

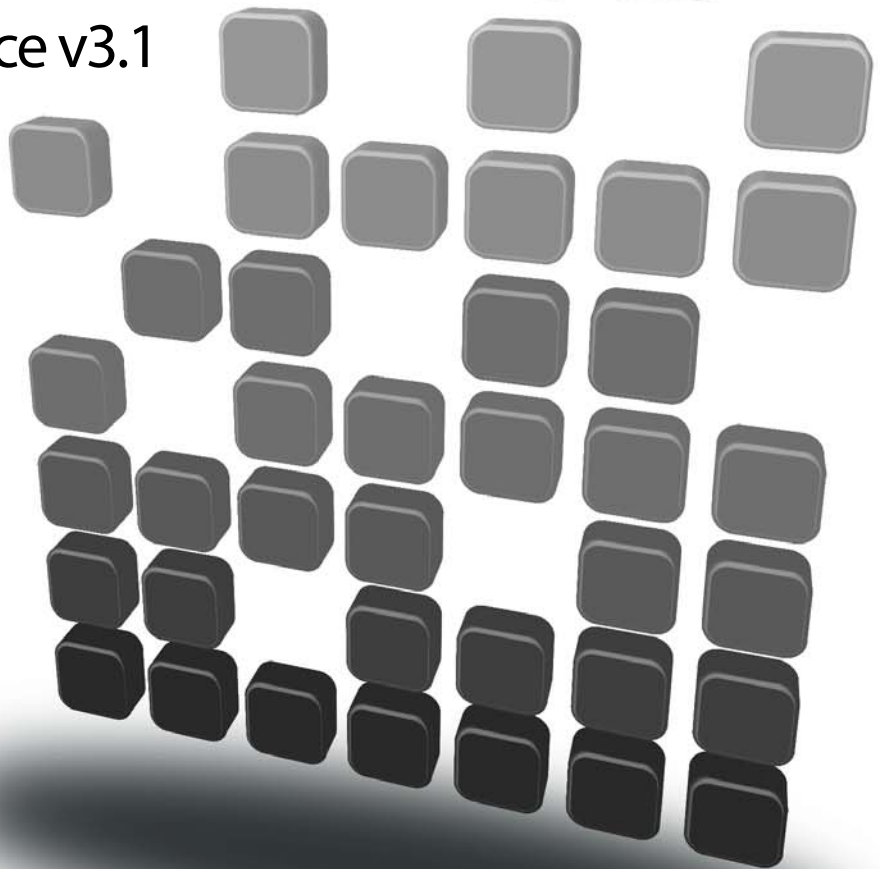


DarkStar®

Lighting the path to network independence

DXMOS

Command Reference v3.1



CHAPTERS

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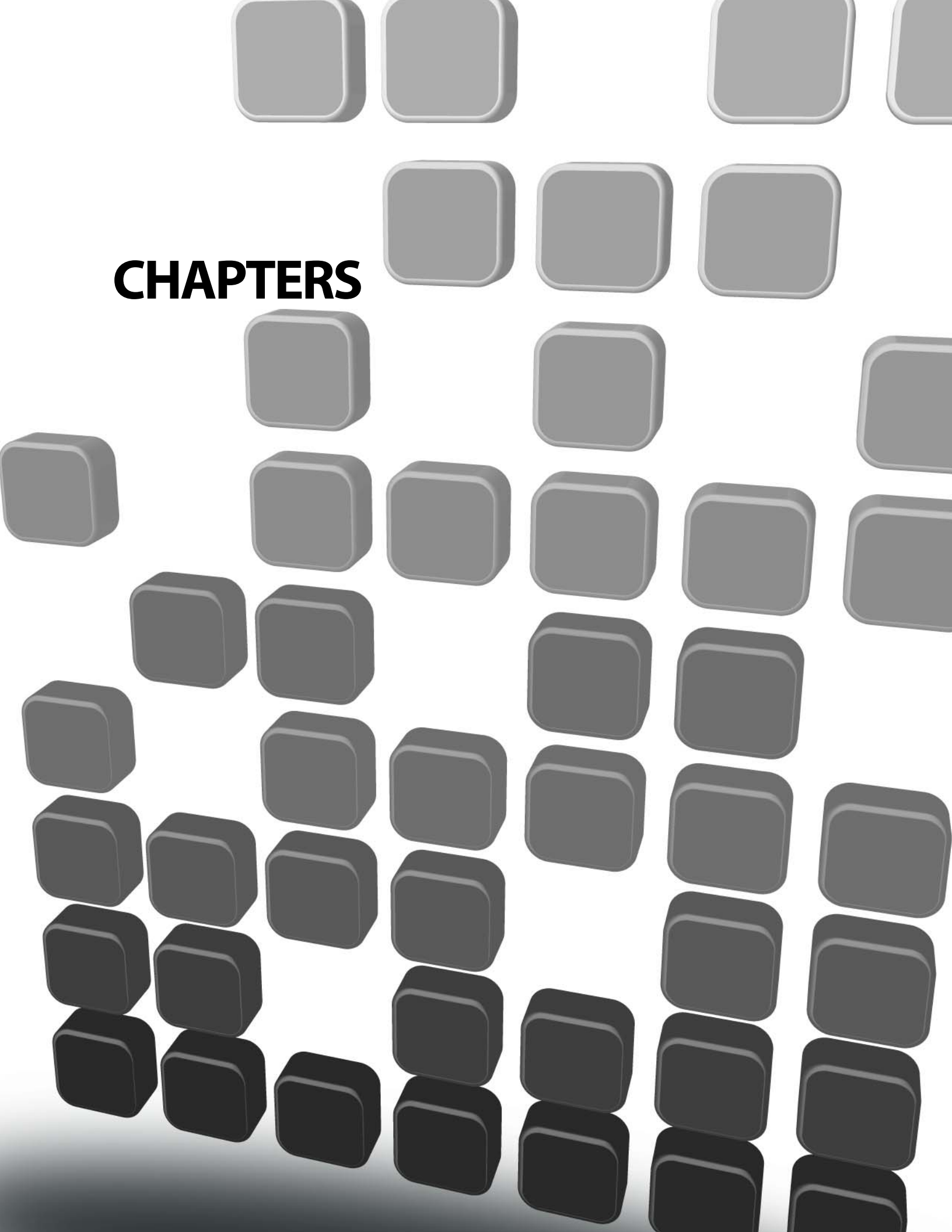
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CHAPTERS



Introduction

1.1 Operating System

DarkStar systems use the DXMOS command line interface (CLI). This chapter contains DXMOS syntax format conventions, keyboard shortcuts, and command summaries. Chapter 2 provides detailed information regarding the CLI commands used to configure and manage DarkStar products.

1.2 Syntax Format

This guide uses the following conventions to represent DXMOS command-line syntax:

TABLE 1.1 Conventions for DXMOS Syntax

Format	Meaning
<code>localhost></code>	All text appearing on the command line is represented by Courier Standard font.
<code>show interfaces</code>	User entries in examples are represented by Courier Standard bold font.
<i><code>interface-number</code></i>	Arguments supplied as free-form input (text, numbers etc.) are represented by Courier Standard italicized font.
<code><interface-identifier></code>	Greater than & less than symbols surround user arguments that are legally provided keywords.
<code>{east west}</code>	Curly braces denote required keywords and arguments. The vertical bar(s) between keywords and arguments denotes "or" and means one of multiple terms must be chosen as an option.
<code>[no] connect <transport-identifier1> <transport identifier2> [clock rate encapsulation <encapsulation-type>]</code>	Brackets denote optional keywords or arguments.

1.2.1 Command Prompt

DXMOS command prompts indicate which command mode or level you are in. The `configure` command level (indicated by the `CONF#` prompt) includes sub level commands to configure specific features (for example, the `fan` command configures a hot-swap fan module), each identified by its own prompt (`CONF-FAN[]#`). At any sub level, the command `exit` returns to the previous level, while `end` returns to enabled mode. At any sub level, the keyword `do` executes a top level command without leaving the sub level.

TABLE 1.2 Command Prompts

Format	Meaning
>	Default prompt for top level commands.
#	Default prompt for enable mode commands.
CONF#	Default prompt for configure commands.

1.3 Syntax Shortcuts

1.3.1 CLI Prompt Shortcuts

A CLI prompt reflects the command mode at that point in the session. To prevent syntax blocks from becoming hard to follow, this reference shortens some often-repeated CLI prompts.

