a physical layer process, the timing quality does not vary due to network load. Sync-E builds on the existing Ethernet standards and is backward compatible with IEEE 802.3.

The PHY devices recover the network timing from each line port and output the port recovered timing.
The LIB-4400 has six clock sources (four 10G ports, one SyncE Input, and one IEEE 1588 Input), and allows each output to select recovered timing from all possible line ports.
The and LIB-4424 each have eight clock sources (four 10G ports, two 1G ports, one SyncE Input, and one IEEE 1588 Input), and allow each output to select recovered timing from all possible line ports.
If timing is compromised, the appropriate clock output can be squelched to assist with fast timing switchover.

Transmit timing is common for all ports and Is tracable back to a PRC (Primary Reference Clock). See PHY device recovered clock above. This clock is always available and is tightly controlled by the clock synchronization circuits during a timing failover.

The external clock synchronization receives clocks from many possible sources, and generates a set of stable output reference clocks to be used for transmit timing. The reference clock input and output frequencies are configurable.

Note that each network element along the synchronization path must support SyncE.

These Sync-E commands let you inspect and configure the current SyncE port settings. The LIB-4xxx Sync-E commands include:

>**sync ?**
Available Commands:

SyncE Nominate [<clk_source>] [enable|disable] [<port>] [ql_none|ql_prc|ql_ssua|ql_ssub|ql_eec2|ql_eec1|ql_dnu]
  [<holdoff>] [master|slave|forced]
SyncE Selection [manual|selected|nonrevertive|revertive|holdover|freerun] [<clk_source>] [<wtr_time>]
  [ho_none|ho_prc|ho_ssua|ho_ssub|ho_eec2|ho_eec1|ho_dnu|ho_inv]
  [fr_none|fr_prc|fr_ssua|fr_ssub|fr_eec2|fr_eec1|fr_dnu|fr_inv]
SyncE Priority [<clk_source>] [<clk_priority>]
SyncE Ssm [<port>] [enable|disable]
SyncE Clear <clk_source>
SyncE State
SyncE Config
SyncE ExtClock Output Mode [<ext_clock_enable>] [<clockfreq_out>]
SyncE ExtClock Input Mode [<ext_clock_enable>] [<clockfreq_in>]
SyncE ExtClock Impedance [<impedance>]
SyncE ExtClock Input Status
>

Each of the LIB-4xxx Sync-E commands is described below.

Command: **SyncE Nominate**

Syntax: **synce nominate** [<clk_source>] [enable|disable] [<port>] [ql_none|ql_prc|ql_ssua| ql_ssub|ql_eec2|ql_eec1|ql_dnu] [<holdoff>] [master|slave|forced]

Description: Nominate a PHY port to become a selectable clock source. The parameters are:

<**clk_source**> : Clock source identification.

enable|**disable** : enable or disable the SyncE Nominate function.

<**port**> : Port number (0 = de-nominate).

ql_none|**ql_prc**|**ql_ssua**|**ql_ssub**|**ql_eec2**|**ql_eec1**|**ql_dnu** : Clock source SSM overwrite, where:

ql_none : no known quality / No QL.

ql_prc : QL is Primary Reference Clock (PRC).

ql_ssua : QL is Synchronization Supply Unit A (SSUA).

ql_ssub : QL is Synchronization Supply Unit B (SSUB).

ql_eec2 : QL is The clock source is EEC-Option 2 per ITU-T Rec. G.8262 /Y.1362 (07/2010).

ql_eec1 : QL is EEC-Option 1 per ITU-T Rec. G.8262/Y.1362 (07/2010)

ql_dnu : QL is DNU (Do Not Use.) Quality Level.

<**holdoff**> : The hold off timer value in 100 ms. Valid values are: 0 for disable, and 3-18. The value 100 is for test purposes.

master|**slave**|**forced** : For 1000BaseT ANEG (auto-negotiation) mode; either:

master: Activate prefer master negotiation.

slave: Activate prefer slave negotiation.

forced: Activate forced slave negotiation.

Example:

```
>synce nominate 1 2 ql_prc 3 master
>synce nom

Nomination is:
Clock Source             1       2       3       4       5       6
Ports:                   0       2       3       4       X       X
SSM Overwrite:     QL_NONE QL_SSUA QL_SSUB QL_EEC2 QL_EEC1 QL_NONE
Hold Off:                0       0       0       0       0       0
ANEG Mode:            None    None  Forced  Forced  Forced  Forced

>
```

Note that you can also use the “synce config” command to display the current **synce nominate** configuration.

Note that in SyncE, the 1588 input is disabled if no clock source is nominated.

Command: **SyncE Selection**

Syntax: **syncE selection** [manual|selected|nonrevertive|revertive|holdover|freerun]
[<clk_source>] [<wtr_time>]
[ho_none|ho_prc|ho_ssua|ho_ssub|ho_eec2|ho_eec1|ho_dnu|ho_inv]
[fr_none|fr_prc|fr_ssua|fr_ssub|fr_eec2|fr_eec1|fr_dnu|fr_inv]

Description: Selection mode of nominated clock sources. The parameters are:

[**manual**|**selected**|**nonrevertive**|**revertive**|**holdover**|**freerun**]: The definition of the 'best' clock source is firstly the one with the highest “QL" and secondly (the ones with equal QL) the highest priority. Set the Clock Selector to one of these modes:

Manual: Clock selector will select the clock source stated in Source (see below). If this manually selected clock source is failing, the clock selector will go into holdover state.

Manual To Selected: Same as Manual mode where the selected clock source will become Source.

Auto NonRevertive: Clock Selection of the best clock source is only done when the selected clock fails.

Auto Revertive: Clock Selection of the best clock source is constantly done.

Forced Hold Over: Clock Selector is forced to Free Run State.

The **Hold Over SSM overwrite** <***ho_xxx***>. This is the transmitted SSM QL (Synchronization Status Message Quality Level) value when the clock selector is in Hold Over State. Select either:

QL NONE: The clock source has no known quality / No overwrite.

QL PRC: The clock source is the Primary Reference Clock (PRC).

QL SSUA: The clock source is Synchronization Supply Unit A (SSUA).

QL SSUB: The clock source is Synchronization Supply Unit B (SSUB).

QL EEC2: The clock source is EEC-Option 2 (EEC synchronous Ethernet Equipment Clock) per ITU-T Rec. G.8262/Y.1362 (07/2010).

QL EEC1: The clock source is EEC-Option 1 (EEC synchronous Ethernet Equipment Clock) per ITU-T Rec. G.8262/Y.1362 (07/2010).

QL DNU: Do Not Use.

QL INV: Receiving invalid SSM (not defined) - NOT possible to set.

<**fr_xxx**> : “SSM Free Run” is the transmitted SSM QL value when the clock selector is in Hold Over State. This is the Free Run Quality Level <***fr_xxx***>. This is the transmitted SSM QL value when the clock selector is in Hold Over State. Select either QL None, QL SSUA, QLSSUB, QL ECC2, QLECC1, QL DNU, or QL_INV, where:

QL NONE: No Quality Level (QL) used.

QL PRC: The Primary Reference Clock (PRC) Quality Level (QL) is used.

QL SSUA: The SSUA (Synchronization Supply Unit A) Quality Level (QL) is used.

QL SSUB: The SSUB (Synchronization Supply Unit B) Quality Level (QL) is used.

QL ECC2: The ECC2 (EEC-Option 2) Quality Level (QL) is used.

QL ECC1: The ECC1 (EEC-Option 1) Quality Level (QL) is used.

QL DNU: The DNU (Do Not Use.) Quality Level (QL) is used.

QL_INV: The INV (Invalid) Quality Level (QL) is used. - NOT possible to set..

Example 1:

```
>synce selection

Selection Mode:     Automatic Revertive
WTR Time:  5 min.
SSM Hold Over:  QL_NONE
SSM Free Run:  QL_NONE

>
```

Example 2:

```
>synce selection

Selection Mode:     Automatic Nonrevertive
WTR Time:  2 min.
SSM Hold Over:  QL_PRC
SSM Free Run:  QL_NONE

>synce selection selected 12 ho_prc fr_ssua
>synce selection

Selection Mode:     Manuel to source 7
WTR Time:  12 min.
SSM Hold Over:  QL_PRC
SSM Free Run:  QL_SSUA

>
```

Messages: *NOT possible to make Manuel To Selected if not in locked mode*. For example:

```
>synce selection selected 12 ho_prc fr_ssua
NOT possible to make Manuel To Selected if not in locked mode
>
```

EEC Options: Recommendation ITU-T G.8262/Y.1362 contains two options for synchronous Ethernet: The first option (EEC-Option 1) applies to synchronous Ethernet equipments designed to interwork with networks optimized for the 2048-kbit/s hierarchy. These networks allow the worst-case synchronization reference chain as specified in Figure 8-5 of ITU-T G.803.

The second option (EEC-Option 2) applies to synchronous Ethernet equipments designed to interwork with networks optimized for the 1544-kbit/s hierarchy. The synchronization reference chain for these networks is defined in clause II.3 of ITU-T G.813.

See the ITU spec for differences in terms of Frequency accuracy, Pull-in, hold-in, and pull-out ranges, Noise generation, Noise tolerance, Noise transfer, etc.

SSU (Synchronization Supply Units) are used to ensure reliable synchronisation distribution. SSU functions to:

- Filter the synchronisation signal they receive to remove the higher frequency phase noise,
- Provide distribution by providing a scalable number of outputs to synchronise other local equipment,
- Povide the ability to produce a high quality output even when their input reference is lost (Holdover Mode).

Synchronization performance: two key parameters used to measure synchronisation performance are defined by ITU recommendation G.811, by ETSI standard EN 300 462-1-1, by the ANSI Synchronization Interface Standard T1.101 profiles for clock accuracy at each stratum level, and by Telecordia/Bellcore standards GR-253 and GR-1244.

- Maximum time interval error (MTIE): a measure of the worst case phase variation of a signal with respect to a perfect signal over a given period of time.
- Time deviation (TDEV): a statistical analysis of the phase stability of a signal over a given period of time.

Command: **SyncE Priority**

Syntax: **synce priority** [<clk_source>] [<clk_priority>]

Description: Priority of nominated clock sources. The parameters are:

[<**clk_source**>] : The Clock source identification.

[<**clk_priority**>] : The priority for this clock source. Lowest number (0) is the highest priority. If two clock sources have the same priority, the lowest clock source number gets the highest priority in the clock selection process. The valid range is 0-6. The default is 0.

Example:

```
>synce priority

Priority is:
Clock Source            1       2       3       4       5       6
Priority:               0       0       0       0       0       0

>synce priority 1 1
>synce priority

Priority is:
Clock Source            1       2       3       4       5       6
Priority:               1       0       0       0       0       0

>
```

Command: **Enable / Disable SyncE Ssm**

Syntax: **synce ssm** [<port>] [enable|disable]

Description: Enable or disable SyncE SSM (Synchronization Status Message). The default is disabled . The parameters are:

[<**port**>] : The LIB-4xxx Port number (0 where not applicable).

[**enable**|**disable**] : enable/disable SSM operation.

Example:

```
>synce ssm

SSM enabled on these ports:
1
2

>synce ssm 3 enable
>synce ssm

SSM enabled on these ports:
1
2
3

>
```

Command: **Clear SyncE WTR Timer**

Syntax: **synce clear** <clk_source>

Description: SyncE Clear active WTR (Wait To Restore) timer. The parameters are:
<**clk_source**> : Clock source identification.

Example:

```
>synce clear 1
>synce clear 2
>synce config

SyncE Configuration:
====================

Nomination is:
Clock Source             1       2       3       4       5       6
Ports:                   0       2       0       0       X       X
SSM Overwrite:      QL_PRC QL_NONE QL_NONE QL_NONE QL_NONE QL_NONE
Hold Off:                3       0       0       0       0       0
ANEG Mode:            None    None    None    None    None    None
Priority:                0       1       0       0       0       0

Selection Mode:     Manuel to source 7
WTR Time:  12 min.
SSM Hold Over:  QL_PRC
SSM Free Run:  QL_SSUA

SSM enabled on these ports:
1
2
3
4


SyncE ExtClock Input Mode: State = Enabled, Frequency = 8 KHz
SyncE ExtClock Output Mode: State = Enabled, Frequency = 25 MHz
SyncE ExtClock Impedance: Hi-Z
>
```

Command: **SyncE State**
Syntax: **synce state**
Description: Displays the current Sync-E selector state.

Example 1:

```
>synce state

Selector State is: Free Run

Alarm State is:
Clk:        1        2        3        4        5        6
LOCS:    TRUE     TRUE     TRUE     TRUE     TRUE     TRUE
SSM:     FALSE    FALSE    FALSE    FALSE    FALSE    FALSE
WTR:     FALSE    FALSE    FALSE    FALSE    FALSE    FALSE

LOL:     TRUE
DHOLD:   TRUE

SSM State is:
Port    Tx SSM    Rx SSM      Mode

>
```

Example 2:

```
>synce state

Selector State is: Free Run

Alarm State is:
Clk:        1        2        3        4        5        6
LOCS:    TRUE     TRUE     TRUE     TRUE     TRUE     TRUE
SSM:     FALSE    TRUE     FALSE    FALSE    FALSE    FALSE
WTR:     FALSE    FALSE    FALSE    FALSE    FALSE    FALSE

LOL:     TRUE
DHOLD:   TRUE

SSM State is:
Port    Tx SSM    Rx SSM      Mode
   1   QL_SSUA   QL_SSUA    Master
   2   QL_SSUA   QL_FAIL    Master
   3   QL_SSUA   QL_LINK    Master
   4   QL_SSUA   QL_LINK    Master

>
```

Selector State indicates the current state of the clock selector. Possible selector states include:
Free Run: There is no external clock source to lock to (unlocked state). The Clock Selector has never been locked to a clock source long enough to calculate the hold over frequency offset to local oscillator. The frequency of this node is the frequency of the local oscillator.
Hold Over: There is no external clock source to lock to (unlocked state). The Clock Selector has calculated the holdover frequency offset to local oscillator. The frequency of this node is "held" to the frequency of the clock source previously locked to.
Pre-Locked: The Clock selector is in the process of locking to the selected clock source.
Locked: Clock selector is locked to the clock source indicated (see next).
P**relocked2**: PRELOCKED2.
Loss Of Lock: LOSSOFLOCK2.

Command: **SyncE Config**
Syntax: **synce config**
Description: Display the current SyncE configuration data.

Example 1:

```
>synce nominate 1 2 ql_prc 3 master
>synce config

SyncE Configuration:
====================

Nomination is:
Clock Source             1       2       3       4       5       6
Ports:                   0       2       0       0       X       X
SSM Overwrite:      QL_PRC QL_NONE QL_NONE QL_NONE QL_NONE QL_NONE
Hold Off:                3       0       0       0       0       0
ANEG Mode:             None    None    None    None    None    None
Priority:                0       1       0       0       0       0

Selection Mode:     Manuel to source 7
WTR Time:  12 min.
SSM Hold Over:  QL_PRC
SSM Free Run:  QL_SSUA

SSM enabled on these ports:
1
2
3
4


SyncE ExtClock Input Mode: State = Enabled, Frequency = 8 KHz
SyncE ExtClock Output Mode: State = Enabled, Frequency = 25 MHz
SyncE ExtClock Impedance: Hi-Z
>
```

Example 2:

```
>synce nominate 2 enable 2 ql_eec2 10 master
>synce config

SyncE Configuration:
====================

Nomination is:
Clock Source             1       2       3       4       5       6
Ports:                   0       2       0       0       X       X
SSM Overwrite:      QL_PRC QL_EEC2 QL_NONE QL_NONE QL_NONE QL_NONE
Hold Off:                3      10       0       0       0       0
ANEG Mode:             None    None    None    None    None    None
Priority:                0       1       0       0       0       0

Selection Mode:     Manuel to source 7
WTR Time:  12 min.
SSM Hold Over:  QL_PRC
SSM Free Run:  QL_SSUA

SSM enabled on these ports:
1
2
3
4


SyncE ExtClock Input Mode: State = Enabled, Frequency = 8 KHz
SyncE ExtClock Output Mode: State = Enabled, Frequency = 25 MHz
SyncE ExtClock Impedance: Hi-Z
>
```

Command: **Synce External Clock Output Mode**
Syntax: **synce extclock output mode** [<ext_clock_enable>] [<clockfreq_out>]
Description: Update or show the SyncE SMB Output, where:
<**ext_clock_enable**>:
enable: Enable the external SMB output.
disable: Disable the external SMB output.
<**clockfreq_out>** : the External clock output frequency:
[8KHz|64KHz|1.544MHz|2.048MHz|10MHz|19.44MHz|25MHz]

Example 1:
```
>synce extclock output mode
SyncE ExtClock Output Mode: State = Enabled, Frequency = 25 MHz
>synce extclock output mode enable 10
>synce extclock output mode
SyncE ExtClock Output Mode: State = Enabled, Frequency = 10 MHz
>synce extclock output mode disable
>synce extclock output mode
SyncE ExtClock Output Mode: State = Disabled, Frequency = 8 KHz
>
```

Command: **Synce External Clock Input Mode**
Syntax: **synce extclock input mode** [<ext_clock_enable>] [<clockfreq_in>]
Description: Update or show the SyncE SMB Input, where:
<**ext_clock_enable**>:
enable: Enable the external SMB input.
disable: Disable the external SMB input.
<**clockfreq_in**> : The External clock input frequency:
[8KHz|64KHz|1.544MHz|2.048MHz|10MHz|19.44MHz|25MHz]

Example 1:
```
>synce extclock input mode
SyncE ExtClock Input Mode: State = Enabled, Frequency = 8 KHz
>synce extclock input mode enable 25
>synce extclock input mode
SyncE ExtClock Input Mode: State = Enabled, Frequency = 25 MHz
>synce extclock input mode disable
>synce extclock input mode
SyncE ExtClock Input Mode: State = Disabled, Frequency = 8 KHz
>
```

Command: **Sync External Clock Impedance**
Syntax: **synce extclock impedance** [<impedance>]
Description: Update or show the External I/O Impedance, where:
<**impedance**>:
50 : 50 ohm external I/O impedance.
75 : 75 ohm external I/O impedance.
Hi-Z : no impedance termination driven.

Example 1:
```
>synce extclock impedance
SyncE ExtClock Impedance: Hi-Z
>synce extclock impedance 50
>synce extclock impedance
SyncE ExtClock Impedance: 50 Ohms
>synce extclock impedance 75
>synce extclock impedance
SyncE ExtClock Impedance: 75 Ohms
>
```

Command: **Sync External Clock Input Status**
Syntax: **synce extclock input status**
Description: Show the current SyncE Input Frequency. Displays the real-time input frequency detected. Does not require the input to be enabled.

Example 1:
```
>synce extclock input status
SyncE Input Status:

Input Frequency: 80000
>
```

Messages:
Invalid parameter error returned from SYNCE
Not legal to change port on a nominated clock source - first de-nominate clock source
NOT possible to make Manual To Selected if not in locked mode
Port nominated to a clock source is already nominated
The selected port is not valid
Unknown error returned from SYNCE
Meaning: An invalid parameter was entered or an invalid port entered, etc.
Recovery:
1. Verify the parameters entered for the **synce** command.
2. See the related "Sync-E Command" section.

Message:

Invalid parameter error returned from SYNCE
Port nominated to a clock source is already nominated
Not legal to change port on a nominated clock source - first de-nominate clock source
The selected port is not valid\n

Meaning: You entered an invalid "Clock Selection Mode and State" parameter.

Recovery: 1. Click the **OK** button to clear the web page message. 2. Re-enter the parameter.
3. See "Clock Selection Mode and State" on page 348.

Message:
Clock source identification 1-n (only if manual selection mode)
Clock source identification (only if manual selection mode)
manual: Selector is manually set to the chosen clock source
selected: Selector is manually set to the pt. selected clocfk source (not possible in unlocked mode
selected: Selector is manually set to the selected clock source (not possible in unlocked mode)
nonrevertive: Selector is automatically selecting the best clock source - non revertively
revertive: Selector is automatically selecting the best clock source - revertively

Meaning: An issue exists with “Clock source selection mode".

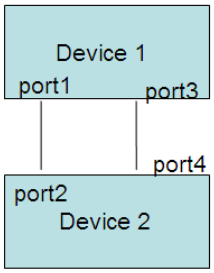
Recovery: 1. Click the **OK** button to clear the web page message. 2. Re-enter the parameter. 3. See “Clock Selection Mode and State“ on page 348.

Performance Monitor (PM)

Performance Monitor will continuiously check the bandwidth usage of each instance, if a threshold crossing alarm condition occurs, the system will generate TCA traps to server while SNMP trap is enabled. Up to 132 Instances are supported. PM is not currently configurable via the CLI.

Link Fail-over (Link Over)

SOAM DM-based Link Fail-over protocol is a 1+1 protection scheme designed to protect link-based Ethernet networks. It must work on ELPS. The Link Fail-over function works on the link as a single jump protocol for link protection, based on SOAM Delay Measurement (DM). The Link Over function provides a way to 'failover' links based on jitter measurements (i.e., jitter reaches some value and the links switches from primary to secondary).



Link Fail-over is configured as described and shown below:

1. Configure MEP on ports1, 2, 3, and 4.
2. Configure ELPS on ports 1, 2, 3 and 4.
3. Enable DM link fail-over on the Device 1.
4. Configure the value of the max delta of the average total (MaxDelta).
5. AT indicates the average total. At the beginning, the dataflow is working on the port1-port2 line. But if AT (port 1) – AT (port3) >= MaxDelta, it will send a signal about the forced switch to ELPS, and the dataflow will be switched to the port3-port4 line. Otherwise, If AT (port3) – AT (port1) >= MAxDelta, it will send a signal about the clear to ELPS, and the dataflow will be switched back.
6. The checking interval is 10seconds.

Note: The Link Fail-over function is based on two-way DM in SOAM. DM must be configured after the basic SOAM function is configured and working. You must reconfigure the DM function after a reboot.

Note: The Link Fail-over function can only be configured on one side. It doesn't support both-sides working on the links. If the link-over is Enabled on one side, the command can not be configured on the other side

1. DM-based link fail-over uses the value in SOAM DM as shown below.
2. The input value:
    1. DM- fail over Status .
    2. Delta value (6-120).

Troubleshooting

1. Check the LIB-4xxx Back Panel Connections (see the *LIB-4400/LIB-4424/ Install Guide* manual).
2. Verify the Installation. Check the Operating System, Web Browser, Telnet Client, and/or Terminal Emulation package support (see the *LIB-4400/LIB-4424/ Install Guide* manual).
3. Make sure your particular model supports the function attempted.
4. Check the LIB-4xxx Front Panel Connectors and LEDs (see the *LIB-4400/LIB-4424/ Install Guide* manual).
5. Respond to any LIB-4xxx CLI error messages (see below).
6. Run the LIB-4xxx Diagnostics tests and verification functions (e.g., Ping, Link OAM Mib Retrieve, Ping6, VeriPHY). See the "Diagnostics" sub-menu section in the *LIB-4400/LIB-4424/ User Guide*.
7. Perform the LIB-4xxx troubleshooting and service functions (e.g., Restart Device, reset to Factory Defaults, Software Upload, Image Select). See the "Maintenance" section in the *LIB-4400/LIB-4424/ User Guide*.
8. Check the LIB-4xxx operating parameters (e.g., Information, CPU Load, Log, Detailed Log). See the "Monitor" section in the *LIB-4400/LIB-4424/ User Guide* manual.

Messages and Recovery

The LIB-4xxx displays error and information messages from the CLI and Web interface. This section lists the CLI messages, provides examples, and discusses the message meaning of and possible recovery steps. For web interface messages, refer to the *LIB-4400/LIB-4424/ User Guide* manual.

For many messages, recovery involves reviewing the command/function description and verifying the entry selection/syntax. For example, for many CLI messages, the first recovery step would be to refer to the applicable Command section (e.g., "System" or "IP" or "Ports") or the related CLI Command Group or specific CLI command for syntax /instructions.