1.3.1.1 <AMPLIFIER-PROMPT>

On DSM or DXM systems with amplifiers, `<AMPLIFIER-PROMPT>` expands to:

```
{ EDFA | RAMAN [ IN | OUT ] }
```

1.3.1.2 <ETHERNET-PROMPT>

`<ETHERNET-PROMPT>` expands to:

```
{ ETH | OSC | LOOPBACK }
```

1.3.1.3 <INTERFACE-PROMPT>

`<INTERFACE-PROMPT>` expands to:

```
{ <TRANSPORT-PROMPT> | <ETHERNET-PROMPT> }
```

1.3.1.4 <TRANSPORT-PROMPT>

`<TRANSPORT-PROMPT>` expands to:

```
{ CLIENT | WAVE | WAVE-EAST | WAVE-WEST }
```

1.3.2 Command Syntax Shortcuts

To prevent syntax blocks from becoming hard to follow, this reference shortens some often-repeated syntax segments. When you use a command, expand the shortcut in its syntax reference to include the relevant options.

1.3.2.1 <amplifier-identifier>

On non-redundant DSM or DXM systems, <amplifier-identifier> expands to:

```
{edfa [IN|OUT]}
```

On redundant DSM or DXM systems, <amplifier-identifier> expands to:

```
{edfa [EAST|WEST|NORTH|SOUTH] [IN|OUT]}
```

On DBA -L and DRA systems, <amplifier-identifier> expands to:

```
{edfa | raman <path-label> [IN|OUT]}
```

1.3.2.2 <ethernet-identifier>

<ethernet-identifier> expands to:

```
{{ethernet | loopback | osc} interface-number} | {osc {east | west | north | south}}}
```

1.3.2.3 <transport-identifier>

On redundant systems, <transport-identifier> expands to:

```
{client | wave {east | west | north | south}} interface-number
```

On non-redundant systems, <transport-identifier> expands to:

```
{client | wave} interface-number
```

1.3.2.4 <interface-identifier>

On non-redundant systems, <interface-identifier> expands to:

```
{<ethernet-identifier> | <transport-identifier>} interface-number
```

1.3.2.5 <encapsulation type>

On DarkStar systems using SFP+ laser modules <encapsulation type> expands to:

```
{gigabitethernet | 10gigabitethernet {FEC} | fibrechannel {1G | 2G | 4G | 8G | 10G} sonet {OC48 | OC192 | OC192{FEC}}}
```

On DarkStar systems using XFP laser modules <encapsulation type> expands to:

```
{10gigabitethernet | 10gigabitethernet fec | fibrechannel 10g | sonet OC192 | sonet OC192 fec }
```

1.3.2.6 <storage-location-config>

<storage-location-config> expands to:

{startup-config | backup1-config | backup2-config}

- startup-config is equivalent to writing "/dxmos/config.dat"
- backup1-config is equivalent to writing "/dxmos/config-backup1.dat"
- backup2-config is equivalent to writing "/dxmos/config-backup2.dat"

1.4 High-Level Command Summaries

The DarkStar system has two modes of commands, enable and disable. Enable mode allows users with appropriate permission to reconfigure and display all information about a system. The commands available in the disable (default) mode are a subset of the commands available in enable mode. The following tables "1.3 Disabled Mode Command Summary", "1.4 Enabled Mode Command Summary" and "1.5 Configure Command Summary" outline the commands and descriptions of the three main modes in DXMOS. All commands and their options are detailed alphabetically in chapter 2 - Command Reference.

TABLE 1.3 Disabled Mode Command Summary

Command	Description
enable	Enters enabled mode.
exit	Logs out when issued from console configured with password protection; logs out and disconnects when issued from telnet or SSH session.
logout	Disconnects from the DarkStar system.
no	Reverses the action of the specified command.
ping, ping6	Sends test packets to a specific address.
show	Displays configuration and other system information.
telnet	Establishes telnet connection.
terminal	Sets the terminal pager behavior. This value becomes the login default.
version	Displays version information about the DarkStar system.

TABLE 1.4 Enabled Mode Command Summary

Command	Description
app	Configures automatic path protection (APP).
checksum	Calculates the md5sum and sum results for a given file.
clear	Clears a software or hardware configuration setting.
clock	Sets the time and date of the DarkStar system clock.
configure	Places the DarkStar system in configuration mode.
copy	Copies configuration, software images, and gateway images between storage locations.
debug	Enables diagnostic debugging output.