For any error condition, you can check the Net2Edge support site for possible solutions. For any problem that persists, contact Net2Edge Tech Support at +44-345-00130030 xtn 6810 or via Email at support@net2edge.com

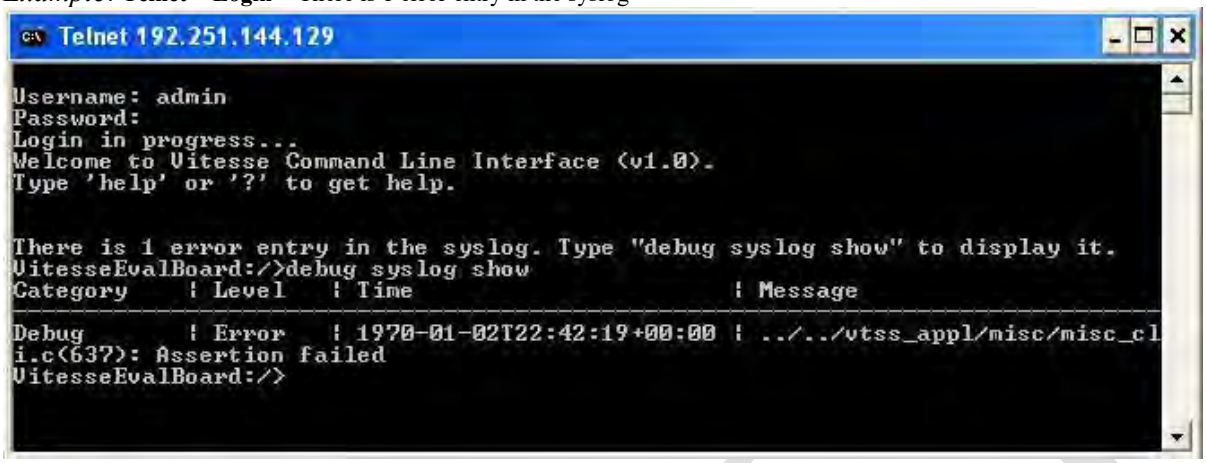
Basic Recovery Steps

You entered a command, but the operation failed or is still in process.

1. Wait for a few moments for the operation to complete.
2. Use the **Help** or **?** command to get assistance (help) on a group of commands or on a specific command.
3. Make sure this is the command you want and that the device/port/configuration supports this command.
4. Make sure this device/port supports the function attempted. Use the **go** command to switch locations.
5. Verify the command syntax and re-enter the command. See the related section of the manual for specifics.
6. Try using the Web interface to perform the function.
7. If the "continue **y**(es) **n**(o) prompt" displays, type **y** and press **Enter** to continue.
8. If the problem persists, contact Net2Edge Tech Support at +44-345-00130030 xtn 6810 or via Email at support@net2edge.com

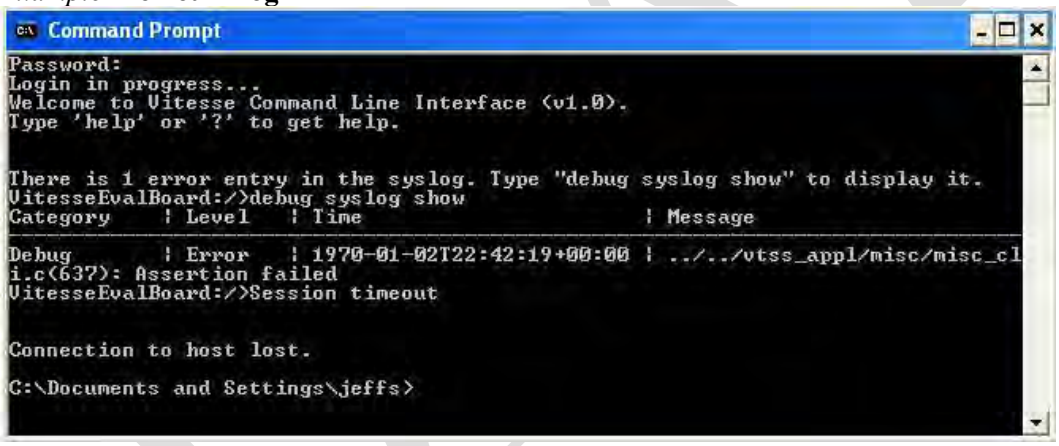
CLI Messages

Message: **There is 1 error entry in the syslog - Assertion failed**
Example: **Telnet** > **Login** > There is 1 error entry in the syslog



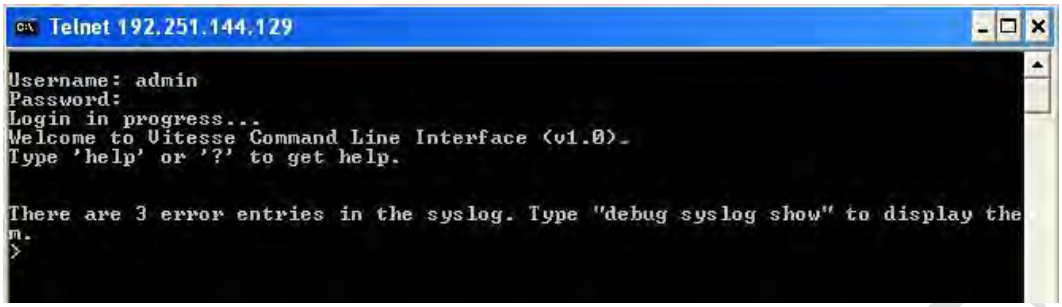
Meaning: You logged in successfully, an error occurred and this message displayed.
Recovery:
1. Follow the on-screen prompts to display the error, or press **Enter** to display the commands Help screen.
2. If the problem persists, contact TN Tech Support.

Message: **Session timeout - Connection to host lost**
Example: **Telnet** > **Login** > 1 error > Session timeout - Connection to host lost:

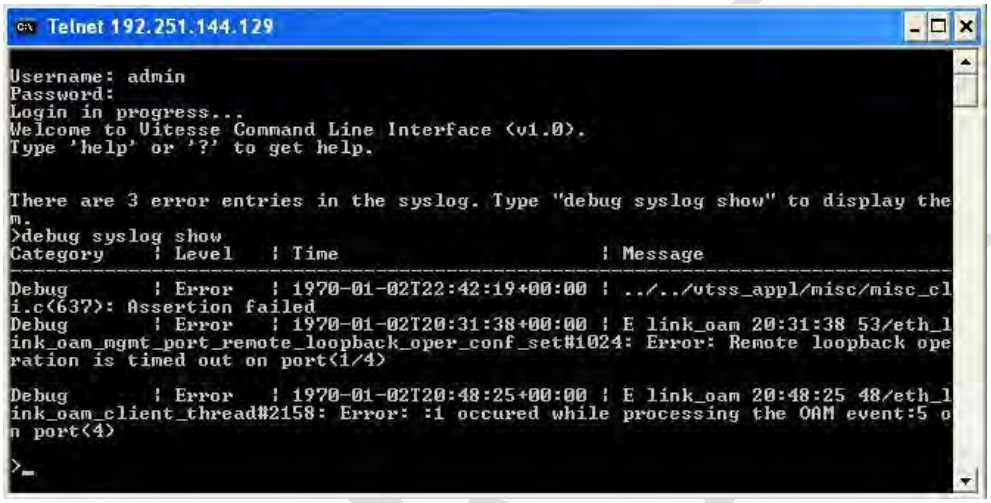


Meaning: You logged in successfully, an error occurred, this message displayed, and the Telnet connection dropped.
Recovery:
1. Log in via Telnet again.
2. If the problem persists, contact TN Tech Support.

Message: **There are 3 error entries in the syslog. Type “debug syslog show” to display them.**

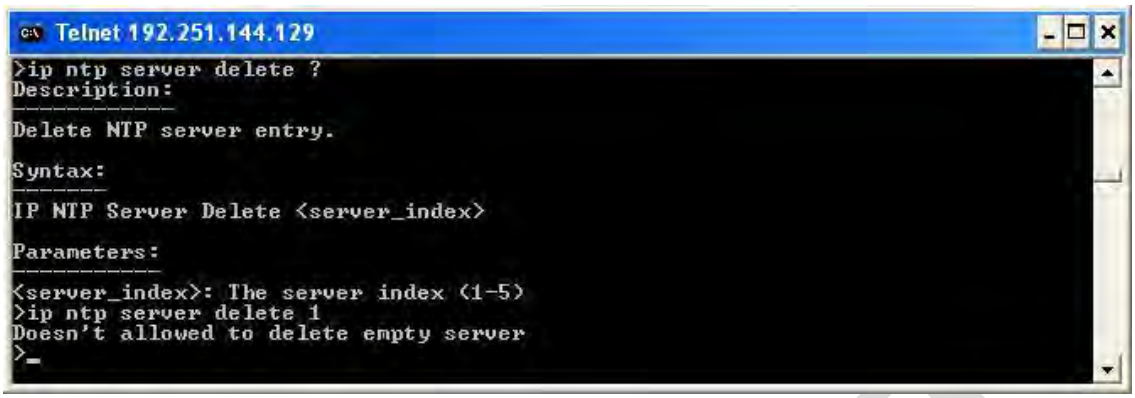


Meaning: Startup message - information only.
Recovery:
1. You can either type the command “**debug syslog show**” and press **Enter** to display the error entries, or just press the **Enter** key to continue without addressing the error entries.



3. If the problem persists, contact TN Tech Support.

Message: **Doesn't allowed to delete empty server**



Meaning: You entered a command to delete a specific NTP Server, but that NTP Server has not been created or does not exist.
Recovery:
1. Make sure the NTP Server you want to delete has been created and has not yet been deleted.
2. Retry the IP>**ntp server delete x** command with r a valid server index (1-5).
3. If the problem persists, contact TN Tech Support.

Message: **Port *x* does not support this mode**

Meaning: Error message displays if the entered port number does not support the selected mode.
Recovery:
1. Verify the command syntax (**port mode** [<port_list>] [auto|10hdx|10fdx|100hdx|100fdx|1000fdx|2500fdx]).
2. Type **port mode** and press **Enter** to display the port / mode / list table.
3. Retry the command.
4. If the problem persists, contact TN Tech Support.

Message: **Port 2 is already included in aggregation 2**
Meaning: You tried to aggregate a port in more than one Aggregation ID.
Recovery:
1. Re-enter the "Aggr Add" command with the correct parameters.
2. See the related command section for specific information.

Message: **Port x is already included in a static aggregation**
Example:

```
LACP>mode 1,2,3 enable
Port 2 is already included in a static aggregation
Port 3 is already included in a static aggregation
LACP>
```

Meaning: The LACP mode command entry failed for one or more particular ports.
Recovery:
1. Re-enter the "lacp mode" command with the correct parameters.
2. See the "lacp mode" command section for specific information.

Message: **Please disable trap security engine ID probe first**
Example:
```
>security switch snmp trap security engine id 800007e5017f000001
Please disable trap security engine ID probe first
```
Meaning: You entered a command before the system can accept its parameter.
Recovery:
1. Disable the trap security engine ID probe before using this command.
2. See the "Set or Show SNMP Trap Probe Security Engine ID" command description.

Message: **tftp client get failed: 8**
Example:
```
>config restore binary 192.168.1.30 LIB-4400_v0.1.0_conf.bin
tftp client get failed: 8
>config restore binary 192.168.1.30 LIB-4400_v0.3.0_conf.bin
Restore successful
```
Meaning: The Configuration Restore Binary command (tftp get) failed.
Recovery:
1. Make sure the TFTP server is configured and running.
2. Make sure the file name is accurate and located properly.
3. See the "config restore binary" command on page 18.

Message: **tftp client put failed: 8**
Example:
```
>config backup binary 192.168.1.30 LIB-4400_v0.2.0_conf.bin
tftp client put failed: 8
>
```
Meaning: The backup procedure failed, likely because of an unsupported TFTP Server product or version. For example, SolarWinds Multi-Threaded TFTP Server for Windows Version 8.2.7 (Standard Edition) does not function with the LIB-4xxx **config backup binary** command.
SolarWinds TFTP Server version 8.2.7 (September 2005) does not work. SolarWinds TFTP server version 10.4.0.14 works fine for LIB-4xxx binary backups.
Recovery:
1. If using SolarWinds Standard Edition v 8.2.7, uninstall it and download and install the latest version.
2. Configure and start the new version and retry the LIB-4xxx **config backup binary** command.

Message: **tftp client put failed: 0**
Meaning: Various OSes have different sets of accepted characters. So for an LIB-4xxx backup command, certain haracters are not allowed in filename based on the OS in use. The ten characters that are not allowed in the backup filename are listed below in single quotes:

'*'	**'<'**	**'>'**	**':'**	**'%'**	**'/'**
'"'	**'?'**	**'|'**	**'\\'**		

Example:
```
Config>backup binary 192.168.144.207 a.bin
Config>backup binary 192.168.144.207 ass@#$$^()-+:123.bin
tftp client put failed: 0
Config>
```
Recovery:
1. Enter the Backup command with a filename that does not include any of the above invalid characters.

Message:
Cannot find the module name. module ID = *x*
Change to lower privilege level will lock yourself out.
The privilege level of *x* is *y*.
Meaning: A user privilege level issue occurred.
Recovery:
1. Re-enter the command with a different privilege level.
2. See the "Security Switch Privilege" command on page 61.

Message: **W web 12:58:34 61/handler_config_https_cert_load#272: Warning: Please disable HTTPS mode first**
Meaning: An HTTPS security certificate loading issue occurred requiring HTTPS to be disabled.
Recovery:
1. Disable HTTPS. See the "Security Switch Commands" on page 78.

Message: **No port members for VLAN "vid". Please check the delete button to delete VLAN from the list or add the members.**
Meaning: You tried to delete a non- existent VLAN translation entry from a group.
1. Re-enter the command with a different (existing) group.
2. Add port member to the group and re-try the operation.
3. Make sure you are not trying to delete VLAN 1. Deleting VLAN 1 causes issues with forwarding.
4. To make sure no ports belong to VLAN 1, then add VLAN 1 with all ports in the forbidden state.
5. See the **Delete VLAN Translation Group Entry** command for more information.

Problem: **Policing on ECE traffic on UNI doesn't seem to work**
Meaning: At the **Configuration** > **EVC** menu path, you:
1. Created an EVPL service and assigned a policer to one of the UNI ECEs.
2. Configured an EVPL as shown below:

```
                                          Inner            Inner      Outer
EVC ID  VID   IVID  Learning  NNI Ports     Type/Mode/VID    PCP/DEI    VID
------  ----  ----  --------  ------------  ---------------  ---------  ---
2       55    111   Disabled  4             None/Normal/0    Fixed 0/0  0

ECE ID  Direction   EVC ID  Tag Type  VID        PCP  DEI  Frame  UNI Ports
------  ----------  ------  --------  ---------  ---  ---  -----  ---------
2       Both        2       Tagged    10         Any  Any  Any    2
3       Both        2       Tagged    11         Any  Any  Any    2
```

3. Configured an ECE (ECE ID: 2) with Policy Number: 1 (Policer assigned).
4. Configured Policer (Policer=1, State=enabled, Mode=Aware, CIR=5000, CBS=64000, EIR=1.EBS=0).
5. When frames with VLAN Id = 10 are sent to the UNI Port 2, its not rate limited to 5k, but is to the line rate.
The coupling between a policer and an ECE is done in the ACL configuration. You must add an ACE with the policy specified in the ECE. This is done by the CLI command "**Security/Network/ACL>add 1 policy 1 0xff any disable 1**". This command will add ACE ID 2 with policy 1 and it will accept all VLANs; rate limiting is disabled and the EVC policer is 1.
In other words, the ECE will filter on the VLAN ID specified for the UNI. This is done in IS1 TCAM, and the next step is the policing done by ACE in IS2.
Note that the policer it self is always colour aware (aware or coupled). If you want colour-blind policing, you can use QCL classification to make all traffic green.
Recovery:
1. Create an EVPL EVC and assign a policer to the ECE on Port 2 (UNI) for ingress bandwidth limiting (see command sequence below).

2. Send traffic at line rate; there will be no rate limits on the UNI.
Command sequence:

```
>evc conf
Port  DEI Mode  Tag Mode  Address
----  --------  --------  --------
1     Fixed     Outer     SMAC/SIP
2     Fixed     Outer     SMAC/SIP
3     Fixed     Outer     SMAC/SIP
4     Fixed     Outer     SMAC/SIP
5     Fixed     Outer     SMAC/SIP
6     Fixed     Outer     SMAC/SIP
7     Fixed     Outer     SMAC/SIP
8     Fixed     Outer     SMAC/SIP
9     Fixed     Outer     SMAC/SIP

Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Enabled   Aware    5000     64000  0        0             <== Policier created
2        Disabled  Aware    0        0      0        0
3        Disabled  Aware    0        0      0        0
4        Disabled  Aware    0        0      0        0
5        Disabled  Aware    0        0      0        0
6        Disabled  Aware    0        0      0        0
7        Disabled  Aware    0        0      0        0
8        Disabled  Aware    0        0      0        0
9        Disabled  Aware    0        0      0        0
10       Disabled  Aware    0        0      0        0
:
:
125      Disabled  Aware    0        0      0        0
126      Disabled  Aware    0        0      0        0
127      Disabled  Aware    0        0      0        0
128      Disabled  Aware    0        0      0        0


                                                Inner            Inner     Outer
EVC ID  VID   IVID  Learning  NNI Ports         Type/Mode/VID    PCP/DEI    VID
------  ----  ----  --------  ---------------   ---------------  ---------  ---
2       55    111   Disabled  4                 None/Normal/0    Fixed      0/0  0

ECE ID  Direction   EVC ID  Tag Type  VID        PCP  DEI  Frame  UNI Ports
------  ----------  ------  --------  ---------  ---  ---  -----  ---------
2       Both        2       Tagged    10         Any  Any  Any    2
3       Both        2       Tagged    11         Any  Any  Any    2



>evc ece status 2

ECE ID          : 2

Key Parameters
--------------
UNI Ports       : 2
DMAC Type       : Any
SMAC            : Any
Outer Tag Type  : Tagged
Outer VID       : 10
Outer PCP       : Any
Outer DEI       : Any
Frame Type      : Any

Action Parameters
-----------------
```

```
Direction       : Both
EVC ID          : 2
Tag Pop Count   : 0
Policy Number   : 1             <== Policer assigned to ECE
Class           : Disabled
Outer Mode      : Disabled
Outer PCP/DEI   : Fixed
Outer PCP       : 0
Outer DEI       : 0
Conflict        : No
>
>evc ece status 3
ECE ID          : 3

Key Parameters
--------------
UNI Ports       : 2
DMAC Type       : Any
SMAC            : Any
Outer Tag Type  : Tagged
Outer VID       : 11
Outer PCP       : Any
Outer DEI       : Any
Frame Type      : Any

Action Parameters
-----------------
Direction       : Both
EVC ID          : 2

Tag Pop Count   : 0
Policy Number   : 0
Class           : Disabled
Outer Mode      : Disabled
Outer PCP/DEI   : Fixed
Outer PCP       : 0
Outer DEI       : 0
Conflict        : No
>
>evc policer 1
Policer  State     Mode     CIR      CBS    EIR      EBS
-------  --------  -------  -------  -----  -------  ----
1        Enabled   Aware    5000     64000  0        0
```

Message:
%s User Configured a different VID on the ports
Error: VLAN is configured by Static VLAN user. Check VLAN LOOKUP info. Operation aborted.
Invalid parameter: x
Missing <vid>|<name> parameter
VLAN deletion failure
VLAN Id Membership conflict
VLAN table configuration open error
VLAN table full
Meaning: A VLAN Forbidden conflict or error occurred, or you tried to modify or delete a non-existent VLAN.
Recovery:
1. Verify the command parameters.
2. See the "VLAN Commands" on page 58.

Message: **Invalid parameter *xxxx***
Meaning: The command you entered was not accepted because a parameter entry was outside the valid range.
Recovery:
1. Check the ***xxxx*** portion of the command for possible meaning in understanding the cause of the problem.
2. Use the show version of the command if available.
3. Check the command syntax; see the related command page and re-enter the command.
Examples: An "Invalid parameter' message displays if you try to enter a value outside of the valid range of 1518-9600 packets (e.g., Invalid parameter: 9999 displays). Examples are provided below.

```
>security switch snmp trap version 2x
Invalid parameter: 2x

>security switch snmp user add
Invalid parameter: sha

>security network acl rate 1,2 kbps 3*100
Invalid parameter: 3*100

>security network acl add 1 2 3 4 5 6 7 8 9
Invalid parameter: 8

STP>maxhops 5
Invalid parameter: 5

STP>maxage 4
Invalid parameter: 4
<max_age>: STP maximum age time (6-40) ** s/b 6-39

>LLDP Optional_TLV all sys1 engsyst opttlvenabl 192.168.1.110 enable
Invalid parameter: sys1

>lldp delay 11
Delay must be less than 1/4 of Interval

>evc ece add 1 1 1 1 unicast any T tagged 1 1 1 A 4 1 any 1 fragment any any 6 any D nni-to-uni V 1 P 1
1 1 1 K 1 O enable fixed 1 1
Invalid parameter: unicast

>evc ece delete 1
W evc 04:37:12 50/evc_mgmt_ece_del#1297: Warning: id: 1 not found
ECE delete failed

>eps create 1 domport 1p1 w p w p aps enable
Invalid parameter: w

MEP>config 1 mip ingress 1 domport 5 itu megid1 1 1 1 enable
Invalid parameter error returned from MEP

MEP>ais config 1 2 1m clear enable
Invalid parameter error returned from MEP

MEP>lck config 1 2 1s enable
Invalid parameter error returned from MEP

QoS>port queueshaper rate 1 4 6660000
Invalid parameter: 6660000

QoS>qcl add 1 last 1 tag 1 0-1 any any unicast kw1 0x900 l any any any k any any k any any EF yes any
any k any 1 0 BE
Invalid parameter: last

QoS>qcl lookup all
Invalid parameter: all

>ipmc router 1 enable mld
Invalid parameter: mld

>mrp applicant  1
Invalid parameter
```

Message: **No port members for VLAN "vid". Please check the delete button to delete VLAN from the list or add the members.**
Meaning: You tried to delete a non-existing VLAN translation entry from a group.
Recovery:
1. Follow the on-screen instructions.
2. See the **vlan translation delete** command on page 45.

Message: **The privilege level of 'Read-only' should be less than or equal to 'Read-write'**
Meaning: The security privilege level entered was rejected by the CLI. For example:

```
>security switch privilege level group ptp 1
The privilege level of 'Read-only' should be less than or equal to 'Read-write'
>security switch privilege level group ptp 15
The privilege level of 'Read-only' should be less than or equal to 'Read-write'
>
```

Recovery:
1. Re-enter a valid security privilege level.
2. See the **security switch privilege level group** command on page 60.

Message: **>W web 08:14:26 53/handler_config_https_cert_load#258: Warning: SSL Certificate PEM file size too big**
Meaning: The HTTPS certificate had a problem loading.
Recovery:
1. Verify the certificate's file type and file size and re-try the command.
2. See the **security switch https cert show** command on page 62.

Message:
Error: File LIB-4400-cacert-key.pem was not found
Error: Please disable HTTPS mode first
Meaning: You must disable HTTPS mode before using this command.
Recovery:
1. Disable HTTPS mode before using this command (see the "Security Switch HTTPS Mode" command).
2. See the "Security Switch HTTPS Group" commands on pages 63-65.
3. Re-try the failed command.

Message:
Invalid <oid_subtree> parameter: xxxx
Invalid parameter: 80
Invalid parameter: sha
Invalid <engineid> parameter: 123456789
The entry 'xxxxxxx' is not exist
The format of 'Engine ID' may not be all zeros or all 'ff'H and is restricted to 5 - 32 octet string
The group name 'xxxx' is not exist
The length is restricted to 8 - 40
The security name 'xxxx' is not exist
Trap security engine ID should not NULL
Meaning: An SNMP parameter entry failed.
Recovery:
1. Use the "show" version of the commands and verify the correct syntax.
2. See the "Security Switch SNMP Group" commands section on page 78.