TABLE 1.4 Enabled Mode Command Summary

Command	Description
delete	Deletes the specified file from the file system, if the file is not read only.
dir	Provides a directory listing for a specified file or directory. If no argument is present, provides a listing of the root directory.
disable	Exits enabled mode
exit	Returns to disabled mode when issued from a console configured without password protection; logs out when issued from console configured with password protection; logs out and disconnects when issued from a telnet or SSH session.
logout	Equivalent to exit command.
no	Reverses the action of the specified command.
ping, ping6	Sends test packets to a specified IP address.
reboot	Reloads the DXMOS software from a manually designated boot file.
reload	Warm boots the DXMOS software and gateway.
show	Displays configuration and other information.
telnet	Establishes a telnet connection to a remote host.
terminal	Sets the terminal pager behavior. This value becomes the login default.
tftp	Updates DXMOS software, gateway, and configuration from an external server via the Trivial File Transfer Protocol (TFTP).
undebug	Stops diagnostic debugging output.
verbosity	Sets message output levels for diagnostic tools and user commands.
version	Displays version information about the DarkStar system.
write	Writes configuration information to storage.

TABLE 1.5 Configure Command Summary

Command	Description
aaa	Enables the Authentication, Authorization, and Accounting (AAA) feature.
access-list	Defines an IP access control list.
app	Configures APP.
banner	Specifies a display message that appears to the user at login.
bert	Commands to configure, run, and log BER tests.
boot	Selects a boot image from a TFTP or flash memory location.
clock	Configures time zone and Daylight Saving Time.
connect	Connects a transport interface to a second interface.
do	Execute top level commands described in Table 1.2 and Table 1.3 without leaving configuration mode.
edfa	Places the DarkStar system in Erbium Doped Fiber Amplifier (EDFA) configuration mode (only available on systems with an EDFA).

TABLE 1.5 Configure Command Summary

Command	Description
<code>enable secret</code>	Sets a password for enabled mode.
<code>end</code>	Exits configuration mode and returns to the top level.
<code>exit</code>	Exits configuration mode and returns to the top level.
<code>fan</code>	Places the DarkStar system in fan configuration mode.
<code>hostname</code>	Sets the hostname for the DarkStar system.
<code>interface</code>	Places the DarkStar system in interface configuration mode.
<code>ip</code>	Configures IP settings for a DarkStar system Ethernet interface.
<code>ipv6</code>	Configures IPv6 settings.
<code>line</code>	Places the DarkStar system in line configuration mode.
<code>logging</code>	Configures logging of events to the local event log and the syslog service.
<code>no</code>	Reverses the action of the specified command.
<code>radius-server</code>	Defines a RADIUS AAA server.
<code>raman</code>	Displays information about Raman amplifier state and function.
<code>router</code>	Sets a router configuration.
<code>show</code>	Displays the running configuration.
<code>snmp-server</code>	Configures System Network Management Protocol (SNMP) settings.
<code>tacacs-server</code>	Configures a TACACS+ server for AAA.
<code>sntp</code>	Configures a System Network Time Protocol (SNTP) server for synchronizing the system clock.
<code>terminal pager</code>	Sets the terminal pager behavior. This value becomes the login default.
<code>tune</code>	Tunes a wave interface to a channel, frequency, or wavelength in the ITU grid.
<code>tunebulk</code>	Tunes the wavelengths of a Multifiber Push-On (MPO) connector in a single operation.
<code>user</code>	Creates a user account for logging in to the DarkStar system.

1.5 Command Abbreviations

Commands may be abbreviated if the command is unique in the current mode. For example, `show connections` can be shortened to `sh conn`, but cannot be shortened to `s con` because there are multiple possible completions.

1.6 Keyboard Shortcuts

The following keyboard shortcuts are available in DXMOS:

TABLE 1.6 DXMOS Keyboard Shortcuts

Shortcut	Action
CTRL+A	Go to the beginning of line.
CTRL+B, ←	Go back one character.
CTRL+C	Cancel the current command line input.
CTRL+D	Delete the current character.
CTRL+E	Go to end of line.
CTRL+F, →	Go forward one character.
CTRL+K	Delete all characters from the current cursor position to the end of the command line.
CTRL+N, ↓	Scroll forward through the command history
CTRL+P, ↑	Scroll backward through the command history
CTRL+R	Redraw the current command input (useful for restoring what was typed if the system writes output to the console while you enter a command).
CTRL+U	Clear the current command line contents.
CTRL+V	Disregard any special meaning of the character following. The CLI already disregards most special characters and this shortcut is rarely required.
CTRL+Z	Discard the current command line and exit configure mode (equivalent to typing <code>end</code> at a configure mode prompt)
tab	Complete partially entered unique keyword. If more than one possible completion exists, <code>tab</code> displays a list of choices.
?	List options for context-sensitive entered keywords. Displays information on additional command options.
; or !	Ignore rest of line. Use as an initial character to insert comments in the command line.

1.7 Help

DarkStar system commands include a Help feature. To use this feature, enter `?` at any system prompt or command line. Or, press `tab` at the end of incomplete commands.

2

Command Reference

This chapter contains a complete list of commands available in DXMOS.

2.1 checksum

Syntax:

```
# checksum file-name  
#
```

Description:

For a given file, calculates and reports on checksums according to the MD5 hashing and the BSD cksum algorithms.

Command Keyword Definitions

file-name Specifies file to be checked.

2.2 clear

Syntax:

```
# clear  
#
```

Description:

Immediately clears system caches or resets interface hardware. Clearing a system cache such as ARP, DNS, or RIP has the effect of refreshing the cache, since the cache will repopulate as the next host or IP address updates occur. Resetting a client or wave interface resets the optical hardware and causes some loss of customer traffic.

2.2.1 clear app

Syntax:

```
# clear app
```

#

Description:

Resets APP groups to their default state and resets all APP counters. The command is available only on systems with redundant interfaces configurable in APP groups.



WARNING

The `clear app` command may cause some packet loss from interrupted APP operations.

2.2.2 clear arp-cache

Syntax:

```
# clear arp-cache  
#
```

Description:

Clears the DarkStar system ARP cache. Use the `show arp` command to view the ARP cache contents.

2.2.3 clear counters

Syntax:

```
# clear counters [interface <interface-identifier>]  
#
```

Description:

Resets packet and byte counters for the designated interface. Example: `clear counters ethernet 0`

Without arguments, `clear counters` clears all counters displayed by the `show interface` command.

Command Keyword Definitions

<interface-identifier> Clears the counters for the specified interface.

Command Display Example

```
; ** Showing counters before and after the clear command **  
localhost# show inter eth 0  
  
Ethernet 0 is up, line protocol is up,  
  Description Connected to building network  
  Internet address is 10.15.1.126/24  
  Hardware is 10/100 Ethernet, MAC address is 00:A0:E3:00:04:06  
  Full Duplex mode, link type is 100Mbps (Auto-Negotiated)  
  Last State Change: 0:18:07:23 ago
```



```
31251 packets input, 2788818 bytes
0 no receive buffer, 0 CRC error, 0 overrun
0 no transmit buffer
19 packets output, 1158 bytes
0 collisions, 0 late collisions,
0 deferred, 0 lost carrier, 0 no carrier

localhost# clear counters eth 0
localhost# sh inter eth 0

Ethernet 0 is up, line protocol is up,
Description Connected to building network
Internet address is 10.15.1.126/24
Hardware is 10/100 Ethernet, MAC address is 00:A0:E3:00:04:06
Full Duplex mode, link type is 100Mbps (Auto-Negotiated)
Last State Change: 0:18:07:45 ago
14 packets input, 1236 bytes
0 no receive buffer, 0 CRC error, 0 overrun
0 no transmit buffer
0 packets output, 0 bytes
0 collisions, 0 late collisions,
0 deferred, 0 lost carrier, 0 no carrier
```

2.2.4 clear host

Syntax:

```
# clear host
#
```

Description:

Clears the system DNS cache that maps network host names to IP addresses.

2.2.5 clear interface

Syntax:

```
# clear interface <interface-identifier>
#
```

Description:

Resets the specified interface or all interfaces of the given class if an interface is not given. This may be useful if a device becomes unresponsive. Example: `clear interface ethernet 0`

Command Keyword Definitions

<interface-identifier> Specifies the interface to be cleared.