Message:
<data_source> dosen't exit
Invalid <history_id> parameter: 0
Invalid <rising_threshold> parameter: -2
Meaning: An RMON parameter entry failed.
Recovery:
1. Use the "show" version of the commands and verify the correct syntax.
2. See the "Security Switch RMON Group Commands" on pages 70-74.

Messages:
ACL Delete failed
E api/cil 03:51:14 31/l26_acl_policer_free#5997: Error: policer 0 already free
Invalid <ace_id> parameter: 0
Invalid parameter: 3*100
Meaning:
Recovery:
1. Use the "show" version of the commands and verify the correct syntax.
2. See the "Security Network ACL Group" commands on pages 99-102.

Message: **We need at least one server**
Meaning: You tried to set or show the DHCP relay mode without at least one DHCP server enabled and configured.
Recovery:
1. Enable and configure one or more DHCP servers and retry the command.
2. See the **"**Security Network DHCP Group**"** commands on pages 105-107.

Message:
Port x is already included in aggregation x
The aggregation does not exist
Meaning: You tried to aggregate a port in more than one Aggregation ID, or you tried to delete a non-existent aggregation.
Recovery:
1. Use the "show" version of the Aggregation commands or the 'aggr lookup' command to verify the correct syntax of <aggr_id>.
2. Try deleting another aggregation. See the "aggregation add" command on page 141.
3. Try adding a different aggregation. See the "aggregation delete" command on page 142.

Message: **Port x is already included in a static aggregation**
Meaning: You tried to set or display the LACP Role or the LACP Key, but one already exists.
Recovery:
1. See the 'LACP Key' command on page 144.
2. See the 'LACP Role' command on page 145.

Message: **No LLDP entries found**
Meaning: You entered an "lldp info" command to display existing (configured) LLDP neighbor device information, but no LLDP neighbors exist.
Recovery:
1. Make sure one or more neighbor devices are configured.
2. Verify the <port_list> parameter entered.
3. See the "LLDP Commands" on pages 147-152.

Message: **No LLDP-MED entries found**
Meaning: You entered the "lldpmed info" command to show LLDP-MED neighbor device information, but no LLDP-MED neighbors exist.
Recovery:
1. Make sure one or more neighbor devices are configured.
2. Verify the <port_list> parameter entered.
3. See the "lldpmed info" command on page 153.

Message: **EVC x does not exist**
Meaning: You entered an "EVC Lookup" or "EVC Delete" command but the specified EVC does not exist.
Recovery:
1. Verify that an existing EVC ID (1-128) exists.
2. Create a new EVC if required.
3. Retry the command with a proper <evc_id> parameter entry. See the "evc lookup" or "evc delete" commands on pages 166-168.

Message: **Invalid parameter: w**
Meaning: You entered an **eps create** command, but the command failed.
Recovery:
1. Use the "**eps state**" command to verify the current state.
2. See the "EPS Create" command on page 171 for specific parameter requirements.

Message: **Operating on an instance not created**
Meaning: You entered an **eps** command, but the instance requested does not yet exist.
Recovery:
1. Use the **eps state** command to verify the current eps configuration.
2. Verify the <inst> parameter entry.
3. See the "EPS Commands" section on page 171.

Messages:
'instance' and 'enable|disable' required
Invalid number of peer's for this configuration
Invalid parameter error returned from MEP
MEP instance is not enabled
Meaning: You entered a MEP command but the command failed.
Recovery:
1. Review the particular command syntax and description.
2. Verify and re-enter the MEP command parameters.
3. See "MEP Commands" on page 175.

Messages:
Invalid parameter: 6660000
QCL Add failed: classified parameter missing
Meaning: You entered a QoS command but the command failed. For example:

```
QoS>port queueshaper rate 1 4 6660000
Invalid parameter: 6660000
```

Recovery:
1. Use the "show" version of the Aggregation commands
2. Verify the QoS command syntax.
3. See the "QoS Commands" on pages 187-209.

Message:
Download of LIB-4400fw from 192.168.1.30 failed: Operation timed out.
Error: Flash is already updated with this image
Meaning: The firmware download failed or has already been updated to this version. For example:

```
>firmware load 192.168.1.30 LIB-4400fw.dat
Download of LIB-4400fw from 192.168.1.30 failed: Operation timed out.
>firmware load 192.168.1.30 LIB-4400-v0.3.0.dat
Downloaded "LIB-4400-v0.3.0.dat", 3561451 bytes
Error: Flash is already updated with this image
>
```

Recovery:
1. Enter the "firmware information" command to display information about the Active (current) and Alternate (available) firmware images.
2. Make sure the TFTP server is configured and running.
3. Verify the command syntax. See "Firmware Commands" on pages 212-214.
4. Check the TN web site for a more recent firmware version.

Message:
east and west ports are same
failed in setting rpl block
given port is not configured either east or west for this group
given protection group does not exists
hold off should be configured in multiples of 100 ms - Invalid <hold_timeout> parameter: 1
incorrect error code = 36
incorrect error code = 37
incorrect error code = 4294967295
Invalid <group-id> parameter: 0
Invalid <rpl_port> parameter: 0
node is configured as neighbour for given group, can not set as rpl
this node is rpl owner for given protection group
vlans can not be deleted for this protection group
Meaning: You entered an ERPS command but the command failed.
Recovery:
1. Review the particular command syntax and description.
2. Verify and re-enter the ERPS command parameters.
3. See "ERPS Commands" on pages 240-246.

Messages:
E link_oam 22:53:06 61/eth_link_oam_mgmt_port_mib_retrival_oper_set#849: Error: Unable to retrive the mode of the port(1/43)
E link_oam 23:02:10 61/eth_link_oam_mgmt_port_mib_retrival_oper_set#910: Error: Error:7 occured while building MIB variable on port(1/0)
Requested configuration is already configured on port(1/1)
Meaning: The "loam mib-retrival-support" command or "loam variable-retrieve" command failed.
Recovery:
1. Click the browser's back button to clear the message, verify your selection, and then try the operation again.
2. Verify the requested configuration.
3. See "LOAM Commands" on pages 247-258.

Messages:
Invalid request on this port
Link OAM is not enabled on the port(1/1)
Requested configuration is not supported with the current OAM mode on port(1/1)
Requested operation is already in progress
Meaning: You entered a LOAM command (e.g., loam variable-retrieve), but the command failed.
Recovery:
1. Review the particular LOAM command syntax and description.
2. Verify and re-enter the LOAM command parameters.
3. See "LOAM Commands" on pages 247-258.

Messages:
Deleting Protocol to Group mapping Failed
Invalid <mac_addr> parameter: 11:22:33:44:55:66
Meaning: The attempted VCL command failed.
Recovery:
1. Review the specific VCL command syntax and description.
2. Verify the <*mac_addr*> parameter.
3. See "VCL Commands" on pages 276-279.

Message: **MVRP is not enabled Globally.**
Meaning: You entered a command to set or show the MRP rrole ('restricted role') configuration, but did not first enable MVRP globally.
Recovery:
1. Enable MVRP globally before this command will function; use the **mvrp rrole enable** command.
2. Re-try the **mvrp control enable** command.
3. See "MVRP Commands" on pages 285-288.

Problem: **CPU can be overloaded by broadcast packets, causing loss of management**.
LIB-4400 receiving excess broadcast packets causes loss of management.
Meaning: LIB-4xxx CPU overload and loss of management occur even when STP is discarding all packets from the port that the broadcasts are from, and when QoS Storm Control is configured to limit broadcast packets to rates as low as 1pps.
Recovery:
1. Enable Loop Protection.
2. See "Loop Protection Configuration".

Problem: **Ingress Bandwidth profiling on Port doesn't allow for bursty TCP flows.**

Meaning: The Port ingress policers work fine for traffic generation for normal L2 traffic streams. For TCP flow which is bursty in nature, the resultant bandwidth is very poor close to 10% of the set rate.

The issue can be that the leaky bucket for port ingress policer may not be set correctly to accommodate for the bursts mainly for TCP control frames.

Recovery:

1. Use EPL service which allows for bursty traffic flow.
2. See "Ethernet Services" on page 99.

Problem: **MEP not working over link aggregation.**

Meaning: Protocols above the LAG layer don't seem to consider the LAG group as a logical port (e.g., SOAM over an aggregated link). A MEP does not view the LAG group as a logical port; for example, if you:

1. Create an EVC with all LAG groups' ports in NNI.
2. Create a LAG group.
3. Create MEPs on the EVC (e.g., EVPL) service on UNI and NNI ports. Note that since a MEP has a residence port attached to it even though it's an EVC MEP, this creates issue when the residence port is down and CCMs are to be carried over the other ports. This creates faults on the MEP, possibly because of the MAC address being used in the CCMs.

Recovery: This is a deployment issue.

1. Use MEP on EVC instead; this is orthogonal to any aggregation. For a service running over an aggregation, just add all port to the NNI.

Problem: **Management Port EtherType 9100 does not function**

Meaning: When Management Port Ethertype Customer S-port is set to 9100, LIB-4xxx access via Port 9 (MGMT port) is lost. This is a known issue with a fix in process, available at the next LIB-4xxx version release.

Recovery:

1. Make sure you are running the latest version of LIB-4xxx software; upgrade if a newer version is available.
2. If possible, use the LIB-4xxx MGMT PORT.
3. If possible, use Ethertype 88A8 or 8100. See the "Ports" description on page 225.
4. Verify the APS and MEP configurations.
5. Retry the operation.

Problem: **When ERPS is configured using a separate APS and SF MEPs, the LIB-4xxx will crash. The separate APS MEP is configured with CCM disabled and APS enabled.**
Meaning: This is a known issue with a fix in process; available at the next LIB-4xxx version release.
The LIB-4xxx boot script runs, and a series of messages displays:

Warning: conf_sec_open failed or size mismatch, creating defaultsW erps 00:00:01 29/erps_init#1315: Warning: conf_sec_open failed or size
mismatch, creating defaultsW link_oam 00:00:01 29/eth_link_oam_init#3012: Warning: conf_sec_open failed or size mismatch, creating
defaultsPassword:
Login in progress...
Invalid username or password!
Username: adminPassword:
Login in progress...
Welcome to Net2Edge Ltd. Command Line Interface (v1.0).
Type 'help' or '?' to get help.

Recovery:
1. Check the IP configuration. At the CLI prompt type **ip conf'** and press **Enter**. For example:

```
>ip conf
IP Configuration:
=================

DHCP Client       : Enabled
IP Address        : 192.0.2.1
IP Mask           : 255.255.255.0
IP Router         : 0.0.0.0
VLAN ID           : 1
```

3. Make sure you are running the latest version of LIB-4xxx software; upgrade if a newer version is available.
4. Verify the APS and MEP configurations. See the related sections of this manual.
5. Retry the operation.

Message: **fis load fails after firmware upgrade**. The 'fis load -d nanaged' fails with one of the following errors after firmware upgrade:

decompression error: invalid block type
decompression error: invalid stored block lengths

Meaning: Flash Corruption and SPI Bus Access bug.
Recovery:
1. Boot managed.bk and run the firmware upgrade again.
2. When running the firmware upgrade again does not work, reprogramming the flash image has worked. Contact TN Support for direction.

Problem: **Auto Negotiation between a 2.5G port and a 1G port does not work in LIB-4400 v1.0.**
Meaning: A check was added '&& (conf->speed == VTSS_SPEED_1G)', but 2.5G was missed.
The LIB-4xxx software reads the SFP module and configures the link accordingly. On some systems it is not possible to read the SFP module via the I2C interface and this is the reason for the faulty behavior.
This is a known issue with a fix in process; available at the next LIB-4xxx version release.
Recovery:
1. Make sure you are running the latest version of LIB-4xxx software; upgrade if a newer version is available.
2. Verify the port and auto-negotiation configurations. See the related sections of this manual.
3. Retry the operation.

Problem: **Security level 11 appears to be equivalent to level 1**

Meaning: When running at security level 11, only commands that work at levels 1 - 4 will display via the help, and do not seem to be otherwise available. This is a known issue with a fix in process, available at the next LIB-4xxx version release.
Recovery:
1. Do not use Security Level 11. Use Levels 10 and 12-14 instead.

Problem: **Security level 1 help does not display correct results.**
Meaning: Entering "S ?" in the CLI running under level 1 displays commands that do not work in level 1, and do not begin with the letter "s". The "System" command is available in limited form, but to get that information, "sy ?" must be entered. This is a known issue with a fix in process, available at the next LIB-4xxx version release.
Recovery: Use the "**sy ?**" command instead of the "**S ?**" command. For example:
1. Enter an "**S ?**" command which displays:

```
Command Groups:
--------------------------------------------------------------------------
Switch : Switch security
Network : Network security
AAA : Authentication, Authorization and Accounting

Type '<group>' to enter command group
Type '<group> ?' to get group help
```

2. Enter an "**sy ?**" command which displays:

```
Available Commands:

System Configuration [all | (port <port_list>)]
System Log Configuration
System Version
System Log Lookup [<log_id>] [all|info|warning|error]
```

Problem: Errors displaying **Sys Log Lookup** command data.
Meaning: A series of cli_parser command errors display with the “sys log lookup” command. For example:

```
sys log lookup
Number of entries:
Info : 5
Warning: 0
Error : 176
All : 181
ID Level Time Message
-------------------------------------------------------------------------------
1 Info - Switch just made a cool boot.
2 Info 1970-01-01T00:00:02+00:00 Using primary power source.
3 Info 1970-01-01T00:00:09+00:00 Link up on port 1
4 Info 1970-01-04T02:51:12+00:00 Link down on port 1
5 Info 1970-01-04T02:51:46+00:00 Link up on port 1
6 Error 1970-01-07T00:08:56+00:00 E cli 97/cli_parse_command#2864: Er ...
7 Error 1970-01-07T00:08:56+00:00 E cli 97/cli_parse_command#2879: Er ...
8 Error 1970-01-07T00:08:56+00:00 E cli 97/cli_parse_command#2879: Er ...
9 Error 1970-01-07T00:08:56+00:00 E cli 97/cli_parse_command#2879: Er ...
```

Recovery:
1. Make sure you are running the latest version of LIB-4xxx software; upgrade if a newer version is available.
2. If possible, use the existing information as displayed.

Problem: the input **n ? ?** displays internal errors.

Meaning: Entering the command "**n > ?**" causes 'parse_command' internal error 2879 to display repeatedly. For example:

```
test1:/>n ? ?
E cli 139/cli_parse_command#2864: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli parse command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
E cli 139/cli_parse_command#2879: Error: Internal error
```

Recovery:
1. Make sure you are running the latest version of LIB-4xxx software; upgrade if a newer version is available.
2. If possible, use the existing information displayed, or try using another CLI command.

Problem: Can no longer HTTPS browse to LIB-4xxx after new certificate is generated.
Meaning: Initially enabling HTTPS and browsing to the LIB-4xxx with HTTPS works. However, if a new certificate is generated, any web browser that previously navigated the LIB-4xxx via https (using the old certificate) can no longer HTTPS browse the LIB-4xxx.This may be because when a new certificate is generated, it re-uses the original certificate's serial number. This is a known issue with a fix in process, available at the next LIB-4xxx version release.
Recovery:
1. Make sure you are running the latest version of LIB-4xxx software; upgrade if a newer version is available.
2. If possible, use the existing certificate.

Message:

eth: DAD detected duplicate IPv6 address ::c000:0201: NS in/out=0/3, NA in=1
eth: DAD complete for ::c000:0201 - duplicate found
eth: manual intervention required
possible hardware address duplication detected, disable IPv6

Meaning: A possible hardware address duplication was detected.
During the stateless autoconfiguration process, duplicate address detection verifies the uniqueness of new unicast IPv6 addresses before the addresses are assigned to interfaces (the new addresses remain in a tentative state while duplicate address detection is performed). Duplicate address detection is performed first on the new link-local address. When the link local address is verified as unique, then duplicate address detection is performed on all other IPv6 unicast addresses on the interface.
Duplicate address detection is suspended on interfaces that are administratively down. While an interface is administratively down, the unicast IPv6 addresses assigned to the interface are set to a 'pending' state. An interface returning to an administratively up state restarts duplicate address detection for all of the unicast IPv6 addresses on the interface.
When a duplicate address is identified, the state of the address is set to 'Duplicate', the address is not used, and the above error message displays.
If the duplicate address is a global address, the address is not used. Recovery is automatically performed.
If the duplicate address is the link-local address of the interface, the processing of IPv6 packets is disabled on the interface.
Recovery:
1. Provide a valid, unique IPv6 address for this LIB-4xxx.
2. Enter the **ip config** command to verify the current IP configuration settings.
3. Disable IPv6 temporarily, retry the operation, and then enable IPv6 again.
4. Disable IPv6 Auto Configuration temporarily, retry the operation, and then enable IPv6 again.
5. When successful , the new message "**DAD complete for ::c000:0201 -9 - no duplicates found**" displays.

Message:

Backup Error
HTTPS Certificate Generate Error
Restore Error

Meaning: A problem was detected in the privilege level checks for TN web pages.
Recovery:
1. Check the user privilege level to make sure the current level assigned has access to the attempted function.
2. Either try another command or have the user privilege level changed to a higher level.
3. Contact TN support if the problem persists.

Message: *>E api 00:28:25 57/vtss_vcap_add#640: Error: VCAP IS1: Could not find ID: 2*
E web 00:28:25 57/handler_config_evc_edit#311: Error: evc_mgmt_add(0): failed
Meaning: At the LIB-4xxx **Configuration** > **Ethernet Services** menu path, you tried to set up the ECE before setting up the related EVC.
At the CLI, you entered one of the EVC ECE commands before entering the related EVC commands.
Recovery: Set up the EVC before trying to set up the ECE.

Message: **1 Error 1970-01-01T00:00:00+00:00 E misc 00:00:00 26/hpic_spi_init_st ...**
Meaning: An internal incompatibility exists.
Recovery:
1. Check the current firmware version and upgrade as necessary.
2. Reboot your computer.
3. Contact TN Support.

Message: **arp: 00-c0-f2-21-b8-c4 is using my IP address 192.168.1.110!**
Meaning: An IP address confict exists.
Example 1:

```
>ip setup 192.168.1.110 255.255.255.0 192.168.1.1
>arp: 00-c0-f2-21-b8-c4 is using my IP address 192.168.1.110!
```

Example 2:

```
>config backup bin 192.168.1.30 v1.1.1bucfg
arp: 00-c0-f2-21-b8-c4 is using my IP address 192.168.1.110!
arp: 00-c0-f2-21-b8-c4 is using my IP address 192.168.1.110!
arp: 00-c0-f2-21-b8-c4 is using my IP address 192.168.1.110!
arp: 00-c0-f2-21-b8-c4 is using my IP address 192.168.1.110!
arp: 00-c0-f2-21-b8-c4 is using my IP address 192.168.1.110!
tftp client put failed: 8
>
```

Recovery:
1. Check the current '**ip config**' parameters and change as necessary.
2. Reboot your computer.
3. Contact TN Support.

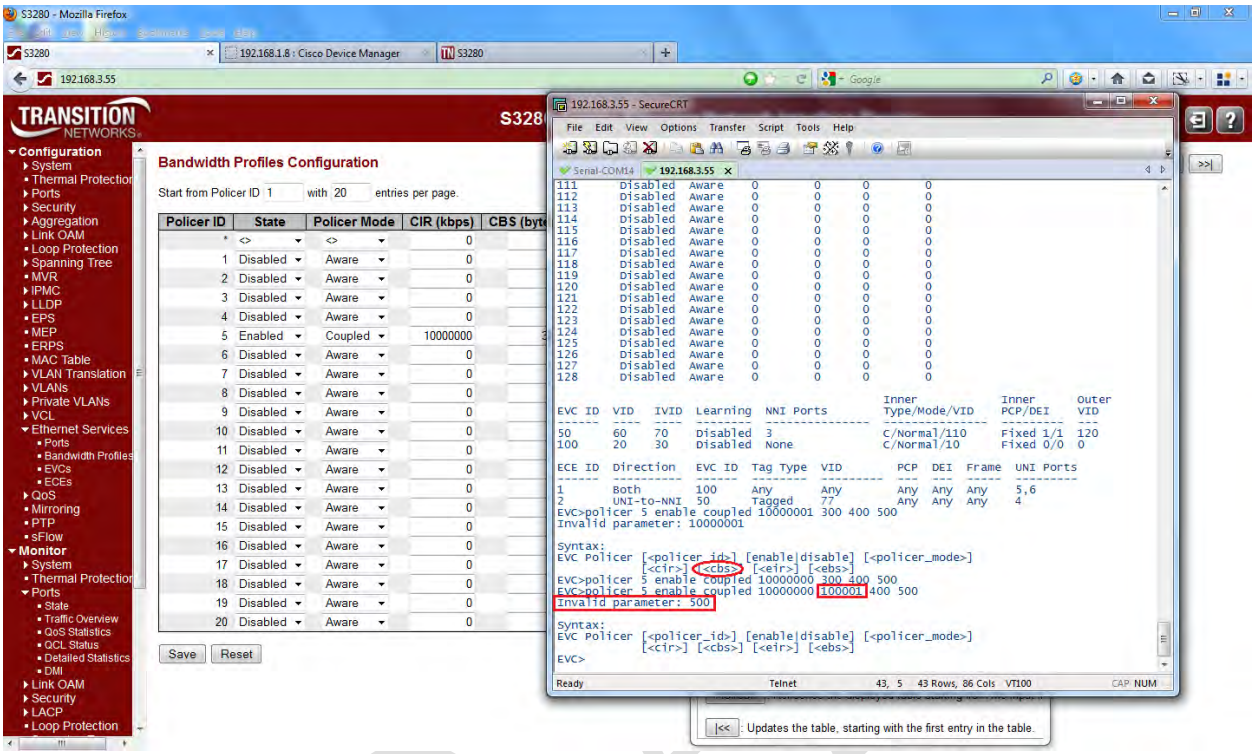
Message: **Username: W ptp 00:00:00 00.921,452 31/ptp_conf_read#926: Warning: version mismatch, creating defaults**
Meaning: The new version that you uploaded does not match the current version settings. Message displays via CLI whether the Upload was via CLI or Web interface.
Recovery:
1. Press the **Enter** button to display the Password prompt and re-log in.
2. Contact TN Tech Support.

Message: **W mvr 02:25:04 48/_mvr_vlan_warning_handler#4230: Warning: Please adjust the management VLAN ports overlapped with MVR source ports!**
Meaning: At **Configuration** > **MVR** > **VLAN Interface Setting** you set a Port Role to S:Source or R:Receiver, and that setting is in conflict with a Management VLAN port setting.
Recovery:
1. Cycle power.
2. Log in again via CLI.
3a. CLI: enter the **config default keep** command and press **Enter**.
3b. Web interface: at **Maintenance** > **Factory Defaults** select **Yes**.

Problem: **When the FDB table reaches 8192 entries, a new dynamic MAC will be learned and override the old one.**
Description: When the MAC table is full (8192 entries), the switch learns new entries and purges older entries even though these entries are not aged. This is the expected behavior. The MAC table is implemented so that it will always store the most active entries. The least recently used entries are removed to provide storage for new entries. The benefit of this approach is that in a normal network, flooding is kept to a minimum when the MAC table becomes full. This occurs even when aging is disabled. This behavior is not configurable.
Resolution:
1. Apply Port- or MAC-based authentication (IEEE802.1X).
2. Set up a per-port MAC table limit, preventing an intruder from taking up too much of the MAC table. For example, if a port is limited to 64 entries in the MAC table, frames causing this limit to be exceeded are discarded, and the MAC table is not affected.
3. Set up additional Storm Policers to prevent flooding on an unknown MAC address. See the **Configuration** > **QoS** section.

Problem: The "psec_limit" cannot work when configuration "limit" is "1024".
Description: This is a Port Security Limit Control issue where the software is unable to process the new Mac address frames in time. It is receiving frames faster than it can add to the Mac table and in turn looks likes it is losing frames, thus not reaching the limit. In a normal scenario if new Mac addresses turns up for example, once a second, it will work. But in case of an attack of new Mac address, then the port won't shutdown, but it won't switch these frames either. The LIB-4xxx works fine when tested at 5 frames/second.
Resolution:
1. Decrease the limit to less than 200 (e.g., (security network limit limit 194).
2. Check for upgrades with a fix to this known problem.

Message / Problem: **"Invalid parameter" message displays when a valid parameter entered**
Meaning: This is not an error. This is the intended way the parser works by design. If you set CBS value to 100001, you would expect that since this is an invalid value, a warning should display that the 100001 entry is invalid, but it displays the wrong information that the EBS value is invalid.
Example:



The command syntax is: `EVC Policer [<policer_id>] [enable|disable] [<policer_mode>] [<cir>] [<cbs>] [<eir>] [<ebs>]`
When entered as **EVC Policer 1 enable aware 4 1000001 1 1**

1. **4** is tried as cir and succeeds.
2. **1000001** is tried as **cbs** but fails.
3. **cbs** is optional so **1000001** is tried as **eir** and succeeds.
4. **1** is tried as **ebs** and succeeds.
5. There are no parameters left to match, so the remaining **1** returns an error.

If you enter the command without the last parameter 1, it will succeed and you can see which parameters were filled:

```
>EVC Policer 1 enable aware 4 1000001 1
>EVC Policer 1
Policer  State     Mode      CIR       CBS     EIR       EBS
-------  --------  -------   -------   -----   -------   ----
1        Enabled   Aware     4         0       1000001   1
>
```

Message: **E web 00:10:06 60/httpd_form_get_value_int#799: Error: Unknown form. Form name = thermal_port_prio_12, form_value = 12**
Meaning: A discrepancy exists in the thermal port or thermal priority configuration.
Recovery:
1. Verify the "**thermal**" command parameters.

Message:
R-APS is only allowed in port domain (via either CLI or web interface)
Meaning: You tried to select an invalid MEP configuration.
Recovery:
1. Select another port domain parameter.
2. See "MEP Commands" on page 216.

Message: **VLAN is not created on this VID** (via either CLI or web interface)
Meaning: A VLAN was not created for this VLAN ID.
Recovery:
1. Configure the VLAN and VCL properly. See the related sections of this manual.
2. Add a new peer MEP.
3. See "MEP Commands" on page 216.

Message: **Peer MAC should be non-zero for HW Generated CCM** (via either CLI or web interface)
Meaning: A Peer MAC is needed for CCM rates 300f/sec and 100f/sec. The value of '300s|100s|10s|1s|6m|1m|6h' is the number of CCM frames per second. The values 300s and 100s require that the peer MAC address be non-zero.
Recovery:
1. For CCM rates 300f/sec and 100f/sec, make sure that that the peer MAC address is non-zero.
2. Select another CCM rate.
3. See "MEP Commands" on page 216.

Problem: ***'System Restore Default' hangs intermittently and indefinitely.***
Meaning: This appears to only happen when an EVC/ECE is configured. In LIB-4xxx with v1.2.1 and above, EVC and ECE configurations are removed when you execute a System Restore via the web (**Maintenance** > **Configuration** > **Restore Binary**) or via the CLI (**config restore binary** command).
Recovery:
1. If the EVC/ECE is removed before defaulting then the command will not hang.
2. Upgrade the LIB-4xxx to the latest software version.

Message:
E snmp 22:02:10 8/snmpDMINotification#442: Error: Notification for dmi failed due to insuffcient memory.
E snmp 22:02:11 8/trap_bind_var#172: Error: FATAL: cannot malloc in trap_bind_var
Meaning: An LIB-4xxx memory error condition exists.
Recovery:
1. Re-configure the recent configuration changes.
2. Upgrade the LIB-4xxx to the latest software version.

Message:
W conf 02:44:14 60/conf_tn_bin_restore#1076: Warning: config buffer is invalid
W web 02:44:14 60/handler_config_restore_binary#405: Warning: Restore from binary config failed
Meaning: A failure occurred during a Restore procedure.
Recovery:
1. Verify the restore file name and size, and re-try the operation.
2. See the "Configuration Management Commands" on page 26.
3. Upgrade the LIB-4xxx to the latest software version.

Problem: At **Configuration** > **Ethernet Services** > **Bandwidth Profiles** in the "Bandwidth Profiles Configuration" table, the numbers in the CIR (kbps) CBS (bytes) EIR (kbps) EBS (bytes) columns are different than expected.
Meaning: EVC BWP rates are now calculated from layer 2. Software versions 1.2.2 and before are based on Line rate (level 1) in BWP; versions 1.2.3 and above are based on Data rate (level 2) in BWP (per MEF CE2.0).
Recovery:
1. Reconfigure the "Bandwidth Profiles Configuration" table parameters.
2. See the "Set / Show EVC Policer" ("evc policer" command on page 220.

Message: *Setting Tx mirroring for mirror port (port %lu) has no effect. Tx mirroring ignored.*
Meaning: At Configuration > Mirroring > Mirror Port Configuration table, if you set an invalid value to the Mirroring Mode, this SNMP error displays.
Recovery:
1. Select a valid Mirror Mode entry (e.g., enable, disable, rx, or tx).
2. See "Mirroring Configuration" on page 316.

Message:
syslog Clear Level = %ld
syslog message get info fail!
syslog server address to set is: %s
Testing syslog number %d (prefix: Debug, Info, Warning, etc.)
Meaning: You entered an invalid Syslog entry.
Recovery:
1. Select a valid Syslog entry.
2. See "Log (System Log) Configuration" on page 32.

Message:
txt2ipv4 failed for tnIpAddr = %s (IP Mgmt Table Entry)
txt2ipv4 failed for tnSubnetMask = %s(IP Mgmt Table Entry)
Configuration failed (DefaultGateway table entry)
Meaning: An error occurred when configuring the DNS Server table.
Recovery:
1. Select a valid DNS entry at **Configuration** > **System** > **IP**.
2. See "IPv4 Configuration" on page 20.

Message: Using IPv6 link-local address is not allowed here.
Meaning: You entered an invalid IP address.
Recovery:
1. Enter a valid IP command in the correct format.
2. See "IP Commands" on page 28.

Messages:
Username: E ptp/interface 00:00:30 31/ptp_socket_init#1609: Error: binding error
W packet 20/RX_callback#819: Warning: Module PTP has spent more than 1 second (2 0380 msecs) in its Packet Rx callback
Meaning: An error occurred during PTP configuration or operation.
Recovery:
1. Review the specific PTP configuration or operation for invalid parameter entries.
2. See "PTP Commands" on page 277.

Messages:
Aggregation Error - Port joining aggregation must be in the same speed and in full duplex
Group 1 member counts error!! Local aggregation must include 2-16 ports.
LACP Error - LACP and Static aggregation can not both be enabled on the same ports
Meaning: You configured a port for both LACP and Static aggregation, which is not supported. For example, at **Configuration** > **Aggregation** > **Static**. and at **Configuration** > **Aggregation** > **LACP** you configured a port for both LACP and Static aggregation, which is not supported.
Recovery:
1. Click the browser 'Back' button to clear the message.
2. Make sure each port has one configuration (either LACP or Static aggregation) enabled.
3. Verify the aggregation path configuration, click Save, and continue operation. See the "Aggr (Aggregation) Commands" section on page 179.
4. If a problem persists, contact TN Tech Support.

Message:
NOT possible to make Manual To Selected if not in locked mode\n
Port nominated to a clock source is already nominated
Meaning: A PTP config error occurred.
Recovery:
1. Re-enter the PTP command.
2. See "PTP Commands" on page 277.

For EtherSAT messages, see the *RFC 2544 User Guide* manual.

System Log Messages

The LIB-4xxx displays four levels of syslog messages as explained below. Note that the **All** level displays all three levels of information that the LIB-4xxx can logged (Info, Warning, and Error).

```
>system log lookup
Number of entries:
Info   : 7
Warning: 0
Error  : 5
All    : 12

ID    Level   Time                        Message
----  ------  --------------------------  -------
   1  Info    -  Switch just made a cool boot.
   2  Info    1970-01-01T00:00:02+00:00  Link up on port 6
   3  Info    1970-01-01T00:00:02+00:00  Using primary power source.
   4  Info    1970-01-01T00:00:07+00:00  Link up on port 3
   5  Error   1970-01-01T00:26:54+00:00  VLAN Port Configuration Ingress Fil ...

   6  Error   1970-01-01T00:26:54+00:00  VLAN Port Configuration Ingress Fil ...

   7  Error   1970-01-01T00:26:54+00:00  VLAN Port Configuration Ingress Fil ...

   8  Error   1970-01-01T00:26:54+00:00  VLAN Port Configuration Ingress Fil ...

   9  Info    1970-01-01T03:31:43+00:00  Link down on port 6
  10  Info    1970-01-04T01:15:48+00:00  Link down on port 3
  11  Info    1970-01-04T01:15:54+00:00  Link up on port 3
  12  Error   1970-01-04T01:15:54+00:00  VLAN Port Configuration Ingress Fil ...

>
```

Info Level Messages

These are the Information level messages of the system log. These are normal operational messages used for reporting, measuring throughput, etc. This level of message requires no action.

Table 3. Syslog Info Messages

Info Level Message	Description
Switch just made a cold boot.	The LIB-4xxx was restarted. See "**Maintenance** > **Restart Device**". No action required.
Link up on port x	The most recent link status on the port *x* is 'link up'. Port Link is up - no action needed.
Link down on port x	The most recent link status on the port *x* is 'link down'. See **Configuration** > **Ports** > **Port Configuration**. No action required.
Using primary power source.	Normal power on operation. No action required.
Frame of 243 bytes received on port 1MAC	Normal frame size information. No action required.
Port 1 shut down	Normal port shutdown information. No action required.

Warning Level Messages

These messages are the Warning level of the system log. These Warning messages are not an error, but an indication that an error will occur if action is not taken (e.g. file system 85% full). Each item must be resolved within a given time.

Table 4. Syslog Warning Messages

Warning Level Message	Description
E api/cil 17:42:26 29/l26_action_check#6036:	ACL policer and EVC policer can not both be enabled. Disable one or the other.

Error Level Messages

Error level messages of the system log. These non-urgent failures should be relayed to a developer or an administrator.

Each item must be resolved within a given time.

Table 5. Syslog Error Messages

Error Level Message	Description
E api/cil 17:42:45 29/l26_acl_policer_free#6069:	Error: policer 0 already free. The EVC policer or ACL policer. See the related section of this manual.
VLAN Port Configuration Ingress Filter Conflict - MSTP	Verify the Ingress Policers, Port Policing, or Queue Policing configuration. See the **Configuration** > **Security** > **Network** > **ACL** or the **Configuration** > **QoS** menu path.
VLAN Port Configuration Ingress Filter Conflict - ERPS	Verify the ERPS, VLAN, and port configurations. See the related section of this manual.

Note that the **All** level displays all three levels of information that the LIB-4xxx can logged (Info, Warning, and Error).

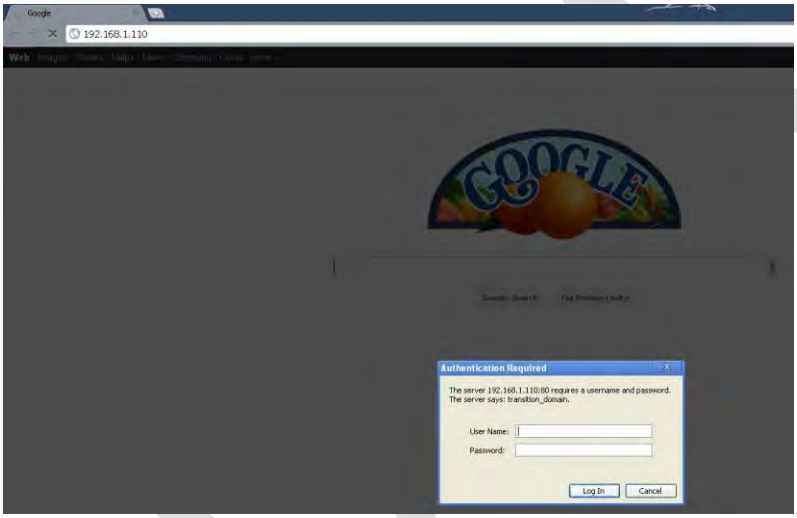
Third Party Program Messages

The LIB-4xxx displays error and information messages from various third party applications, such as Internet Explorer, HyperTerminal, PuTTY, etc. This section lists the messages, provides an example, and discusses the message meaning of and possible recovery steps.

Message: **PuTTY Security Alert - The server's host key is not cached in the registry**.

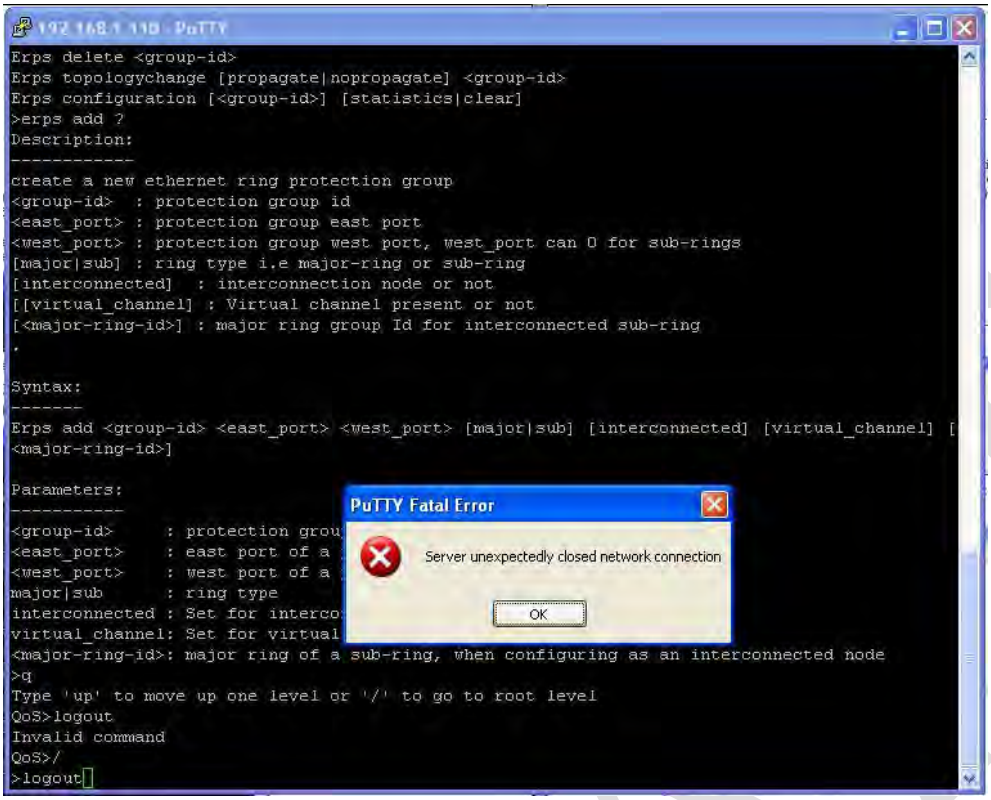
Meaning: Normal PuTTY login security message.
Recovery: Click the **Yes** button to trust this host, add the key to the PuTTY cache, and clear the message.

Message: **Authentication Required**



Meaning: Normal Google Chrome login screen.
Recovery: Enter your LIB-4xxx User Name and Password, and click the **Log In** button.

Message: **PuTTY Fatal Error - Server unexpectedly closed network connection**



Meaning: The PuTTY application suffered a fatal internal error.
Recovery:
1. Click the **OK** button to close the message dialog box.
2. Close the PuTTY session window.
3. Start a new PuTTY session.

Message: **Unknown parameter:** [<dmirxpwrintthr>]
Example:

```
>port dmi
Unknown parameter: [<dmirxpwrintthr>]
>
```

Meaning: The parameter you entered was not recognized.
Recovery:
1. See the related command section for specific information.
2. Make sure the LIB-4xxx firmware is the latest and upgrade if a newer version is available.

Message: **PuTTY Fatal Error - Network Error: Software caused connection abort**

Meaning:
Recovery:
1. Click the **OK** button to clear the PuTTY message.
2. Exit the PuTTY screen.
3. Start a new PuTTY session and log in to the LIB-4xxx.
4. Verify the command entered and retry the operation.
5. If the problem persists, contact TN Tech Support.

Recording Model and System Information

After performing the troubleshooting procedures, and before calling or emailing Technical Support, please record as much information as possible in order to help the TN Technical Support Specialist.

1. From the CLI, use the commands needed to gather the information requested below (e.g., **system config**, **system log config**, **system version**, **ip config**, or others as request by the TN Tech Support Specialist.)

   From the web interface, select the **Monitor** > **System** > **Information** menu path.

2. Record the **system information** for your LIB-4xxx.

   Software ID _____ Product ID _____

   Serial # _____ FPGA Version _____

   Chip ID _____ ____ System Date _____

   System Uptime _____ Software Version _____

   Software Date _____ ZTP Auto Disc: _____

   Operating System: _____ Web Browser: _____

3. Provide additional Model and System information to your Technical Support Specialist. See “Basic Troubleshooting” in the *LIB-4400/LIB-4424/ User Guide* manual.

   Your Net2Edge Ltd. service contract number: _____

   Describe the failure: _____

   _____

   _____

   _____

   _____

   Describe any action(s) already taken to resolve the problem (e.g., rebooting, troubleshooting steps, etc.):

   _____

   _____

   _____

   The serial and revision numbers of all involved Net2Edge Ltd. products in the network:

   _____

   _____

   _____

Describe your network environment (layout, cable type, etc.): _____

_____

_____

_____

_____

Network load and frame size at the time of trouble (if known): _____

_____

_____

The device history (i.e., have you returned the device before, is this a recurring problem, etc.):

_____

_____

_____

Any previous Return Material Authorization (RMA) numbers: _____

_____

_____

Technical Support

Technical support is available at: +44-345-0130030, xtn 6810

E-Mail	Ask a question anytime by sending an e-mail message to our technical support staff: support@net2edge.com
Address	Net2Edge Ltd. Kulite House, Stroudley Road, Basingstoke RG24 8UG, UK. Tel: +44 345 0130030

CLI Command Summary by Group

The LIB-4xxx has 33 command groups and approximately 500 commands. Note that the item numbers below are added for reference purposes only.

Command Groups

```
>help
General Commands:
-----------------
1.  Help/?: Get help on a group or a specific command
2.  Up    : Move one command level up
3.  Logout: Exit CLI

Command Groups:
---------------
4.  System     : System settings and reset options
5.  Conf       : Configuration management
6.  Loop       : Loop Protection
7.  IP         : IP configuration and Ping
8.  Port       : Port management
9.  MAC        : MAC address table
10. VLAN       : Virtual LAN
11. PVLAN      : Private VLAN
12. Security   : Security management
13. STP        : Spanning Tree Protocol
14. Aggr       : Link Aggregation
15. LACP       : Link Aggregation Control Protocol
16. LLDP       : Link Layer Discovery Protocol
17. SyncE      : Ethernet Syncronization
18. EVC        : Ethernet Virtual Connections
19. EPS        : Ethernet Protection Switching
20. MEP        : Maintainence entity End Point
21. QoS        : Quality of Service
22. Mirror     : Port mirroring
23. Firmware   : Download of firmware via TFTP
24. PTP        : IEEE1588 Precision Time Protocol
25. MVR        : Multicast VLAN Registration
26. ERPS       : Ethernet Ring Protection Switching
27. LOAM       : Ethernet Link OAM
28. Loop Protect: Loop Protection
29. IPMC       : MLD/IGMP Snooping
30. VCL        : VLAN Control List
31. EtherSAT   : Ethernet Service Activation Testing

Type '<group>' to enter command group, e.g. 'port'.
Type '<group> ?' to get list of group commands, e.g. 'port ?'.
Type '<command> ?' to get help on a command, e.g. 'port mode ?'.
Commands may be abbreviated, e.g. 'por co' instead of 'port configuration'.
>
```

General Commands

1. Help/?: Get help on a group or a specific command
2. Up : Move one command level up
3. Logout: Exit CLI

System Commands

4. System Configuration [all | (port <port_list>)]
5. System Log Configuration
6. System Timezone Configuration
7. System Version
8. System Log Server Mode [enable|disable]
9. System ZTP Auto Discovery [enable|disable]
10. System Name [<name>]
11. System Timezone Offset [<offset>]
12. System Contact [<contact>]
13. System Log Server Address [<ip_addr_string>]
14. System Timezone Acronym [<acronym>]
15. System DST Configuration
16. System Location [<location>]
17. System Log Level [info|warning|error]
18. System DST Mode [disable|recurring|non-recurring]
19. System DST start <week> <day> <month> <date> <year> <hour> <minute>
20. System Log Lookup [<log_id>] [all|info|warning|error]
21. System DST end <week> <day> <month> <date> <year> <hour> <minute>
22. System Log Clear [all|info|warning|error]
23. System Reboot
24. System Date
25. System DST Offset [<dst_offset>]
26. System Powersupply Present [<power_supply>]
27. System Load
28. System ZTP Auto Discovery [enable|disable]
29. System Banner Exec [<exec-banner-txt>]
30. System Banner Login [<login-banner-txt>]
31. System Banner MOTD [<motd-banner-txt>]

Config Commands

32. Config Backup Binary <hostname> <file_name>
33. Config Restore Binary <hostname> <file_name>
34. Config Default [keep_ip]

Loop Commands

35. Loop Protect Configuration
36. Loop Protect Mode [enable|disable]
37. Loop Protect Transmit [<transmit-time>]
38. Loop Protect Shutdown [<shutdown-time>]
39. Loop Protect Port Configuration [<port_list>]
40. Loop Protect Port Mode [<port_list>] [enable|disable]
41. Loop Protect Port Action [<port_list>] [shutdown|trap|log|shut_log|shut_trap|log_trap|all]
42. Loop Protect Port Transmit [<port_list>] [enable|disable]
43. Loop Protect Status [<port_list>]

IP Commands

44. IP ARP Show
45. IP Configuration
46. IP DHCP [enable|disable]
47. IP Setup [<ip_addr>] [<ip_mask>] [<ip_router>]
48. IP Ping <ip_addr_string> [(Length <ping_length>)] [(Count <ping_count>)] [(Interval <ping_interval>)]
49. IP DNS [<ip_addr>]
50. IP DNS_Proxy [enable|disable]
51. IP IPv6 AUTOCONFIG [enable|disable]
52. IP IPv6 Setup [<ipv6_addr>] [<ipv6_prefix>] [<ipv6_router>]
53. IP IPv6 State <ipv6_addr> [enable|disable]
54. IP IPv6 Ping6 <ipv6_addr> [(Length <ping_length>)] [(Count <ping_count>)] [(Interval <ping_interval>)]
55. IP MVlan [<vid>]
56. IP NTP Configuration
57. IP NTP Mode [enable|disable]
58. IP NTP Server Add <server_index> <ip_addr_string>
59. IP NTP Server Ipv6 Add <server_index> <server_ipv6>
60. IP NTP Server Delete <server_index>

Port Commands

61. Port Configuration [<port_list>] [up|down]
62. Port SharedPort [internal|external]
63. Port Mode [<port_list>] [auto|10hdx|10fdx|100hdx|100fdx|1000fdx|sfp_auto_ams]
64. Port Flow Control [<port_list>] [enable|disable]
65. Port State [<port_list>] [enable|disable]
66. Port MaxFrame [<port_list>] [<max_frame>]
67. Port Power [<port_list>] [enable|disable|actiphy|dynamic]
68. Port Excessive [<port_list>] [discard|restart]
69. Port Statistics [<port_list>] [<command>] [up|down]
70. Port VeriPHY [<port_list>]
71. Port SFP [<port_list>]
72. Port DMI Configuration [<port_list>] [<dmi_rx_pwr_int_thr>]
73. Port DMI Statistics [<port_list>]
74. Port Description [<port_list>] [<name>]

MAC Commands

75. AC Configuration [<port_list>]
76. MAC Add <mac_addr> <port_list> [<vid>]
77. MAC Delete <mac_addr> [<vid>]
78. MAC Lookup <mac_addr> [<vid>]
79. MAC Agetime [<age_time>]
80. MAC Learning [<port_list>] [auto|disable|secure]
81. MAC Dump [<mac_max>] [<mac_addr>] [<vid>]
82. MAC Statistics [<port_list>]
83. MAC Flush