2.2.6 clear line

Syntax:

```
# clear line line-number
#
```

Description:

Immediately disconnects the terminal session on the designated console or VTY line. A *line-number* value of 0 is the console, and values 1 through 4 are the VTY lines. Use the `show lines` command to see which lines are currently connected

NOTE

If the current session is connected via line *n*, then the `clear line n` command terminates it.

2.2.7 clear logging

Syntax:

```
# clear logging
#
```

Description:

Clears the DarkStar system event log buffer. Use the `show logging` command to view the buffer contents.

2.2.8 clear rip

Syntax:

```
# clear rip
#
```

Description:

Delete all routing information acquired by RIP. This information will be repopulated when the next RIP update occurs. Use the `show ip routes` command to view the system-wide routing table.

2.3 clock

Syntax:

```
# clock {set hh:mm:ss day month year | read-calendar | update-calendar}
```

#

Description:

Sets the time and date of the DarkStar system clock.

Command Keyword Definitions

<code>set hh:mm:ss day month year</code>	Set the time for the system clock.
<code>read-calendar</code>	Copy the time from the calendar chip to the system clock.
<code>update-calendar</code>	Copy the time from the system clock to the calendar chip.

2.4 configure

Syntax:

```
# configure
CONF#
```

Description:

Places the DarkStar system into global configuration mode.

Changes made in enabled mode affect immediately how the DarkStar is operating. Changes made in configure mode may be saved in non-volatile storage using the `write memory` and `write network` commands.

2.4.1 aaa accounting exec

Syntax:

```
CONF# [no] aaa accounting exec
CONF#
```

Description:

Enables or disables AAA accounting for session starts/stops.

Command Keyword Definitions

<code>aaa accounting exec</code>	Enables AAA accounting for session starts/stops.
<code>[no] aaa accounting exec</code>	Disables AAA accounting for session starts/stops.

2.4.2 aaa accounting commands

Syntax:

```
CONF# [no] aaa accounting commands <privilege-level> default start-stop group
tacacs+
CONF#
```

Description:

Enables or disables AAA command accounting functionality.

Command Keyword Definitions

<code>aaa accounting commands</code>	Enables AAA accounting functionality.
<code>[no] aaa accounting commands</code>	Disables AAA command accounting functionality.
<code><privilege-level></code>	Specifies the privilege level; 0 for commands from a disabled vty session; 1 for commands from an enabled vty session.
<code>default</code>	Specifies the name of the method list.
<code>start-stop</code>	Specifies the type of record to account.
<code>group tacacs+</code>	Specifies the group TACACS+ to be used for command accounting.

2.4.3 aaa authorization exec

Syntax:

```
CONF# aaa authorization exec default [group radius|group tacacs+]
CONF#
```

Description:

When set, a user is immediately placed in enabled mode upon login, provided that the authentication server declares that the user has sufficient privileges. A successful authentication request for a user holding privilege level 15 will result in an enabled login.

Command Keyword Definitions

<code>aaa authorization exec</code>	Enables AAA authorization functionality to direct the user to exec mode, if authorized
<code>[no] aaa authorization</code>	Disables AAA authorization functionality to direct the user to exec mode, if authorized.
<code>default</code>	Specifies the name of the method list.
<code>group radius</code>	Specifies use of a RADIUS server group.
<code>group tacacs+</code>	Specifies use of a TACACS+ server group.

2.4.4 aaa authorization commands

Syntax:

```
CONF# [no] aaa authorization commands <privilege-level> default group tacacs+
CONF#
```

Description:

Enables or disables authorization of commands executed on a vty session via the TACACS+ server. By default, command authorization applies to vty sessions only. To enable command authorization for the console session, see "authorization commands default".

For a privilege-lowering command that does not terminate a session, such as `exit`, `end`, or `disable`, DXMOS will seek TACACS+ authorization for the command, log the result, but always allow the operation to proceed. In this way, a user authorized to enter an elevated mode is not denied the ability to leave it.

The top-level privilege-lowering commands `exit` and `logout` terminate a session. If TACACS+ denies an `exit` or `logout` command, DXMOS honors this denial. This prevents accidental logout from a session intended to be permanent. A permanent session may still be disconnected via a `clear line` command from a suitably authorized login, or externally by using the appropriate telnet or SSH client escape sequence to break the session.