VLAN Commands

84. VLAN Configuration [<port_list>]
85. VLAN Translation Add <group_id> <vid> <trans_vid>
86. VLAN PVID [<port_list>] [<vid>|none]
87. VLAN Translation Delete <group_id> <vid>
88. VLAN FrameType [<port_list>] [all|tagged|untagged]
89. VLAN Translation Group [<port_list>] [<group_id>]
90. VLAN IngressFilter [<port_list>] [enable|disable]
91. VLAN tx_tag [<port_list>] [untag_pvid|untag_all|tag_all]
92. VLAN PortType [<port_list>] [unaware|c-port|s-port|s-custom-port]
93. VLAN EtypeCustomSport [<etype>]
94. VLAN Add <vid>|<name> [<ports_list>]
95. VLAN Forbidden Add <vid>|<name> [<port_list>]
96. VLAN Delete <vid>|<name>
97. VLAN Forbidden Delete <vid>|<name>
98. VLAN Forbidden Lookup [<vid>] [(name <name>)]
99. VLAN Lookup [<vid>] [(name <name>)] [combined|static|nas|mvr|evc|all]
100. VLAN Name Add <name> <vid>
101. VLAN Name Delete <name>
102. VLAN Name Lookup [<name>]
103. VLAN Status [<port_list>] [combined|static|nas|mvr|mstp|erps|mep|vcl|all|conflicts]
104. VLAN MPort PortType [unaware|c-port|s-port|s-custom-port]
105. VLAN remove <vid>|<name> [<port_list>]

PVLAN Commands

106. PVLAN Configuration [<port_list>]
107. PVLAN Add <pvlan_id> [<port_list>]
108. PVLAN Delete <pvlan_id>
109. PVLAN Lookup [<pvlan_id>]
110. PVLAN Isolate [<port_list>] [enable|disable]

Security Commands

Switch : Switch security command groups
- Security Switch Users : User management
  94. Security Switch Users Configuration
  95. Security Switch Users Add <user_name> <password> <privilege_level>
  96. Security Switch Users Delete <user_name>
- Security Switch Privilege: Privilege level
  97. Security Switch Privilege Level Configuration
  98. Security Switch Privilege Level Group <group_name>
  99. [<cro>] [<crw>] [<sro>] [<srw>]
  100. Security Switch Privilege Level Current
- Security Switch Auth : Authentication
  101. Security Switch Auth Configuration
  102. Security Switch Auth Method [console|telnet|ssh|web] [none|local|radius|tacacs+] [enable|disable]
- Security Switch SSH : Secure Shell
  103. Security Switch SSH Configuration
  104. Security Switch SSH Mode [enable|disable]
- Security Switch HTTPS : Hypertext Transfer Protocol over Secure Socket Layer
  105. Security Switch HTTPS Configuration
  106. Security Switch HTTPS Mode [enable|disable]
  107. Security Switch HTTPS Redirect [enable|disable]
  108. Security Switch HTTPS Certificate Show
  109. Security Switch HTTPS Certificate Generate [rsa|dsa]

110. Security Switch HTTPS Certificate Load <hostname> <file_name>

Security Switch Access : Access management

111. Security Switch Access Configuration
112. Security Switch Access Mode [enable|disable]
113. Security Switch Access Add <access_id> <start_ip_addr> <end_ip_addr> [web] [snmp] [telnet]
114. Security Switch Access Ipv6 Add <access_id> <start_ipv6_addr> <end_ipv6_addr> [w
115. eb] [snmp] [telnet]
116. Security Switch Access Delete <access_id>
117. Security Switch Access Lookup [<access_id>]
118. Security Switch Access Clear
119. Security Switch Access Statistics [clear]

Security Switch SNMP : Simple Network Management Protocol

120. Security Switch SNMP Configuration
121. Security Switch SNMP Mode [enable|disable]
122. Security Switch SNMP Version [1|2c|3]
123. Security Switch SNMP Read Community [<community>]
124. Security Switch SNMP Write Community [<community>]
125. Security Switch SNMP Trap Mode [enable|disable]
126. Security Switch SNMP Trap Version [1|2c|3]
127. Security Switch SNMP Trap Community [<community>]
128. Security Switch SNMP Trap Destination [<ip_addr_string>]
129. Security Switch SNMP Trap IPv6 Destination [<ipv6_addr>]
130. Security Switch SNMP Trap Authentication Failure [enable|disable]
131. Security Switch SNMP Trap Link-up [enable|disable]
132. Security Switch SNMP Trap Inform Mode [enable|disable]
133. Security Switch SNMP Trap Inform Timeout [<timeout>]
134. Security Switch SNMP Trap Inform Retry Times [<retries>]
135. Security Switch SNMP Trap Probe Security Engine ID [enable|disable]
136. Security Switch SNMP Trap Security Engine ID [<engineid>]
137. Security Switch SNMP Trap Security Name [<security_name>]
138. Security Switch SNMP Engine ID [<engineid>]
139. Security Switch SNMP Community Add <community> [<ip_addr>] [<ip_mask>]
140. Security Switch SNMP Community Delete <index>
141. Security Switch SNMP Community Lookup [<index>]
142. Security Switch SNMP User Add <engineid> <user_name> [MD5|SHA] [<auth_password>] [DES] [<priv_password>]
143. Security Switch SNMP User Delete <index>
144. Security Switch SNMP User Changekey <engineid> <user_name> <auth_password> [<priv_password>]
145. Security Switch SNMP User Lookup [<index>]
146. Security Switch SNMP Group Add <security_model> <security_name> <group_name>
147. Security Switch SNMP Group Delete <index>
148. Security Switch SNMP Group Lookup [<index>]
149. Security Switch SNMP View Add <view_name> [included|excluded] <oid_subtree>
150. Security Switch SNMP View Delete <index>
151. Security Switch SNMP View Lookup [<index>]
152. Security Switch SNMP Access Add <group_name> <security_model> <security_level> [<read_view_name>] [<write_view_name>]
153. Security Switch SNMP Access Delete <index>
154. Security Switch SNMP Access Lookup [<index>]

Security Switch RMON : Remote Network Monitoring

155. Security Switch RMON Statistics Add <stats_id> <data_source>
156. Security Switch RMON Statistics Delete <stats_id>
157. Security Switch RMON Statistics Lookup [<stats_id>]
158. Security Switch RMON History Add <history_id> <data_source> [<interval>] [<buckets>]
159. Security Switch RMON History Delete <history_id>

160. Security Switch RMON History Lookup [<history_id>]
161. Security Switch RMON Alarm Add <alarm_id> <interval> <alarm_vairable> [absolute|delta] <rising_threshold> <rising_event_index> <falling_threshold> <falling_event_index> [rising|falling|both]
162. Security Switch RMON Alarm Delete <alarm_id>
163. Security Switch RMON Alarm Lookup [<alarm_id>]
164. Security Switch RMON Event Add <event_id> [none|log|trap|log_trap] [<community>] [<description>]
165. Security Switch RMON Event Delete <event_id>
166. Security Switch RMON Event Lookup [<event_id>]

Network : Network security command groups

Security Network Psec : Port Security Status commands

401. Security Network Psec Switch [<port_list>]
402. Security Network Psec Port [<port_list>]

Security Network Limit : Port Security Limit Control commands

403. Security Network Limit Configuration [<port_list>]
404. Security Network Limit Mode [enable|disable]
405. Security Network Limit Aging [enable|disable]
406. Security Network Limit Agetime [<age_time>]
407. Security Network Limit Port [<port_list>] [enable|disable]
408. Security Network Limit Limit [<port_list>] [<limit>]
409. Security Network Limit Action [<port_list>] [none|trap|shut|trap_shut]
410. Security Network Limit Reopen [<port_list>]

Security Network NAS : Network Access Server (IEEE 802.1X) commands

411. Security Network NAS Configuration [<port_list>]
412. Security Network NAS Mode [enable|disable]
413. Security Network NAS State [<port_list>] [auto|authorized|unauthorized|single|multi|macbased]
414. Security Network NAS Reauthentication [enable|disable]
415. Security Network NAS ReauthPeriod [<reauth_period>]
416. Security Network NAS EapolTimeout [<eapol_timeout>]
417. Security Network NAS Agetime [<age_time>]
418. Security Network NAS Holdtime [<hold_time>]
419. Security Network NAS RADIUS_QoS [global|<port_list>] [enable|disable]
420. Security Network NAS RADIUS_VLAN [global|<port_list>] [enable|disable]
421. Security Network NAS Guest_VLAN [global|<port_list>] [enable|disable] [<vid>] [<reauth_max>] [<allow_if_eapol_seen>]
422. Security Network NAS Authenticate [<port_list>] [now]
423. Security Network NAS Statistics [<port_list>] [clear|eapol|radius]

Security Network ACL : Access Control List commands

424. Security Network ACL Configuration [<port_list>]
425. Security Network ACL Action [<port_list>] [permit|deny] [<rate_limiter>] [<evc_policer>] [<port_redirect>] [<mirror>] [<logging>] [<shutdown>]
426. Security Network ACL Policy [<port_list>] [<policy>]
427. Security Network ACL Rate [<rate_limiter_list>] [<rate_unit>] [<rate>]
428. Security Network ACL Add [<ace_id>] [<ace_id_next>]
[(port <port_list>)] [(policy <policy> <policy_bitmask>)]
[<tagged>] [<vid>] [<tag_prio>] [<dmac_type>]
[(etype [<etype>] [<smac>] [<dmac>]) |
(arp [<sip>] [<dip>] [<smac>] [<arp_opcode>] [<arp_flags>]) |
(ip [<sip>] [<dip>] [<protocol>] [<ip_flags>]) |
(icmp [<sip>] [<dip>] [<icmp_type>] [<icmp_code>] [<ip_flags>]) |
(udp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>]) |
(tcp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>] [<tcp_flags>])]
[permit|deny] [<rate_limiter>] [<evc_policer>] [<port_redirect>] [<mirror>] [<logging>] [<shutdown>]
429. Security Network ACL Delete <ace_id>

430. Security Network ACL Lookup [<ace_id>]
431. Security Network ACL Clear
432. Security Network ACL Status [combined|static|link_oam|dhcp|ptp|arp_inspection|mep|ipmc|ip_source_guard|conflicts]
433. Security Network ACL Port State [<port_list>] [enable|disable]

Security Network DHCP : Dynamic Host Configuration Protocol commands

434. Security Network DHCP Relay Configuration
435. Security Network DHCP Relay Mode [enable|disable]
436. Security Network DHCP Relay Server [<ip_addr>]
437. Security Network DHCP Relay Information Mode [enable|disable]
438. Security Network DHCP Relay Information Policy [replace|keep|drop]
439. Security Network DHCP Relay Statistics [clear]
440. Security Network DHCP Snooping Configuration
441. Security Network DHCP Snooping Mode [enable|disable]
442. Security Network DHCP Snooping Port Mode [<port_list>] [trusted|untrusted]
443. Security Network DHCP Snooping Statistics [<port_list>] [clear]

Security Network IP : IP Source Guard commands

444. Security Network IP Source Guard Configuration
445. Security Network IP Source Guard Mode [enable|disable]
446. Security Network IP Source Guard Port Mode [<port_list>] [enable|disable]
447. Security Network IP Source Guard limit [<port_list>] [<dynamic_entry_limit>|unlimited]
448. Security Network IP Source Guard Entry [<port_list>] add|delete <vid> <allowed_ip> <allowed_mac>
449. Security Network IP Source Guard Status [<port_list>]
450. Security Network IP Source Guard Translation

Security Network ARP : Address Resolution Protocol commands

451. Security Network ARP Inspection Configuration
452. Security Network ARP Inspection Mode [enable|disable]
453. Security Network ARP Inspection Port Mode [<port_list>] [enable|disable]
454. Security Network ARP Inspection Entry [<port_list>] add|delete <vid> <allowed_mac> <allowed_ip>
455. Security Network ARP Inspection Status [<port_list>]
456. Security Network ARP Inspection Translation

AAA : Authentication, Authorization and Accounting commands

457. Security AAA Configuration
458. Security AAA Timeout [<timeout>]
459. Security AAA Deadtime [<dead_time>]
460. Security AAA RADIUS [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]
461. Security AAA ACCT_RADIUS [<server_index>] [enable|disable] [<ip_addr_string>] [< secret>] [<server_port>]
462. Security AAA TACACS+ [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]
463. Security AAA Statistics [<server_index>]

STP Commands

464. STP Configuration
465. STP Version [<stp_version>]
466. STP Txhold [<holdcount>]
467. STP MaxHops [<maxhops>]
468. STP MaxAge [<max_age>]
469. STP FwdDelay [<delay>]
470. STP CName [<config-name>] [<integer>]
471. STP bpduFilter [enable|disable]
472. STP bpduGuard [enable|disable]
473. STP recovery [<timeout>]
474. STP Status [<msti>] [<stp_port_list>]

475. STP Msti Priority [<msti>] [<priority>]
476. STP Msti Map [<msti>] [clear]
477. STP Msti Add <msti> <vid-range>
478. STP Port Configuration [<stp_port_list>]
479. STP Port Mode [<stp_port_list>] [enable|disable]
480. STP Port Edge [<stp_port_list>] [enable|disable]
481. STP Port AutoEdge [<stp_port_list>] [enable|disable]
482. STP Port P2P [<stp_port_list>] [enable|disable|auto]
483. STP Port RestrictedRole [<stp_port_list>] [enable|disable]
484. STP Port RestrictedTcn [<stp_port_list>] [enable|disable]
485. STP Port bpduGuard [<stp_port_list>] [enable|disable]
486. STP Port Statistics [<stp_port_list>] [clear]
487. STP Port Mcheck [<stp_port_list>]
488. STP Msti Port Configuration [<msti>] [<stp_port_list>]
489. STP Msti Port Cost [<msti>] [<stp_port_list>] [<path_cost>]
490. STP Msti Port Priority [<msti>] [<stp_port_list>] [<priority>]

Aggr Commands

491. Aggr Configuration
492. Aggr Add <port_list> [<aggr_id>]
493. Aggr Delete <aggr_id>
494. Aggr Lookup [<aggr_id>]
495. Aggr Mode [smac|dmac|ip|port] [enable|disable]

LACP Commands

496. LACP Configuration [<port_list>]
497. LACP Mode [<port_list>] [enable|disable]
498. LACP Key [<port_list>] [<key>]
499. LACP Prio [<port_list>] [<prio>]
500. LACP System Prio [<sysprio>]
501. LACP Role [<port_list>] [active|passive]
502. LACP Status [<port_list>]
503. LACP Statistics [<port_list>] [clear]
504. LACP Timeout [<port_list>] [fast|slow]

LLDP Commands

505. LLDP Configuration [<port_list>]
506. LLDP Mode [<port_list>] [enable|disable|rx|tx]
507. LLDP Optional_TLV [<port_list>] [port_descr|sys_name|sys_descr|sys_capa|mgmt_addr] [enable|disable]
508. LLDP Interval [<interval>]
509. LLDP Hold [<hold>]
510. LLDP Delay [<delay>]
511. LLDP Reinit [<reinit>]
512. LLDP Statistics [<port_list>] [clear]
513. LLDP Info [<port_list>]
514. LLDP cdp_aware [<port_list>] [enable|disable]

EVC Commands

401. EVC Configuration [<port_list>] [<policer_id>]
402. EVC Port DEI [<port_list>] [<dei_mode>]
403. EVC Port Tag [<port_list>] [<tag_mode>]
404. EVC Port Addr [<port_list>] [<addr_mode>]
405. EVC Port L2CP [<port_list>] [<l2cp_list>] [<mode>]
406. EVC Policer [<policer_id>] [enable|disable] [<policer_mode>] [<cir>] [<cbs>] [<eir>] [<ebs>]

EVC Add <evc_id> [<vid>] [<ivid>] [<nni_list>] [<learning>]
[inner] [<it_type>] [<it_vid_mode>] [<it_vid>]
[<it_preserve>] [<it_pcp>] [<it_dei>]
[outer] [<ot_vid>]
EVC Delete <evc_id>
EVC Lookup [<evc_id>]
EVC Name [<evc_id>] [<name>]
EVC Status [<evc_id>]
EVC Statistics [<port_list>] [<class_list>] [<command>]
EVC ECE Add [<ece_id>] [<ece_id_next>] [uni] [<uni_list>]
[<dmac_type>] [<smac>]
[tag] [<tag_type>] [<vid>] [<pcp>] [<dei>]
[all |
(ipv4 [<proto>] [<sip>] [<dscp>] [<fragment>] [<sport>] [<dport>]) |
(ipv6 [<proto>] [<sip_v6>] [<dscp>] [<sport>] [<dport>])]
[direction] [<direction>]
[evc] [<evc_id>]
[pop] [<pop>]
[policy] [<policy>]
[class] [<class>]
[outer] [<ot_mode>] [<ot_preserve>] [<ot_pcp>] [<ot_dei>]
EVC ECE Delete <ece_id>
EVC ECE Lookup [<ece_id>]
EVC ECE Status [<ece_id>]
EVC ECE Statistics [<ece_id>] [<port_list>] [<command>] [frames|bytes]

EPS Commands

EPS create [<inst>] [domport] [1p1|1f1] [<flow_w>] [<flow_p>] [<mep_w>] [<mep_p>] [<mep_aps>] [enable|disable]
EPS config [<inst>] [aps|noaps] [revert|norevert] [unidir|bidir] [w0s|w10s|w30s|w1m|w5m|w12m] [h0s|h100ms|h500ms|h1s|h2s|h5s|h10s]
EPS command [<inst>] [clear|lockout|forced|manualp|manualw|exercise|freeze|lockoutlocal]
EPS state [<inst>]

MEP Commands

MEP config [<inst>] [mep|mip] [down|up] [<port>] [domport|domevc] [<level>] [itu|ieee] [<meg>] [<mep>] [<vid>] [<flow>] [enable|disable]
MEP peer MEP [<inst>] [<mep>] [<mac_addr>] [enable|disable]
MEP cc config [<inst>] [<prio>] [300s|100s|10s|1s|6m|1m|6h] [enable|disable]
MEP cc config [<inst>] [<prio>] [300s|100s|10s|1s|6m|1m|6h] [enable|disable] r>] [enable|disable]
MEP aps config [<inst>] [<prio>] [uni|multi] [laps|raps] [<octet>] [enable|disable]
MEP client config [<inst>] [domport|domevc] [<level>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>]
MEP ais config [<inst>] [<prio>] [1s|1m] [set|clear] [enable|disable]
MEP lck config [<inst>] [<prio>] [1s|1m] [enable|disable]
MEP lt config [<inst>] [<prio>] [<mac_addr>] [<mep>] [<ttl>] [enable|disable]
MEP lb config [<inst>] [set|clear] [<prio>] [uni|multi] [<mac_addr>] [<mep>] [<tosend>] [<size>] [<gap>] [enable|disable]
MEP dm config [<inst>] [<prio>] [uni|multi] [<mep>] [oneway|twoway] [std|prop] [rdtrp|flow] [<gap>] [<count>] [us|ns] [keep|reset] [d2ford1] [enable|disable]
MEP tst config [<inst>] [set|clear] [<prio>] [<mep>] [no_seq|seq] [<rate>] [<size>] [allzero|allone|onezero] [enable|disable]
MEP state [<inst>]
MEP lm state [<inst>]
MEP lm clear <inst>
MEP lt state [<inst>]
MEP lb state [<inst>]

451. MEP dm state [<inst>]
452. MEP dm clear <inst>
453. MEP tst state [<inst>]
454. MEP tst clear <inst>

QoS Commands

455. QoS Configuration [<port_list>]
456. QoS Port Classification Class [<port_list>] [<class>]
457. QoS Port Classification DPL [<port_list>] [<dpl>]
458. QoS Port Classification PCP [<port_list>] [<pcp>]
459. QoS Port Classification DEI [<port_list>] [<dei>]
460. QoS Port Classification Tag [<port_list>] [enable|disable]
461. QoS Port Classification Map [<port_list>] [<pcp_list>] [<dei_list>] [<class>] [<dpl>]
462. QoS Port Classification DSCP [<port_list>] [enable|disable]
463. QoS Port Policer Mode [<port_list>] [enable|disable]
464. QoS Port Policer Rate [<port_list>] [<rate>]
465. QoS Port Policer Unit [<port_list>] [kbps|fps]
466. QoS Port Policer FlowControl [<port_list>] [enable|disable]
467. QoS Port QueuePolicer Mode [<port_list>] [<queue_list>] [enable|disable]
468. QoS Port QueuePolicer Rate [<port_list>] [<queue_list>] [<bit_rate>]
469. QoS Port Scheduler Mode [<port_list>] [strict|weighted]
470. QoS Port Scheduler Weight [<port_list>] [<queue_list>] [<weight>]
471. QoS Port Shaper Mode [<port_list>] [enable|disable]
472. QoS Port Shaper Rate [<port_list>] [<bit_rate>]
473. QoS Port QueueShaper Mode [<port_list>] [<queue_list>] [enable|disable]
474. QoS Port QueueShaper Rate [<port_list>] [<queue_list>] [<bit_rate>]
475. QoS Port QueueShaper Excess [<port_list>] [<queue_list>] [enable|disable]
476. QoS Port TagRemarking Mode [<port_list>] [classified|default|mapped]
477. QoS Port TagRemarking PCP [<port_list>] [<pcp>]
478. QoS Port TagRemarking DEI [<port_list>] [<dei>]
479. QoS Port TagRemarking Map [<port_list>] [<class_list>] [<dpl_list>] [<pcp>] [<dei>]
480. QoS Port DSCP Translation [<port_list>] [enable|disable]
481. QoS Port DSCP Classification [<port_list>] [none|zero|selected|all]
482. QoS Port DSCP EgressRemark [<port_list>] [disable|enable|remap_dp_unaware|remap_dp_aware]
483. QoS DSCP Map [<dscp_list>] [<class>] [<dpl>]
484. QoS DSCP Translation [<dscp_list>] [<trans_dscp>]
485. QoS DSCP Trust [<dscp_list>] [enable|disable]
486. QoS DSCP Classification Mode [<dscp_list>] [enable|disable]
487. QoS DSCP Classification Map [<class_list>] [<dpl_list>] [<dscp>]
488. QoS DSCP EgressRemap [<dscp_list>] [<dpl_list>] [<dscp>]
489. QoS Storm Unicast [enable|disable] [<packet_rate>]
490. QoS Storm Multicast [enable|disable] [<packet_rate>]
491. QoS Storm Broadcast [enable|disable] [<packet_rate>]
492. QoS QCL Add [<qce_id>] [<qce_id_next>]
    [<port_list>]
    [<tag>] [<vid>] [<pcp>] [<dei>] [<smac>] [<dmac_type>]
    [(etype [<etype>]) |
    (LLC [<DSAP>] [<SSAP>] [<control>]) |
    (SNAP [<PID>]) |
    (ipv4 [<protocol>] [<sip>] [<dscp>] [<fragment>] [<sport>] [<dport>]) |
    (ipv6 [<protocol>] [<sip_v6>] [<dscp>] [<sport>] [<dport>])]
    [<class>] [<dp>] [<classified_dscp>]
493. QoS QCL Delete <qce_id>
494. QoS QCL Lookup [<qce_id>]
495. QoS QCL status [combined|static|conflicts]
496. QoS QCL refresh

Mirror Commands

497. Mirror Configuration [<port_list>]
498. Mirror Port [<port>|disable]
499. Mirror Mode [<port_list>] [enable|disable|rx|tx]

Firmware Commands

434. Firmware Load <ip_addr_string> <file_name> [<activate>]
435. Firmware IPv6 Load <ipv6_server> <file_name> [<activate>]
436. Firmware Information
437. Firmware Swap
438. Firmware Peripheral Load <hostname> <file_name>
439. Firmware Peripheral Version

MVR Commands

434. MVR Configuration
435. MVR Mode [enable|disable]
436. MVR VLAN Setup [<mvid>] [add|del|upd] [(Name <mvr_name>)]
437. MVR VLAN Mode [<vid>|<mvr_name>] [dynamic|compatible]
438. MVR VLAN Port [<vid>|<mvr_name>] [<port_list>] [source|receiver|inactive]
439. MVR VLAN LLQI [<vid>|<mvr_name>] [mvr_param_llqi]
440. MVR VLAN Channel [<vid>|<mvr_name>] [add|del|upd] [channel] [channel_bound] [(Name <grp_name>)]
441. MVR VLAN Priority [<vid>|<mvr_name>] [priority] [tagged|untagged]
442. MVR Immediate Leave [<port_list>] [enable|disable]
443. MVR Status [<vid>] [clear]
444. MVR Groups [<vid>]
445. MVR SFM [<vid>] [<port_list>]

PTP Commands

446. PTP Configuration [<clockinst>]
447. PTP PortState <clockinst> [<port_list>] [enable|disable|internal]
448. PTP ClockCreate <clockinst> [<devtype>] [<twostep>] [<protocol>] [<oneway>] [<clockid>] [<tag_enable>] [<vid>] [<prio>]
449. PTP ClockDelete <clockinst> [<devtype>]
450. PTP DefaultDS <clockinst> [<priority1>] [<priority2>] [<domain>]
451. PTP CurrentDS <clockinst>
452. PTP ParentDS <clockinst>
453. PTP Timingproperties <clockinst> [<utcoffset>] [<valid>] [<leap59>] [<leap61>] [<timetrac>] [<freqtrac>] [<ptptimescale>] [<timesource>]
454. PTP PortDataSet <clockinst> [<port_list>] [<announceintv>] [<announceto>] [<syncintv>] [<delaymech>] [<minpdelayreqintv>] [<delayasymmetry>] [<ingressLatency>] [<egressLatency>]
455. PTP LocalClock <clockinst> [update|show|ratio] [<clockratio>]
456. PTP Filter <clockinst> [<def_delay_filt>] [<period>] [<dist>]
457. PTP Servo <clockinst> [<displaystates>] [<ap_enable>] [<ai_enable>] [<ad_enable>] [<ap>] [<ai>] [<ad>]
458. PTP SlaveTableUnicast <clockinst>
459. PTP UniConfig <clockinst> [<index>] [<duration>] [<ip_addr>]
460. PTP ForeignMasters <clockinst> [<port_list>]
461. PTP EgressLatency [show|clear]
462. PTP MasterTableUnicast <clockinst>
463. PTP DebugMode <clockinst> [<debug_mode>]

ERPS Commands

464. Erps command [fs|ms|clear] <port> <group-id>
465. Erps version [v1|v2] <group-id>
466. Erps add <group-id> <east_port> <west_port> [major|sub] [interconnected] [virtual_channel] [<major-ring-id>]
467. Erps reversion [revertive|nonrevertive] <group-id>
468. Erps vlan add <vid> <group-id>
469. Erps vlan delete <vid> <group-id>
470. Erps mep <east_sf_mep> <west_sf_mep> <east_raps_mep> <west_raps_mep> <group-id>
471. Erps rpl neighbour <rpl_port> <group-id>
472. Erps rpl owner <rpl_port> <group-id>
473. Erps rpl neighbour clear <group-id>
474. Erps rpl owner clear <group-id>
475. Erps hold off timeout <hold_timeout> <group-id>
476. Erps guard-timeout <guard_timeout> <group-id>
477. Erps wtr-timeout <wtr_timeout> <group-id>
478. Erps delete <group-id>
479. Erps topologychange [propagate|nopropagate] <group-id>
480. Erps configuration [<group-id>] [statistics|clear]

LOAM Commands

481. LOAM Control [<port_list>] [enable|disable]
482. LOAM Mode [<port_list>] [active|passive]
483. LOAM Mib-retrival-support [<port_list>] [enable|disable]
484. LOAM Variable-retrieve [<port_list>] [local-info|remote-info]
485. LOAM Remote_loopback_support [<port_list>] [enable|disable]
486. LOAM Remote_loopback_oper [<port_list>] [enable|disable]
487. LOAM Link_monitoring_support [<port_list>] [enable|disable]
488. LOAM Frame_error_event [<port_list>] [<error_window>] [<error_threshold>]
489. LOAM Symbol_period_error_event [<port_list>] [<error_window>] [<error_threshold>]
490. LOAM Frame_error_seconds_summary_event [<port_list>] [<error_window>] [<error_threshold>]
491. LOAM Status [<port_list>]
492. LOAM Link_monitor_status [<port_list>]
493. LOAM Statistics [<port_list>] [clear]

IPMC Commands

494. IPMC Configuration [mld|igmp]
495. IPMC Mode [mld|igmp] [enable|disable]
496. IPMC Flooding [mld|igmp] [enable|disable]
497. IPMC Leave Proxy [mld|igmp] [enable|disable]
498. IPMC Proxy [mld|igmp] [enable|disable]
499. IPMC SSM [mld|igmp] [(Range <prefix> <mask_len>)]
500. IPMC State [mld|igmp] [<vid>] [enable|disable]
501. IPMC Querier [mld|igmp] [<vid>] [enable|disable]
502. IPMC Compatibility [mld|igmp] [<vid>] [auto|v1|v2|v3]
503. IPMC Fastleave [mld|igmp] [<port_list>] [enable|disable]
504. IPMC Throttling [mld|igmp] [<port_list>] [limit_group_number]
505. IPMC Filtering [mld|igmp] [<port_list>] [add|del] [group_addr]
506. IPMC Router [mld|igmp] [<port_list>] [enable|disable]
507. IPMC Status [mld|igmp] [<vid>]
508. IPMC Groups [mld|igmp] [<vid>]
509. IPMC Version [mld|igmp] [<vid>]
510. IPMC SFM [mld|igmp] [<vid>] [<port_list>]
511. IPMC Parameter RV [mld|igmp] [<vid>] [ipmc_param_rv]
512. IPMC Parameter QI [mld|igmp] [<vid>] [ipmc_param_qi]
513. IPMC Parameter QRI [mld|igmp] [<vid>] [ipmc_param_qri]
514. IPMC Parameter LLQI [mld|igmp] [<vid>] [ipmc_param_llqi]
515. IPMC Parameter URI [mld|igmp] [<vid>] [ipmc_param_uri]

VCL Commands

516. VCL Macvlan Configuration
517. VCL Macvlan Add <mac_addr> <vid> [<port_list>]
518. VCL Macvlan Del <mac_addr>
519. VCL Status [combined|static|nas|all]
520. VCL ProtoVlan Protocol Add Eth2 <ether_type>|arp|ip|ipx|at <group_id>
521. VCL ProtoVlan Protocol Add Snap <oui>|rfc_1042|snap_8021h <pid> <group_id>
522. VCL ProtoVlan Protocol Add Llc <dsap> <ssap> <group_id>
523. VCL ProtoVlan Protocol Delete Eth2 <ether_type>|arp|ip|ipx|at
524. VCL ProtoVlan Protocol Delete Snap <oui>|rfc_1042|snap_8021h <pid>
525. VCL ProtoVlan Protocol Delete Llc <dsap> <ssap>
526. VCL ProtoVlan Vlan Add [<port_list>] <group_id> <vid>
527. VCL ProtoVlan Vlan Delete [<port_list>] <group_id>
528. VCL ProtoVlan Conf
529. VCL IPVlan Configuration [<vce_id>]
530. VCL IPVlan Add [<vce_id>] <ip_addr_mask> <vid> [<port_list>]
531. VCL IPVlan Delete <vce_id>

EtherSAT Loopback Commands

532. EtherSAT Collector [enable|disable]
533. EtherSAT Loopback Configuration
534. EtherSAT Loopback SMAC [<smac>]
535. EtherSAT Loopback State [<state>]
536. EtherSAT Loopback Status
537. EtherSAT Loopback TestSidePort [<port>]
538. EtherSAT Loopback Timeout [<timeout>]
539. EtherSAT Loopback VID [<vid>]
540. EtherSAT PeerProto [enable|disable]
541. EtherSAT Config Show
542. EtherSAT Profile New <number> [<name>]
543. EtherSAT Profile Delete <number>
544. EtherSAT Profile Show
545. EtherSAT Profile Name Set <number> <name>
546. EtherSAT Profile Flr Set <number> [<ratio>]
547. EtherSAT Profile Linerate Set <number> [<rate>]
548. EtherSAT Profile YellowPCP Set <number> [<pcp_list>]
549. EtherSAT Profile YellowPCPmask Set <number> [<mask>]
550. EtherSAT Profile Sizemix Set <number> [<size>] [<size>] [<size>] [<size>] [<size>] [<size>] [<size>] [<size>] [<size>] [<size>]
551. EtherSAT Profile RateDecStep Set <number> [<rate_step>]
552. EtherSAT Profile StepLength Set <number> [<length>]
553. EtherSAT Profile Testmode Set <number> [unidir|bidir|loopback]
554. EtherSAT Profile FrameEncaps Set <number> [l2|l3] [ethtst|customethtst|llcsnap|udp|tcp]
555. EtherSAT Profile Framefill Set <number> [prbs|fixed] [<pattern>]
556. EtherSAT Profile Frameethtyp Set <number> [<type>]
557. EtherSAT Profile Framellcsnap Set <number> [<id>] [<protocol>]
558. EtherSAT Profile Framemeglevel Set <number> [<level>]
559. EtherSAT Profile FrameIP Set <number> [<destadr>] [<srcadr>] [<dscp>] [<ecn>] [<flags>] [<ttl>]
560. EtherSAT Profile FrameUDP Set <number> [<udpsrcport>] [<udpdestport>]
561. EtherSAT Profile FrameTCP Set <number> [<tcpsrcport>] [<tcpdestport>] [<seq_num>] [<ack_num>] [<control_bits>] [<window_size>]
562. EtherSAT Profile Teststep Set <number> [<step>] [<step>] [<step>] [<step>]
563. EtherSAT Profile Dmthr Insert <number> <threshould_value>
564. EtherSAT Profile Dmthr Remove <number> <threshould_value>
565. EtherSAT Profile Dmvthr Insert <number> <threshould_value>
566. EtherSAT Profile Dmvthr Remove <number> <threshould_value>
567. EtherSAT Profile Config Show <number>
568. EtherSAT Profile Frameformat Show <number>
569. EtherSAT Test New <number> <profile> <address> <in_port> <collector_in_port> <in_tag_type> <in_inner_tag_id> <in_inner_pcp> <in_outer_tag_id> <in_outer_pcp> [<eg_tag_type>] [<eg_inner_tag_id>] [<eg_inner_pcp>] [<eg_outer_tag_id>] [<eg_outer_pcp>] [<name>]
570. EtherSAT Test Delete <number>
571. EtherSAT Test Start <number>
572. EtherSAT Test Stop <number>
573. EtherSAT Test Show
574. EtherSAT Test Name Set <number> [<name>]
575. EtherSAT Test Profile Set <number> [<profile>]
576. EtherSAT Test Ingress Set <number> [<in_tag_type>] [<in_inner_tag_id>] [<in_inner_pcp>] [<in_outer_tag_id>] [<in_outer_pcp>]
577. EtherSAT Test Egress Set <number> [<eg_tag_type>] [<eg_inner_tag_id>] [<eg_inner_pcp>] [<eg_outer_tag_id>] [<eg_outer_pcp>]
578. EtherSAT Test Address Set <number> [<address>]

579. EtherSAT Test CIR Set <number> [<cir>]
580. EtherSAT Test CBS Set <number> [<cbs>]
581. EtherSAT Test EIR Set <number> [<eir>]
582. EtherSAT Test EBS Set <number> [<ebs>]
583. EtherSAT Test BwParams Set <number> <policer_id>
584. EtherSAT Test Testmacaddr Set <number> [<macaddr>]
585. EtherSAT Test Config Show <number>
586. EtherSAT Test Result Show <number>
587. EtherSAT Test Throughput Show <number> [<step_number>]
588. EtherSAT Test Latency Show <number> [<step_number>]
589. EtherSAT Test Flr Show <number> [<step_number>]
590. EtherSAT Test Back-to-back Show <number> [<step_number>]
591. EtherSAT Test Result Export <number> <hostname> <file_name>

Sync-E Commands

592. SyncE Nominate [<clk_source>] [enable|disable] [<port>] [ql_none|ql_prc|ql_ssua|
ql_ssub|ql_eec2|ql_eec1|ql_dnu] [<holdoff>] [master|slave|forced]
SyncE Selection [manual|selected|nonrevertive|revertive|holdover|freerun] [<clk_
source>] [<wtr_time>] [ho_none|ho_prc|ho_ssua|ho_ssub|ho_eec2|ho_eec1|ho_dnu|ho_
inv] [fr_none|fr_prc|fr_ssua|fr_ssub|fr_eec2|fr_eec1|fr_dnu|fr_inv]
593. SyncE Priority [<clk_source>] [<clk_priority>]
594. SyncE Ssm [<port>] [enable|disable]
595. SyncE Clear <clk_source>
596. SyncE State
597. SyncE Config
598. SyncE ExtClock Output Mode [<ext_clock_enable>] [<clockfreq_out>]
599. SyncE ExtClock Input Mode [<ext_clock_enable>] [<clockfreq_in>]
600. SyncE ExtClock Impedance [<impedance>]
601. SyncE ExtClock Input Status

< end of list>

Alphabetical List of CLI Commands

A

1. Aggr Configuration
2. Aggr Add <port_list> [<aggr_id>]
3. Aggr Delete <aggr_id>
4. Aggr Lookup [<aggr_id>]
5. Aggr Mode [smac|dmac|ip|port] [enable|disable]

C

6. Config Backup Binary <hostname> <file_name>
7. Config Restore Binary <hostname> <file_name>
8. Config Default [keep_ip]

E

9. EPS create [<inst>] [domport] [1p1|1f1] [<flow_w>] [<flow_p>] [<mep_w>] [<mep_p>] [<mep_aps>] [enable|disable]
10. EtherSAT Collector [enable|disable]
11. EtherSAT Loopback Configuration
12. EtherSAT Loopback SMAC [<smac>]
13. EtherSAT Loopback State [<state>]
14. EtherSAT Loopback Status
15. EtherSAT Loopback TestSidePort [<port>]
16. EtherSAT Loopback Timeout [<timeout>]
17. EtherSAT Loopback VID [<vid>]
18. EVC Configuration [<port_list>] [<policer_id>]
19. EPS config [<inst>] [aps|noaps] [revert|norevert] [unidir|bidir] [w0s|w10s|w30s|w1m|w5m|w12m] [h0s|h100ms|h500ms|h1s|h2s|h5s|h10s]
20. Erps command [fs|ms|clear] <port> <group-id>
21. Erps version [v1|v2] <group-id>
22. EtherSAT PeerProto [enable|disable]
23. EVC Port DEI [<port_list>] [<dei_mode>]
24. EPS command [<inst>] [clear|lockout|forced|manualp|manualw|exercise|freeze|lockoutlocal]
25. Erps add <group-id> <east_port> <west_port> [major|sub] [interconnected] [virtual_channel] [<major-ring-id>]
26. EPS state [<inst>]
27. EtherSAT Config Show
28. Erps reversion [revertive|nonrevertive] <group-id>
29. EtherSAT Profile New <number> [<name>]
30. EVC Port L2CP [<port_list>] [<l2cp_list>] [<mode>]
31. Erps vlan add <vid> <group-id>
32. EtherSAT Profile Delete <number>
33. EVC Policer [<policer_id>] [enable|disable] [<policer_mode>] [<cir>] [<cbs>] [<eir>] [<ebs>]
34. Erps vlan delete <vid> <group-id>
35. EtherSAT Profile Show
36. EVC Add <evc_id> [<vid>] [<ivid>] [<nni_list>] [<learning>] [<policer_id>]
37. Erps mep <east_sf_mep> <west_sf_mep> <east_raps_mep> <west_raps_mep> <group-id>
38. EtherSAT Profile Name Set <number> <name>
39. EVC Delete <evc_id>
40. Erps rpl neighbour <rpl_port> <group-id>
41. Erps rpl owner <rpl_port> <group-id>
42. EtherSAT Profile Flr Set <number> [<ratio>]
43. EVC Lookup [<evc_id>]
44. EtherSAT Profile Linerate Set <number> [<rate>]
45. EVC Status [<evc_id>]

46. Erps rpl neighbour clear <group-id>
47. Erps rpl owner clear <group-id>
48. EtherSAT Profile YellowPCP Set <number> [<pcp_list>]
49. EVC Statistics [<evc_id>] [<port_list>] [<command>] [frames|bytes]
50. Erps hold off timeout <hold_timeout> <group-id>
51. EtherSAT Profile YellowPCPmask Set <number> [<mask>]
52. Erps guard-timeout <guard_timeout> <group-id>
53. EtherSAT Profile Sizemix Set <number> [<size>] [<size>] [<size>] [<size>] [<size
54. >] [<size>] [<size>] [<size>] [<size>] [<size>]
55. EVC ECE Add [<ece_id>] [<ece_id_next>] [uni] [<uni_list>]
    [tag] [<tag_type>] [<vid>] [<pcp>] [<dei>]
    [intag] [<in_type>] [<in_vid>] [<in_pcp>] [<in_dei>]
    [all | (ipv4 [<dscp>]) | (ipv6 [<dscp>])]
    [direction] [<direction>]
    [evc] [<evc_id>] [<policer_id>]
    [pop] [<pop>]
    [policy] [<policy>]
    [outer] [<ot_mode>] [<ot_vid>] [<ot_preserve>] [<ot_pcp>] [<ot_dei>]
    [inner] [<it_type>] [<it_vid>] [<it_preserve>] [<it_pcp>] [<it_dei>]
56. Erps wtr-timeout <wtr_timeout> <group-id>
57. EtherSAT Profile RateDecStep Set <number> [<rate_step>]
58. EVC ECE Delete <ece_id>
59. Erps delete <group-id>
60. EtherSAT Profile StepLength Set <number> [<length>]
61. EVC ECE Lookup [<ece_id>]
62. Erps topologychange [propagate|nopropagate] <group-id>
63. EtherSAT Profile Testmode Set <number> [unidir|bidir|loopback]
64. EVC ECE Status [<ece_id>]
65. Erps configuration [<group-id>] [statistics|clear]
66. EVC ECE Statistics [<ece_id>] [<port_list>] [<command>] [frames|bytes]
67. EtherSAT Profile FrameEncaps Set <number> [l2|l3] [ethtst|customethtst|llcsnap|u
68. dp|tcp]
69. EtherSAT Profile Framefill Set <number> [prbs|fixed] [<pattern>]
70. EtherSAT Profile Frameethtyp Set <number> [<type>]
71. EtherSAT Profile Framellcsnap Set <number> [<id>] [<protocol>]
72. EtherSAT Profile Framemeglevel Set <number> [<level>]
73. EtherSAT Profile FrameIP Set <number> [<destadr>] [<srcadr>] [<dscp>] [<ecn>] [<
74. flags>] [<ttl>]
75. EtherSAT Profile FrameUDP Set <number> [<udpsrcport>] [<udpdestport>]
76. EtherSAT Profile FrameTCP Set <number> [<tcpsrcport>] [<tcpdestport>] [<seq_num>
77.] [<ack_num>] [<control_bits>] [<window_size>]
78. EtherSAT Profile Teststep Set <number> [<step>] [<step>] [<step>] [<step>]
79. EtherSAT Profile Dmthr Insert <number> <threshould_value>
80. EtherSAT Profile Dmthr Remove <number> <threshould_value>
81. EtherSAT Profile Dmvthr Insert <number> <threshould_value>
82. EtherSAT Profile Dmvthr Remove <number> <threshould_value>
83. EtherSAT Profile Config Show <number>
84. EtherSAT Profile Frameformat Show <number>
85. EtherSAT Test New <number> <profile> <address> <in_port> <collector_in_port>
    <in_tag_type> <in_inner_tag_id> <in_inner_pcp>
    <in_outer_tag_id> <in_outer_pcp>
    [<eg_tag_type>] [<eg_inner_tag_id>] [<eg_inner_pcp>]
    [<eg_outer_tag_id>] [<eg_outer_pcp>]
    [<name>]
86. EtherSAT Test Delete <number>
87. EtherSAT Test Start <number>
88. EtherSAT Test Stop <number>
89. EtherSAT Test Show

90. EtherSAT Test Name Set <number> [<name>]
91. EtherSAT Test Profile Set <number> [<profile>]
92. EtherSAT Test Ingress Set <number> [<in_tag_type>] [<in_inner_tag_id>] [<in_inner_pcp>] [<in_outer_tag_id>] [<in_outer_pcp>]
93. EtherSAT Test Egress Set <number> [<eg_tag_type>] [<eg_inner_tag_id>] [<eg_inner_pcp>] [<eg_outer_tag_id>] [<eg_outer_pcp>]
94. EtherSAT Test Address Set <number> [<address>]
95. EtherSAT Test CIR Set <number> [<cir>]
96. EtherSAT Test CBS Set <number> [<cbs>]
97. EtherSAT Test EIR Set <number> [<eir>]
98. EtherSAT Test EBS Set <number> [<ebs>]
99. EtherSAT Test BwParams Set <number> <policer_id>
100. EtherSAT Test Testmacaddr Set <number> [<macaddr>]
101. EtherSAT Test Config Show <number>
102. EtherSAT Test Result Show <number>
103. EtherSAT Test Throughput Show <number> [<step_number>]
104. EtherSAT Test Latency Show <number> [<step_number>]
105. EtherSAT Test Flr Show <number> [<step_number>]
106. EtherSAT Test Back-to-back Show <number> [<step_number>]
107. EtherSAT Test Result Export <number> <hostname> <file_name>.

F

108. Firmware Load <ip_addr_string> <file_name> [<activate>]
109. Firmware IPv6 Load <ipv6_server> <file_name> [<activate>]
110. Firmware Information
111. Firmware Swap
112. Firmware Peripheral Load <hostname> <file_name>
113. Firmware Peripheral Version

H

114. Help

I

115. IP ARP Show
116. IP Configuration
117. IPMC Configuration [mld|igmp]
118. IP DHCP [enable|disable]
119. IPMC Mode [mld|igmp] [enable|disable]
120. IP Setup [<ip_addr>] [<ip_mask>] [<ip_router>]
121. IPMC Flooding [mld|igmp] [enable|disable]
122. IP Ping <ip_addr_string> [(Length <ping_length>)] [(Count <ping_count>)] [(Inter
123. val <ping_interval>)]
124. IPMC Leave Proxy [mld|igmp] [enable|disable]
125. IP DNS [<ip_addr>]
126. IPMC Proxy [mld|igmp] [enable|disable]
127. IP DNS_Proxy [enable|disable]
128. IPMC SSM [mld|igmp] [(Range <prefix> <mask_len>)]
129. IPMC VLAN Add [mld|igmp] <vid>
130. IP IPv6 AUTOCONFIG [enable|disable]
131. IPMC VLAN Delete [mld|igmp] <vid>
132. IP IPv6 Setup [<ipv6_addr>] [<ipv6_prefix>] [<ipv6_router>]
133. IP IPv6 State <ipv6_addr> [enable|disable]
134. IPMC State [mld|igmp] [<vid>] [enable|disable]
135. IP IPv6 Ping6 <ipv6_addr> [(Length <ping_length>)] [(Count <ping_count>)] [(Inte
136. rval <ping_interval>)]
137. IPMC Querier [mld|igmp] [<vid>] [enable|disable]
138. IPMC Compatibility [mld|igmp] [<vid>] [auto|v1|v2|v3]
139. IPMC Fastleave [mld|igmp] [<port_list>] [enable|disable]
140. IPMC Throttling [mld|igmp] [<port_list>] [limit_group_number]
141. IPMC Filtering [mld|igmp] [<port_list>] [add|del] [group_addr]
142. IPMC Router [mld|igmp] [<port_list>] [enable|disable]
143. IPMC Status [mld|igmp] [<vid>]
144. IPMC Groups [mld|igmp] [<vid>]
145. IPMC Version [mld|igmp] [<vid>]
146. IPMC SFM [mld|igmp] [<vid>] [<port_list>]
147. IPMC Parameter RV [mld|igmp] [<vid>] [ipmc_param_rv]
148. IPMC Parameter QI [mld|igmp] [<vid>] [ipmc_param_qi]
149. IPMC Parameter QRI [mld|igmp] [<vid>] [ipmc_param_qri]
150. IPMC Parameter LLQI [mld|igmp] [<vid>] [ipmc_param_llqi]
151. IPMC Parameter URI [mld|igmp] [<vid>] [ipmc_param_uri]
152. IP MVlan [<vid>]
153. IP NTP Configuration
154. IP NTP Mode [enable|disable]
155. IP NTP Server Add <server_index> <ip_addr_string>
156. IP NTP Server Ipv6 Add <server_index> <server_ipv6>
157. IP NTP Server Delete <server_index>

L

158. LACP Configuration [<port_list>]
159. LLDP Configuration [<port_list>]
160. LOAM Control [<port_list>] [enable|disable]
161. Loop Protect Configuration
162. LACP Mode [<port_list>] [enable|disable]
163. LLDP Mode [<port_list>] [enable|disable|rx|tx]
164. LOAM Mode [<port_list>] [active|passive]
165. Loop Protect Mode [enable|disable]
166. LACP Key [<port_list>] [<key>]
167. LLDP Optional_TLV [<port_list>] [port_descr|sys_name|sys_descr|sys_capa|mgmt_addr] [enable|disable]
168. LOAM Mib-retrival-support [<port_list>] [enable|disable]
169. Logout
170. Loop Protect Transmit [<transmit-time>]
171. LACP Prio [<port_list>] [<prio>]
172. LLDP Interval [<interval>]
173. LOAM Variable-retrieve [<port_list>] [local-info|remote-info]
174. Loop Protect Shutdown [<shutdown-time>]
175. LACP System Prio [<sysprio>]
176. LLDP Hold [<hold>]
177. LOAM Remote_loopback_support [<port_list>] [enable|disable]
178. Loop Protect Port Configuration [<port_list>]
179. LACP Role [<port_list>] [active|passive]
180. LLDP Delay [<delay>]
181. LOAM Remote_loopback_oper [<port_list>] [enable|disable]
182. Loop Protect Port Mode [<port_list>] [enable|disable]
183. LACP Status [<port_list>]
184. LLDP Reinit [<reinit>]
185. LOAM Link_monitoring_support [<port_list>] [enable|disable]
186. Loop Protect Port Action [<port_list>] [shutdown|trap|log|shut_log|shut_trap|log_trap|all]
187. LACP Statistics [<port_list>] [clear]
188. LLDP Statistics [<port_list>] [clear]
189. Loop Protect Port Transmit [<port_list>] [enable|disable]
190. LACP Timeout [<port_list>] [fast|slow]
191. LLDP Info [<port_list>]
192. Loop Protect Status [<port_list>]
193. LLDP cdp_aware [<port_list>] [enable|disable]
194. LOAM Frame_error_event [<port_list>] [<error_window>] [<error_threshold>]
195. LOAM Symbol_period_error_event [<port_list>] [<error_window>] [<error_threshold>]
196. LOAM Frame_error_seconds_summary_event [<port_list>] [<error_window>] [<error_threshold>]
197. LOAM Status [<port_list>]
198. LOAM Link_monitor_status [<port_list>]
199. LOAM Statistics [<port_list>] [clear]

M

204. MAC Configuration [<port_list>]
205. MEP config [<inst>] [mep|mip] [down|up] [<port>] [domport|domevc] [<level>] [itu|ieee] [<meg>] [<mep>] [<vid>] [<flow>] [enable|disable]
206. Mirror Configuration [<port_list>]
207. MVR Configuration
208. MAC Add <mac_addr> <port_list> [<vid>]
209. MEP peer MEP [<inst>] [<mep>] [<mac_addr>] [enable|disable]
210. Mirror Port [<port>|disable]
211. MVR Mode [enable|disable]
212. MAC Delete <mac_addr> [<vid>]
213. MEP cc config [<inst>] [<prio>] [300s|100s|10s|1s|6m|1m|6h] [enable|disable]
214. MVR VLAN Setup [<mvid>] [add|del|upd] [(Name <mvr_name>)]
215. MAC Lookup <mac_addr> [<vid>]
216. MEP lm config [<inst>] [<prio>] [uni|multi] [single|dual] [10s|1s|6m|1m|6h] [<flr>] [enable|disable]
217. Mirror Mode [<port_list>] [enable|disable|rx|tx]
218. MVR VLAN Mode [<vid>|<mvr_name>] [dynamic|compatible]
219. MAC Agetime [<age_time>]
220. MEP aps config [<inst>] [<prio>] [uni|multi] [laps|raps] [<octet>] [enable|disable]
221. MVR VLAN Port [<vid>|<mvr_name>] [<port_list>] [source|receiver|inactive]
222. MAC Learning [<port_list>] [auto|disable|secure]
223. MEP client config [<inst>] [domport|domevc] [<level>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>] [<cflow>]
224. MVR VLAN LLQI [<vid>|<mvr_name>] [mvr_param_llqi]
225. MAC Dump [<mac_max>] [<mac_addr>] [<vid>]
226. MEP ais config [<inst>] [<prio>] [1s|1m] [set|clear] [enable|disable]
227. MVR VLAN Channel [<vid>|<mvr_name>] [add|del|upd] [channel] [channel_bound] [(Name <grp_name>)]
228. MAC Statistics [<port_list>]
229. MEP lck config [<inst>] [<prio>] [1s|1m] [enable|disable]
230. MVR VLAN Priority [<vid>|<mvr_name>] [priority] [tagged|untagged]
231. MAC Flush
232. MEP lt config [<inst>] [<prio>] [<mac_addr>] [<mep>] [<ttl>] [enable|disable]
233. MVR Immediate Leave [<port_list>] [enable|disable]
234. MEP lb config [<inst>] [set|clear] [<prio>] [uni|multi] [<mac_addr>] [<mep>] [<tosend>] [<size>] [<gap>] [enable|disable]
235. MVR Status [<vid>] [clear]
236. MEP dm config [<inst>] [<prio>] [uni|multi] [<mep>] [oneway|twoway] [std|prop] [rdtrp|flow] [<gap>] [<count>] [us|ns] [keep|reset] [d2ford1] [enable|disable]
237. MVR Groups [<vid>]
238. MEP tst config [<inst>] [set|clear] [<prio>] [<mep>] [no_seq|seq] [<rate>] [<size>] [allzero|allone|onezero] [enable|disable]
239. MVR SFM [<vid>] [<port_list>]
240. MEP state [<inst>]
241. MEP lm state [<inst>]
242. MEP lm clear <inst>
243. MEP lt state [<inst>]
244. MEP lb state [<inst>]
245. MEP dm state [<inst>]
246. MEP dm clear <inst>
247. MEP tst state [<inst>]
248. MEP tst clear <inst>

P

249. Port Configuration [<port_list>] [up|down]
250. Port SharedPort [internal|external]
251. PTP Configuration [<clockinst>]
252. PVLAN Configuration [<port_list>]
253. Port Mode [<port_list>] [auto|10hdx|10fdx|100hdx|100fdx|1000fdx|2500fdx|10gfdx|sfp_auto_ams]
254. PTP PortState <clockinst> [<port_list>] [enable|disable|internal]
255. PVLAN Add <pvlan_id> [<port_list>]
256. Port Flow Control [<port_list>] [enable|disable]
257. PTP ClockCreate <clockinst> [<devtype>] [<twostep>] [<protocol>] [<oneway>] [<clockid>] [<tag_enable>] [<vid>] [<prio>]
258. PVLAN Delete <pvlan_id>
259. Port State [<port_list>] [enable|disable]
260. PTP ClockDelete <clockinst> [<devtype>]
261. PVLAN Lookup [<pvlan_id>]
262. Port MaxFrame [<port_list>] [<max_frame>]
263. PTP DefaultDS <clockinst> [<priority1>] [<priority2>] [<domain>]
264. PVLAN Isolate [<port_list>] [enable|disable]
265. Port Power [<port_list>] [enable|disable|actiphy|dynamic]
266. PTP CurrentDS <clockinst>
267. Port Excessive [<port_list>] [discard|restart]
268. PTP ParentDS <clockinst>
269. Port Statistics [<port_list>] [<command>] [up|down]
270. PTP Timingproperties <clockinst> [<utcoffset>] [<valid>] [<leap59>] [<leap61>] [<timetrac>] [<freqtrac>] [<ptptimescale>] [<timesource>]
271. Port VeriPHY [<port_list>]
272. PTP PortDataSet <clockinst> [<port_list>] [<announceintv>] [<announceto>] [<syncintv>] [<delaymech>] [<minpdelayreqintv>] [<delayasymmetry>] [<ingressLatency>] [<egressLatency>]
273. PTP LocalClock <clockinst> [update|show|ratio] [<clockratio>]
274. Port SFP [<port_list>]
275. PTP Filter <clockinst> [<def_delay_filt>] [<period>] [<dist>]
276. PTP Servo <clockinst> [<displaystates>] [<ap_enable>] [<ai_enable>] [<ad_enable>] [<ap>] [<ai>] [<ad>]
277. PTP SlaveTableUnicast <clockinst>
278. PTP UniConfig <clockinst> [<index>] [<duration>] [<ip_addr>]
279. PTP ForeignMasters <clockinst> [<port_list>]
280. PTP EgressLatency [show|clear]
281. PTP MasterTableUnicast <clockinst>
282. PTP ExtClock Output Mode [<ext_clock_enable>] [<clockfreq_out>]
283. PTP ExtClock Input Mode [<ext_clock_enable>] [<clockfreq_in>]
284. PTP ExtClock Impedance [<impedance>]
285. PTP ExtClock Input Status [<clear>]
286. Port DMI Configuration [<port_list>] [<dmi_rx_pwr_int_thr>]
287. Port DMI Statistics [<port_list>]
288. Port Description [<port_list>] [<name>]

Q

289. QoS Configuration [<port_list>]
290. QoS Port Classification Class [<port_list>] [<class>]
291. QoS Port Classification DPL [<port_list>] [<dpl>]
292. QoS Port Classification PCP [<port_list>] [<pcp>]
293. QoS Port Classification DEI [<port_list>] [<dei>]
294. QoS Port Classification Tag [<port_list>] [enable|disable]
295. QoS Port Classification Map [<port_list>] [<pcp_list>] [<dei_list>] [<class>] [<dpl>]
296. QoS Port Classification DSCP [<port_list>] [enable|disable]
297. QoS Port Policer Mode [<port_list>] [enable|disable]
298. QoS Port Policer Rate [<port_list>] [<rate>]
299. QoS Port Policer Unit [<port_list>] [kbps|fps]
300. QoS Port Policer FlowControl [<port_list>] [enable|disable]
301. QoS Port QueuePolicer Mode [<port_list>] [<queue_list>] [enable|disable]
302. QoS Port QueuePolicer Rate [<port_list>] [<queue_list>] [<bit_rate>]
303. QoS Port Scheduler Mode [<port_list>] [strict|weighted]
304. QoS Port Scheduler Weight [<port_list>] [<queue_list>] [<weight>]
305. QoS Port Shaper Mode [<port_list>] [enable|disable]
306. QoS Port Shaper Rate [<port_list>] [<bit_rate>]
307. QoS Port QueueShaper Mode [<port_list>] [<queue_list>] [enable|disable]
308. QoS Port QueueShaper Rate [<port_list>] [<queue_list>] [<bit_rate>]
309. QoS Port QueueShaper Excess [<port_list>] [<queue_list>] [enable|disable]
310. QoS Port TagRemarking Mode [<port_list>] [classified|default|mapped]
311. QoS Port TagRemarking PCP [<port_list>] [<pcp>]
312. QoS Port TagRemarking DEI [<port_list>] [<dei>]
313. QoS Port TagRemarking DPL [<port_list>] [<dpl>] [<dpl>] [<dpl>] [<dpl>]
314. QoS Port TagRemarking Map [<port_list>] [<class_list>] [<dpl_list>] [<pcp>] [<dei>]
315. QoS Port DSCP Translation [<port_list>] [enable|disable]
316. QoS Port DSCP Classification [<port_list>] [none|zero|selected|all]
317. QoS Port DSCP EgressRemark [<port_list>] [disable|enable|remap]
318. QoS DSCP Map [<dscp_list>] [<class>] [<dpl>]
319. QoS DSCP Translation [<dscp_list>] [<trans_dscp>]
320. QoS DSCP Trust [<dscp_list>] [enable|disable]
321. QoS DSCP Classification Mode [<dscp_list>] [enable|disable]
322. QoS DSCP Classification Map [<class_list>] [<dscp>]
323. QoS DSCP EgressRemap [<dscp_list>] [<dscp>]
324. QoS Port Storm Unicast [<port_list>] [enable|disable] [<rate>] [kbps|fps]
325. QoS Port Storm Broadcast [<port_list>] [enable|disable] [<rate>] [kbps|fps]
326. QoS Port Storm Unknown [<port_list>] [enable|disable] [<rate>] [kbps|fps]
327. QoS WRED [<queue_list>] [enable|disable] [<min_th>] [<mdp_1>] [<mdp_2>] [<mdp_3>]
328. QoS QCL Add [<qce_id>] [<qce_id_next>]
     [<port_list>]
     [<tag>] [<vid>] [<pcp>] [<dei>] [<smac>] [<dmac_type>]
     [(etype [<etype>]) |
     (LLC [<DSAP>] [<SSAP>] [<control>]) |
     (SNAP [<PID>]) |
     (ipv4 [<protocol>] [<sip>] [<dscp>] [<fragment>] [<sport>] [<dport>]) |
     (ipv6 [<protocol>] [<sip_v6>] [<dscp>] [<sport>] [<dport>])]
     [<class>] [<dp>] [<classified_dscp>]
329. QoS QCL Delete <qce_id>
330. QoS QCL Lookup [<qce_id>]
331. QoS QCL Status [combined|static|conflicts]
332. QoS QCL Refresh

S

333. Security AAA Configuration
334. Security Network ACL Configuration [<port_list>]
335. Security Network ARP Inspection Configuration
336. Security Network DHCP Relay Configuration
337. Security Network IP Source Guard Configuration
338. Security Network Limit Configuration [<port_list>]
339. Security Network NAS Configuration [<port_list>]
340. Security Network Psec Switch [<port_list>]
341. Security Switch Access Configuration
342. Security Switch HTTPS Configuration
343. Security Switch Privilege Level Configuration
344. Security Switch RMON Statistics Add <stats_id> <data_source>
345. Security Switch SNMP Configuration
346. Security Switch SSH Configuration
347. Security Switch Users Configuration
348. STP Configuration
349. SyncE Nominate [<clk_source>] [enable|disable] [<port>]
    [ql_none|ql_prc|ql_ssua|ql_ssub|ql_eec2|ql_eec1|ql_dnu] [<holdoff>] [master|slave|forced]
350. System Configuration [all | (port <port_list>)]
351. System Log Configuration
352. System Timezone Configuration
353. System Version
354. Security AAA Timeout [<timeout>]
355. Security Network ACL Action [<port_list>] [permit|deny] [<rate_limiter>] [<port_redirect>] [<logging>]
    [<shutdown>]
356. Security Network ARP Inspection Mode [enable|disable]
357. Security Network DHCP Relay Mode [enable|disable]
358. Security Network IP Source Guard Mode [enable|disable]
359. Security Network Limit Mode [enable|disable]
360. Security Network NAS Mode [enable|disable]
361. Security Network Psec Port [<port_list>]
362. Security Switch Access Mode [enable|disable]
363. Security Switch HTTPS Mode [enable|disable]
364. Security Switch Privilege Level Group <group_name> [<cro>] [<crw>] [<sro>] [<srw>]
365. Security Switch RMON Statistics Delete <stats_id>
366. Security Switch SNMP Mode [enable|disable]
367. Security Switch SSH Mode [enable|disable]
368. Security Switch Users Add <user_name> <password> <privilege_level>
369. STP Version [<stp_version>]
370. SyncE Selection [manual|selected|nonrevertive|revertive|holdover|freerun] [<clk_source>] [<wtr_time>]
    [ho_none|ho_prc|ho_ssua|ho_ssub|ho_eec2|ho_eec1|ho_dnu|ho_inv]
    [fr_none|fr_prc|fr_ssua|fr_ssub|fr_eec2|fr_eec1|fr_dnu|fr_inv]
371. System Log Server Mode [enable|disable]
372. System Name [<name>]
373. System Timezone Offset [<offset>]
374. Security AAA Deadtime [<dead_time>]
375. Security Network ACL Policy [<port_list>] [<policy>]
376. Security Network ARP Inspection Port Mode [<port_list>] [enable|disable]
377. Security Network DHCP Relay Server [<ip_addr>]
378. Security Network IP Source Guard Port Mode [<port_list>] [enable|disable]
379. Security Network Limit Aging [enable|disable]
380. Security Network NAS State [<port_list>] [auto|authorized|unauthorized|single|multi|macbased]
381. Security Switch Access Add <access_id> <start_ip_addr> <end_ip_addr> [web] [snmp] [telnet]
382. Security Switch HTTPS Redirect [enable|disable]
383. Security Switch Privilege Level Current
384. Security Switch RMON Statistics Lookup [<stats_id>]

385. Security Switch SNMP Version [1|2c|3]
386. Security Switch Users Delete <user_name>
387. STP Txhold [<holdcount>]
388. SyncE Priority [<clk_source>] [<clk_priority>]
389. System Contact [<contact>]
390. System Log Server Address [<ip_addr_string>]
391. System Timezone Acronym [<acronym>]
392. Security AAA RADIUS [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]
393. Security Network ACL Rate [<rate_limiter_list>] [<rate>]
394. Security Network ARP Inspection Entry [<port_list>] add|delete <vid> <allowed_mac> <allowed_ip>
395. Security Network IP Source Guard limit [<port_list>] [<dynamic_entry_limit>|unlimited]
396. Security Network Limit Agetime [<age_time>]
397. Security Network NAS Reauthentication [enable|disable]
398. Security Switch Access Ipv6 Add <access_id> <start_ipv6_addr> <end_ipv6_addr> [web] [snmp] [telnet]
399. Security Switch RMON History Add <history_id> <data_source> [<interval>] [<buckets>]
400. Security Switch SNMP Read Community [<community>]
401. STP MaxHops [<maxhops>]
402. SyncE Ssm [<port>] [enable|disable]
403. System DST Configuration
404. System Location [<location>]
405. System Log Level [info|warning|error]
406. Security AAA ACCT_RADIUS [<server_index>] [enable|disable] [<ip_addr_string>] [<
407. secret>] [<server_port>]
408. Security Network ACL Add [<ace_id>] [<ace_id_next>]
        [(port <port>)] [(policy <policy> <policy_bitmask>)]
        [<vid>] [<tag_prio>] [<dmac_type>]
        [(etype [<etype>] [<smac>] [<dmac>]) |
         (arp [<sip>] [<dip>] [<smac>] [<arp_opcode>] [<arp_flags>]) |
         (ip   [<sip>] [<dip>] [<protocol>] [<ip_flags>]) |
         (icmp [<sip>] [<dip>] [<icmp_type>] [<icmp_code>] [<ip_flags>]) |
         (udp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>]) |
         (tcp [<sip>] [<dip>] [<sport>] [<dport>] [<ip_flags>] [<tcp_flags>])]
        [permit|deny] [<rate_limiter>] [<port_redirect>] [<logging>] [<shutdown>]
409. Security Network ARP Inspection Status [<port_list>]
410. Security Network DHCP Relay Information Mode [enable|disable]
411. Security Network IP Source Guard Entry [<port_list>] add|delete <vid> <allowed_ip> <ip_mask>
412. Security Network Limit Port [<port_list>] [enable|disable]
413. Security Network NAS ReauthPeriod [<reauth_period>]
414. Security Switch Access Delete <access_id>
415. Security Switch RMON History Delete <history_id>
416. Security Switch SNMP Write Community [<community>]
417. STP MaxAge [<max_age>]
418. SyncE Clear <clk_source>
419. System DST Mode [disable|recurring|non-recurring]
420. Security AAA TACACS+ [<server_index>] [enable|disable] [<ip_addr_string>] [<secret>] [<server_port>]
421. Security Network ACL Delete <ace_id>
422. Security Network ARP Inspection Translation
423. Security Network DHCP Relay Information Policy [replace|keep|drop]
424. Security Network IP Source Guard Status [<port_list>]
425. Security Network Limit Limit [<port_list>] [<limit>]
426. Security Network NAS EapolTimeout [<eapol_timeout>]
427. Security Switch Access Lookup [<access_id>]
428. Security Switch RMON History Lookup [<history_id>]
429. Security Switch SNMP Trap Mode [enable|disable]
430. STP FwdDelay [<delay>]
431. SyncE State
432. System DST start <week> <day> <month> <date> <year> <hour> <minute>
433. System Log Lookup [<log_id>] [all|info|warning|error]

434. Security Network ACL Lookup [<ace_id>]
435. Security Network DHCP Relay Statistics [clear]
436. Security Network IP Source Guard Translation
437. Security Network Limit Action [<port_list>] [none|trap|shut|trap_shut]
438. Security Network NAS Agetime [<age_time>]
439. Security Switch Access Clear
440. Security Switch Auth Configuration
441. Security Switch RMON Alarm Add <alarm_id> <interval> <alarm_variable> [absolute|delta] <rising_threshold> <rising_event_index> <falling_threshold> <falling_event_index> [rising|falling|both]
442. Security Switch SNMP Trap Version [1|2c|3]
443. STP CName [<config-name>] [<integer>]
444. SyncE Config
445. System DST end <week> <day> <month> <date> <year> <hour> <minute>
446. System Log Clear [all|info|warning|error]
447. System Reboot
448. Security Network ACL Clear
449. Security Network Limit Reopen [<port_list>]
450. Security Network NAS Holdtime [<hold_time>]
451. Security Switch Access Statistics [clear]
452. Security Switch Auth Method [console|telnet|ssh|web] [none|local|radius|tacacs+] [enable|disable]
453. Security Switch RMON Alarm Delete <alarm_id>
454. Security Switch SNMP Trap Community [<community>]
455. STP bpduFilter [enable|disable]
456. SyncE ExtClock Output Mode [<ext_clock_enable>] [<clockfreq_out>]
457. System Date
458. System DST Offset [<dst_offset>]
459. Security AAA Statistics [<server_index>]
460. Security Network ACL Status [combined|static|link_oam|loop_protect|dhcp|ptp|arp_inspection|mep|ipmc|ip_source_guard|conflicts]
461. Security Network NAS RADIUS_QoS [global|<port_list>] [enable|disable]
462. Security Switch RMON Alarm Lookup [<alarm_id>]
463. Security Switch SNMP Trap Destination [<ip_addr_string>]
464. STP bpduGuard [enable|disable]
465. SyncE ExtClock Input Mode [<ext_clock_enable>] [<clockfreq_in>]
466. System PowerSupply Status [<power_supply>]
467. Security Network ACL Port State [<port_list>] [enable|disable]
468. Security Network NAS RADIUS_VLAN [global|<port_list>] [enable|disable]
469. Security Switch RMON Event Add <event_id> [none|log|trap|log_trap] [<community>] [<description>]
470. Security Switch SNMP Trap IPv6 Destination [<ipv6_addr>]
471. STP recovery [<timeout>]
472. SyncE ExtClock Impedance [<impedance>]
473. Security Network NAS Guest_VLAN [global|<port_list>] [enable|disable] [<vid>] [<reauth_max>] [<allow_if_eapol_seen>]
474. Security Switch RMON Event Delete <event_id>
475. Security Switch SNMP Trap Authentication Failure [enable|disable]
476. STP Status [<msti>] [<stp_port_list>]
477. SyncE ExtClock Input Status
478. Security Network NAS Authenticate [<port_list>] [now]
479. Security Switch RMON Event Lookup [<event_id>]
480. Security Switch SNMP Trap Link-up [enable|disable]
481. STP Msti Priority [<msti>] [<priority>]
482. Security Network NAS Statistics [<port_list>] [clear|eapol|radius]
483. Security Switch SNMP Trap Inform Mode [enable|disable]
484. STP Msti Map [<msti>] [clear]
485. Security Switch SNMP Trap Inform Timeout [<timeout>]
486. STP Msti Add <msti> <vid-range>

487. Security Switch SNMP Trap Inform Retry Times [<retries>]
488. STP Port Configuration [<stp_port_list>]
489. Security Switch SNMP Trap Probe Security Engine ID [enable|disable]
490. STP Port Mode [<stp_port_list>] [enable|disable]
491. Security Switch SNMP Trap Security Engine ID [<engineid>]
492. STP Port Edge [<stp_port_list>] [enable|disable]
493. Security Switch SNMP Trap Security Name [<security_name>]
494. STP Port AutoEdge [<stp_port_list>] [enable|disable]
495. Security Switch SNMP Engine ID [<engineid>]
496. STP Port P2P [<stp_port_list>] [enable|disable|auto]
497. Security Switch SNMP Community Add <community> [<ip_addr>] [<ip_mask>]
498. STP Port RestrictedRole [<stp_port_list>] [enable|disable]
499. Security Switch SNMP Community Delete <index>
500. STP Port RestrictedTcn [<stp_port_list>] [enable|disable]
501. Security Switch SNMP Community Lookup [<index>]
502. STP Port bpduGuard [<stp_port_list>] [enable|disable]
503. Security Switch SNMP User Add <engineid> <user_name> [MD5|SHA] [<auth_password>] [DES] [<priv_password>]
504. STP Port Statistics [<stp_port_list>] [clear]
505. Security Switch SNMP User Delete <index>
506. STP Port Mcheck [<stp_port_list>]
507. Security Switch SNMP User Changekey <engineid> <user_name> <auth_password> [<priv_password>]
508. STP Msti Port Configuration [<msti>] [<stp_port_list>]
509. Security Switch SNMP User Lookup [<index>]
510. STP Msti Port Cost [<msti>] [<stp_port_list>] [<path_cost>]
511. Security Switch SNMP Group Add <security_model> <security_name> <group_name>
512. STP Msti Port Priority [<msti>] [<stp_port_list>] [<priority>]
513. Security Switch SNMP Group Delete <index>
514. Security Switch SNMP Group Lookup [<index>]
515. Security Switch SNMP View Add <view_name> [included|excluded] <oid_subtree>
516. Security Switch SNMP View Delete <index>
517. Security Switch SNMP View Lookup [<index>]
518. Security Switch SNMP Access Add <group_name> <security_model> <security_level> [<read_view_name>] [<write_view_name>]
519. Security Switch SNMP Access Delete <index>
520. Security Switch SNMP Access Lookup [<index>]
521. Security Switch HTTPS Certificate Generate [rsa|dsa]
522. Security Switch HTTPS Certificate Load <hostname> <file_name>
523. Security Switch HTTPS Certificate Show
524. System Load
525. Security Network DHCP Snooping Configuration
526. Security Network DHCP Snooping Mode [enable|disable]
527. Security Network DHCP Snooping Port Mode [<port_list>] [trusted|untrusted]
528. Security Network DHCP Snooping Statistics [<port_list>] [clear]
529. System ZTP Auto Discovery [enable|disable]
530. System Banner Exec [<exec-banner-txt>]
531. System Banner Login [<login-banner-txt>]
532. System Banner MOTD [<motd-banner-txt>]

U

533. Up

V

534. VCL Macvlan Configuration
535. VLAN Configuration [<port_list>]
536. VLAN Translation Add <group_id> <vid> <trans_vid>
537. VCL Macvlan Add <mac_addr> <vid> [<port_list>]
538. VLAN PVID [<port_list>] [<vid>|none]
539. VLAN Translation Delete <group_id> <vid>
540. VCL Macvlan Del <mac_addr>
541. VLAN FrameType [<port_list>] [all|tagged|untagged]
542. VLAN Translation Group [<port_list>] [<group_id>]
543. VCL Status [combined|static|nas|all]
544. VLAN IngressFilter [<port_list>] [enable|disable]
545. VLAN tx_tag [<port_list>] [untag_pvid|untag_all|tag_all]
546. VLAN PortType [<port_list>] [unaware|c-port|s-port|s-custom-port]
547. VLAN MPort PortType [unaware|c-port|s-port|s-custom-port]
548. VLAN remove <vid>|<name> [<port_list>]
549. VLAN EtypeCustomSport [<etype>]
550. VLAN Add <vid>|<name> [<ports_list>]
551. VLAN Forbidden Add <vid>|<name> [<port_list>]
552. VLAN Delete <vid>|<name>
553. VLAN Forbidden Delete <vid>|<name>
554. VLAN Forbidden Lookup [<vid>] [(name <name>)]
555. VLAN Lookup [<vid>] [(name <name>)] [combined|static|nas|mvr|evc|all]
556. VLAN Name Add <name> <vid>
557. VLAN Name Delete <name>
558. VLAN Name Lookup [<name>]
559. VLAN Status [<port_list>] [combined|static|nas|mvr|mstp|erps|mep|vcl|all|conflicts]
560. VCL ProtoVlan Protocol Add Eth2 <ether_type>|arp|ip|ipx|at <group_id>
561. VCL ProtoVlan Protocol Add Snap <oui>|rfc_1042|snap_8021h <pid> <group_id>
562. VCL ProtoVlan Protocol Add Llc <dsap> <ssap> <group_id>
563. VCL ProtoVlan Protocol Delete Eth2 <ether_type>|arp|ip|ipx|at
564. VCL ProtoVlan Protocol Delete Snap <oui>|rfc_1042|snap_8021h <pid>
565. VCL ProtoVlan Protocol Delete Llc <dsap> <ssap>
566. VCL ProtoVlan Vlan Add [<port_list>] <group_id> <vid>
567. VCL ProtoVlan Vlan Delete [<port_list>] <group_id>
568. VCL ProtoVlan Conf
569. VCL IPVlan Configuration [<vce_id>]
570. VCL IPVlan Add [<vce_id>] <ip_addr_mask> <vid> [<port_list>]
571. VCL IPVlan Delete <vce_id>

CLI Commands with Privilege Levels

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
Aggr Add	X		
Aggr Configuration	X	X	
Aggr Delete	X		
Aggr Lookup	X	X	
Aggr Mode	X	X	
Config Backup Binary	X		
Config Default	X		
Config Restore Binary	X		
EPS command	X	X	
EPS config	X	X	
EPS create	X	X	
EPS state	X	X	
EVC Add	X	X	
EVC Configuration	X	X	
EVC Delete	X	X	
EVC ECE Add	X	X	
EVC ECE Delete	X	X	
EVC ECE Lookup	X	X	
EVC ECE Status	X	X	
EVC Lookup	X	X	
EVC Policer	X	X	
EVC Port Addr	X	X	
EVC Port DEI	X	X	
EVC Port L2CP	X	X	
EVC Port Tag	X	X	
EVC Statistics	X	X	
EVC Status	X	X	
Erps add	X		
Erps command	X		
Erps configuration	X	X	
Erps delete	X		
Erps guard	X		
Erps holdoff	X		
Erps mep	X		
Erps reversion	X		
Erps rpl neighbour	X		
Erps rpl neighbour clear	X		
Erps rpl owner	X		
Erps rpl owner clear	X		
Erps topologychange	X		
Erps version	X		
Erps vlan add	X		
Erps vlan delete	X		
Erps wtr	X		
EtherSAT Loopback Configuration	X		
EtherSAT Loopback SMAC	X		

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
EtherSAT Loopback State (see the related manual)	*	*	*
Firmware IPv6 Load	X		
Firmware Information	X		
Firmware Load	X		
Firmware Swap	X		
Firmware Peripheral Version	X		
Firmware Peripheral Load	X		
Help	X	X	X
IP ARP Show	X	X	
IP Configuration	X	X	
IP DHCP	X	X	
IP DNS	X	X	
IP DNS_Proxy	X	X	
IP IPv6 AUTOCONFIG	X	X	
IP IPv6 Ping6	X		
IP IPv6 Setup	X		
IP IPv6 State	X		
IP MVlan	X		
IP NTP Configuration	X	X	
IP NTP Mode	X	X	
IP NTP Server Add	X		
IP NTP Server Delete	X		
IP NTP Server Ipv6 Add	X		
IP Ping	X		
IP Setup	X		
IPMC Compatibility	X	X	
IPMC Configuration	X	X	
IPMC Fastleave	X	X	
IPMC Filtering	X	X	
IPMC Flooding	X	X	
IPMC Groups	X	X	
IPMC Leave Proxy	X	X	
IPMC Mode	X	X	
IPMC Parameter LLQI	X	X	
IPMC Parameter QI	X	X	
IPMC Parameter QRI	X	X	
IPMC Parameter RV	X	X	
IPMC Parameter URI	X	X	
IPMC Proxy	X	X	
IPMC Querier	X	X	
IPMC Router	X	X	
IPMC SFM	X	X	
IPMC SSM	X	X	
IPMC State	X	X	
IPMC Status	X	X	
IPMC Throttling	X	X	
IPMC Version	X	X	
LACP Configuration	X	X	

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
LACP Key	X	X	
LACP Mode	X	X	
LACP Role	X	X	
LACP Statistics	X	X	
LACP Status	X	X	
LACP Timeout	X	X	
LACP Prio	X	X	
LACP System Prio	X	X	
LLDP Configuration	X	X	
LLDP Delay	X	X	
LLDP Hold	X	X	
LLDP Info	X	X	
LLDP Interval	X	X	
LLDP Mode	X	X	
LLDP Optional_TLV	X	X	
LLDP Reinit	X	X	
LLDP Statistics	X	X	
LLDP cdp_aware	X	X	
LOAM Control	X	X	
LOAM Frame_error_event	X		
LOAM Frame_error_seconds_summary_event	X		
LOAM Link_monitor_status	X	X	
LOAM Link_monitoring_support	X	X	
LOAM Mib	X	X	
LOAM Mode	X	X	
LOAM Remote_loopback_oper	X	X	
LOAM Remote_loopback_support	X	X	
LOAM Statistics	X	X	
LOAM Status	X	X	
LOAM Symbol_period_error_event	X		
LOAM Variable	X	X	
Logout	X	X	X
Loop Protect Configuration	X	X	
Loop Protect Mode	X	X	
Loop Protect Port Action	X	X	
Loop Protect Port Configuration	X	X	
Loop Protect Port Mode	X	X	
Loop Protect Port Transmit	X	X	
Loop Protect Shutdown	X	X	
Loop Protect Status	X	X	
Loop Protect Transmit	X	X	
MAC Add	X		
MAC Agetime	X	X	
MAC Configuration	X	X	
MAC Delete	X		
MAC Dump	X	X	
MAC Flush	X		
MAC Learning	X	X	

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
MAC Lookup	X	X	
MAC Statistics	X	X	
MEP ais config	X	X	
MEP aps config	X	X	
MEP cc config	X	X	
MEP client config	X	X	
MEP config	X	X	
MEP dm clear	X	X	
MEP dm config	X	X	
MEP dm state	X	X	
MEP lb config	X	X	
MEP lb state	X	X	
MEP lck config	X	X	
MEP lm clear	X	X	
MEP lm config	X	X	
MEP lm state	X	X	
MEP lt config	X	X	
MEP lt state	X	X	
MEP peer MEP	X	X	
MEP state	X	X	
MEP tst clear	X	X	
MEP tst config	X	X	
MEP tst state	X	X	
MVR Configuration	X	X	
MVR Group	X	X	
MVR Immediate Leave	X	X	
MVR Mode	X	X	
MVR Multicast VLAN	X	X	
MVR Port Mode	X	X	
MVR Port Type	X	X	
MVR Status	X	X	
Mirror Configuration	X	X	
Mirror Mode	X	X	
Mirror Port	X	X	
PTP Configuration	X	X	
PTP PortState	X	X	
PTP ClockCreate	X	X	
PTP ClockDelete	X	X	
PTP DefaultDS	X	X	
PTP CurrentDS	X	X	
PTP ParentDS	X	X	
PTP Timingproperties	X	X	
PTP PortDataSet	X	X	
PTP LocalClock	X	X	
PTP Filter	X	X	
PTP Servo	X	X	
PTP SlaveTableUnicast	X	X	
PTP UniConfig	X	X	

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
PTP ForeignMasters	X	X	
PTP EgressLatency	X	X	
PTP MasterTableUnicast	X	X	
PTP ExtClock Output Mode	X	X	
PTP ExtClock Input Mode	X	X	
PTP ExtClock Impedance	X	X	
PTP ExtClock Input Status	X	X	
PVLAN Add	X		
PVLAN Configuration	X	X	
PVLAN Delete	X		
PVLAN Isolate	X	X	
PVLAN Lookup	X	X	
Port Configuration	X	X	
Port DMI Configuration	X	X	X
Port DMI Statistics	X	X	X
Port Excessive	X	X	
Port Flow Control	X	X	
Port MaxFrame	X	X	
Port Mode	X	X	
Port Power	X	X	
Port SFP	X	X	X
Port SharedPort	X	X	
Port State	X	X	
Port Statistics	X	X	X
Port VeriPHY	X		
QoS Configuration	X	X	
QoS DSCP Classification Map	X	X	
QoS DSCP Classification Mode	X	X	
QoS DSCP EgressRemap	X	X	
QoS DSCP Map	X	X	
QoS DSCP Translation	X	X	
QoS DSCP Trust	X	X	
QoS Port Classification Class	X	X	
QoS Port Classification DEI	X	X	
QoS Port Classification DPL	X	X	
QoS Port Classification DSCP	X	X	
QoS Port Classification Map	X	X	
QoS Port Classification PCP	X	X	
QoS Port Classification Tag	X	X	
QoS Port DSCP Classification	X	X	
QoS Port DSCP EgressRemark	X	X	
QoS Port DSCP Translation	X	X	
QoS Port Policer FlowControl	X	X	
QoS Port Policer Mode	X	X	
QoS Port Policer Rate	X	X	
QoS Port Policer Unit	X	X	
QoS Port QueuePolicer Mode	X	X	
QoS Port QueuePolicer Rate	X	X	

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
QoS Port QueueShaper Excess	X	X	
QoS Port QueueShaper Mode	X	X	
QoS Port QueueShaper Rate	X	X	
QoS Port Scheduler Mode	X	X	
QoS Port Scheduler Weight	X	X	
QoS Port Shaper Mode	X	X	
QoS Port Shaper Rate	X	X	
QoS Port TagRemarking DEI	X	X	
QoS Port TagRemarking Map	X	X	
QoS Port TagRemarking Mode	X	X	
QoS Port TagRemarking PCP	X	X	
QoS QCL Add	X		
QoS QCL Delete	X		
QoS QCL Lookup	X	X	
QoS QCL refresh	X	X	
QoS QCL status	X	X	
QoS Storm Broadcast	X	X	
QoS Storm Multicast	X	X	
QoS Storm Unicast	X	X	
STP CName	X	X	
STP Configuration	X	X	
STP FwdDelay	X	X	
STP MaxAge	X	X	
STP MaxHops	X	X	
STP Msti Add	X		
STP Msti Map	X	X	
STP Msti Port Configuration	X	X	
STP Msti Port Cost	X	X	
STP Msti Port Priority	X	X	
STP Msti Priority	X	X	
STP Port AutoEdge	X	X	
STP Port Configuration	X	X	
STP Port Edge	X	X	
STP Port Mcheck	X		
STP Port Mode	X	X	
STP Port P2P	X	X	
STP Port RestrictedRole	X	X	
STP Port RestrictedTcn	X	X	
STP Port Statistics	X	X	
STP Port bpduGuard	X	X	
STP Status	X	X	
STP Txhold	X	X	
STP Version	X	X	
STP bpduFilter	X	X	
STP bpduGuard	X	X	
STP recovery	X	X	
Security AAA ACCT_RADIUS	X	X	
Security AAA Configuration	X	X	

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
Security AAA Deadtime	X	X	
Security AAA RADIUS	X	X	
Security AAA Statistics	X	X	
Security AAA TACACS	X	X	
Security AAA Timeout	X	X	
Security Network ACL Action	X	X	
Security Network ACL Add	X		
Security Network ACL Clear	X		
Security Network ACL Configuration	X	X	
Security Network ACL Delete	X		
Security Network ACL Lookup	X	X	
Security Network ACL Policy	X	X	
Security Network ACL Port State	X		
Security Network ACL Rate	X	X	
Security Network ACL Status	X	X	
Security Network ARP Inspection Configuration	X	X	
Security Network ARP Inspection Entry	X		
Security Network ARP Inspection Mode	X	X	
Security Network ARP Inspection Port Mode	X	X	
Security Network ARP Inspection Status	X	X	
Security Network ARP Inspection Translation	X	X	
Security Network DHCP Relay Configuration	X	X	
Security Network DHCP Relay Information Mode	X	X	
Security Network DHCP Relay Information Policy	X	X	
Security Network DHCP Relay Mode	X	X	
Security Network DHCP Relay Server	X	X	
Security Network DHCP Relay Statistics	X	X	
Security Network DHCP Snooping Configuration	X	X	
Security Network DHCP Snooping Mode	X	X	
Security Network DHCP Snooping Port Mode	X	X	
Security Network DHCP Snooping Statistics	X	X	
Security Network IP Source Guard Configuration	X	X	
Security Network IP Source Guard Entry	X		
Security Network IP Source Guard Mode	X	X	
Security Network IP Source Guard Port Mode	X	X	
Security Network IP Source Guard Status	X	X	
Security Network IP Source Guard Translation	X	X	
Security Network IP Source Guard limit	X	X	
Security Network Limit Action	X	X	
Security Network Limit Agetime	X	X	
Security Network Limit Aging	X	X	
Security Network Limit Configuration	X	X	
Security Network Limit Limit	X	X	
Security Network Limit Mode	X	X	
Security Network Limit Port	X	X	
Security Network Limit Reopen	X		
Security Network NAS Agetime	X	X	
Security Network NAS Authenticate	X		

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
Security Network NAS Configuration	X	X	
Security Network NAS EapolTimeout	X	X	
Security Network NAS Guest_VLAN	X	X	
Security Network NAS Holdtime	X	X	
Security Network NAS Mode	X	X	
Security Network NAS RADIUS_QoS	X	X	
Security Network NAS RADIUS_VLAN	X	X	
Security Network NAS ReauthPeriod	X	X	
Security Network NAS Reauthentication	X	X	
Security Network NAS State	X	X	
Security Network NAS Statistics	X	X	
Security Network Psec Port	X	X	
Security Network Psec Switch	X	X	
Security Switch Access Add	X		
Security Switch Access Clear	X		
Security Switch Access Configuration	X	X	
Security Switch Access Delete	X	X	
Security Switch Access Ipv6 Add	X	X	
Security Switch Access Lookup	X	X	
Security Switch Access Mode	X	X	
Security Switch Access Statistics	X	X	
Security Switch Auth Configuration	X	X	
Security Switch Auth Method	X	X	
Security Switch HTTPS Certificate Generate	X	X	
Security Switch HTTPS Certificate Load	X		
Security Switch HTTPS Certificate Show	X	X	
Security Switch HTTPS Configuration	X	X	
Security Switch HTTPS Mode	X	X	
Security Switch HTTPS Redirect	X	X	
Security Switch Privilege Level Configuration			
Security Switch Privilege Level Current			
Security Switch RMON Alarm Add	X		
Security Switch RMON Alarm Delete	X		
Security Switch RMON Alarm Lookup	X	X	
Security Switch RMON Event Add	X		
Security Switch RMON Event Delete	X		
Security Switch RMON Event Lookup	X	X	
Security Switch RMON History Add	X		
Security Switch RMON History Delete	X		
Security Switch RMON History Lookup	X	X	
Security Switch RMON Statistics Add	X		
Security Switch RMON Statistics Delete	X		
Security Switch RMON Statistics Lookup	X	X	
Security Switch SNMP Access Add	X		
Security Switch SNMP Access Delete	X		
Security Switch SNMP Access Lookup	X	X	
Security Switch SNMP Community Add	X		
Security Switch SNMP Community Delete	X		

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
Security Switch SNMP Community Lookup	X	X	
Security Switch SNMP Configuration	X	X	
Security Switch SNMP Engine ID	X	X	
Security Switch SNMP Group Add	X		
Security Switch SNMP Group Delete	X		
Security Switch SNMP Group Lookup	X	X	
Security Switch SNMP Mode	X	X	
Security Switch SNMP Read Community	X	X	
Security Switch SNMP Trap Authentication Failure	X	X	
Security Switch SNMP Trap Community	X	X	
Security Switch SNMP Trap Destination	X	X	
Security Switch SNMP Trap IPv6 Destination	X	X	
Security Switch SNMP Trap Inform Mode	X	X	
Security Switch SNMP Trap Inform Retry Times	X	X	
Security Switch SNMP Trap Inform Timeout	X	X	
Security Switch SNMP Trap Link	X	X	
Security Switch SNMP Trap Mode	X	X	
Security Switch SNMP Trap Probe Security Engine ID	X	X	
Security Switch SNMP Trap Security Engine ID	X	X	
Security Switch SNMP Trap Security Name	X	X	
Security Switch SNMP Trap Version	X	X	
Security Switch SNMP User Add	X		
Security Switch SNMP User Changekey	X		
Security Switch SNMP User Delete	X		
Security Switch SNMP User Lookup	X	X	
Security Switch SNMP Version	X	X	
Security Switch SNMP View Add	X		
Security Switch SNMP View Delete	X		
Security Switch SNMP View Lookup	X	X	
Security Switch SNMP Write Community	X	X	
Security Switch SSH Configuration	X	X	
Security Switch SSH Mode	X	X	
Security Switch Users Add			
Security Switch Users Configuration			
Security Switch Users Delete			
SyncE Nominate	X	X	
SyncE Selection	X	X	
SyncE Priority	X	X	
SyncE Ssm	X	X	
SyncE Clear	X	X	
SyncE State	X	X	
SyncE Config	X	X	
SyncE EioCfg	X	X	
SyncE EioImp	X	X	
System Configuration	X	X	X
System Contact	X	X	
System Date	X	X	
System Load	X		

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
System Location	X	X	
System Log Configuration	X	X	X
System Log Level	X	X	
System Log Lookup	X	X	X
System Log Server Address	X	X	
System Log Server Mode	X	X	
System Name	X	X	
System PowerSupply Present	X	X	
System Reboot			
System Timezone Configuration	X	X	
System Timezone Offset	X	X	
System Timezone Acronym	X	X	
System DST Configuration	X	X	
System DST Mode	X	X	
System DST start	X	X	
System DST end	X	X	
System DST Offset	X	X	
System Version	X	X	X
System ZTP Auto Discovery	x		
System Banner Exec	X		
System Banner Login	X		
System Banner MOTD	X		
Up	X	X	X
VCL Macvlan Add	X		
VCL Macvlan Configuration	X	X	
VCL Macvlan Del	X		
VCL ProtoVlan Conf	X	X	
VCL ProtoVlan Protocol Add Eth2	X		
VCL ProtoVlan Protocol Add Llc	X		
VCL ProtoVlan Protocol Add Snap	X		
VCL ProtoVlan Protocol Delete Eth2	X		
VCL ProtoVlan Protocol Delete Llc	X		
VCL ProtoVlan Protocol Delete Snap	X		
VCL ProtoVlan Vlan Add	X		
VCL ProtoVlan Vlan Delete	X		
VCL IPVlan Configuration	X		
VCL IPVlan Add	X		
VCL IPVlan Delete	X		
VCL Status	X	X	
VLAN Add	X		
VLAN Configuration	X	X	
VLAN Delete	X		
VLAN EtypeCustomSport	X	X	
VLAN Forbidden Add	X		
VLAN Forbidden Delete	X		
VLAN Forbidden Lookup	X	X	
VLAN FrameType	X	X	
VLAN IngressFilter	X	X	

Level 15 Commands	Levels 12-14	Levels 5-10	Levels 1-4
VLAN Lookup	X	X	
VLAN MPort PortType	X	X	
VLAN Name Add	X		
VLAN Name Delete	X		
VLAN Name Lookup	X	X	
VLAN PVID	X	X	
VLAN PortType	X	X	
VLAN remove		X	
VLAN Status	X	X	
VLAN Translation Add	X		
VLAN Translation Delete	X		
VLAN Translation Group	X	X	
VLAN tx_tag	X	X	

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