<code>aaa authorization commands</code>	Enables AAA command authorization.
<code>[no] aaa authorization commands</code>	Disables AAA authorization.
<code><privilege-level></code>	Specifies the privilege level: 0 to authorize commands from a disabled vty session, 1 to authorize commands from an enabled vty session.
<code>default</code>	Specifies the name of the method list.
<code>group tacacs+</code>	Specifies that group tacacs is used for command authorization.
<code>[no]</code>	Disables AAA authorization functionality

2.4.5 aaa authentication

Syntax:

```
CONF# [no] aaa authentication [login|enable] default
[enable|line|local|none|group radius|group tacacs+]
CONF#
```

Description:

Enables or disables AAA authentication. Multiple authentication methods are supported. Authentication methods are tried in order until a success or deny state is reached. If any method returns an error, the next item on the list is attempted.

When AAA new-model is enabled, existing sessions, including the enabling session, do not possess the credentials necessary to authenticate any subsequent commands. They continue using the authentication model already in force, until logged out.

Command Keyword Definitions

<code>aaa authentication</code>	Enables AAA functionality.
<code>[no] aaa authentication</code>	Disables AAA functionality.
<code>login</code>	Specifies rules list used for login.
<code>enable</code>	Specifies rules list used to enable privileges.
<code>default</code>	Specifies name of the method list.
<code>enable</code>	Specifies use of enable password.
<code>line</code>	Specifies use of line-specific password.
<code>local</code>	Specifies use of local user database.
<code>none</code>	Specifies no authorization is required.

<code>group radius</code>	Specifies use of radius server group.
<code>group tacacs+</code>	Specifies use of tacacs+ server group.

 **NOTE**

Use of `none` is dangerous and should be used with extreme caution, even as a final item on the list of methods. For example, a missing username in a local database or an unreachable RADIUS server, followed by a `none`, will give anyone access to the system.

2.4.6 aaa new-model

Syntax:

```
CONF# [no] aaa new-model
CONF#
```

Description:

Enables or disables the AAA feature globally.

Command Keyword Definitions

<code>aaa new-model</code>	Enables AAA functionality.
<code>[no] aaa new-model</code>	Disables AAA functionality.

2.4.7 access-list

Syntax:

```
CONF# [no] access-list list-number {deny|permit} ip mask
CONF#
```

Description:

Defines an IP Access Control List (ACL) rule for filtering management network traffic.

Command Keyword Definitions

<code>access-list</code>	Enables an access list.
<code>[no] access-list</code>	Disables an access list.
<code><i>list-number</i></code>	Assigns a number to identify the access list rule.
<code>{deny permit}</code>	Use <code>permit</code> to allow traffic that matches this rule. Use <code>deny</code> to prevent traffic that matches this rule.
<code><i>ip</i></code>	Specify the beginning IP address in the access list.
<code><i>mask</i></code>	Define an IP wildcard mask to specify the end IP address in the access list.

For IP ACL address subnet masks, a common practice is to use the Classless Inter-Domain Routing (CIDR) format (/nn). The `access-list` command supports the CIDR format for both IPv4 and IPv6, for example:

```
access-list 1 permit 10.14.36.48/15
access-list 1 permit fd16:e32:da22:f02::/94
```

IPv6 supports only the classless CIDR format. The `access-list` command also supports IP ACL subnet masks, for IPv4 only, in the earlier "extended IP ACL" or "dotted" format (a trailing a.b.c.d format mask). For example, the following ACL entries are equivalent:

```
access-list 10 permit 1.2.3.4/24
access-list 10 permit 1.2.3.4 0.0.0.255
```

In this example, note how the extended IP ACL mask bit values (0 . 0 . 0 . 255) are reversed compared with a mask used to configure an interface IP address. In the IPv4 extended IP ACL format, a "0" in the mask indicates a bit must be considered, a "1" in the mask is a "don't care".

All IP ACL masks are saved in the config file in CIDR notation, even if you have explicitly used the IPv4 dotted notation in an `access-list` command.

The example below shows definitions for four sample ACLs.

Command Display Example

```
access-list 1 permit fd16:e32:da22:f02::/64
access-list 1 permit aa:22:33:12:23::/0
access-list 1 permit 10.14.36.48/15
access-list 1 permit 9.14.3.9/6
access-list 1 deny 2.2.2.2/0
access-list 10 deny fe80::209:5bff:fee1:5a7e/128
access-list 10 permit fd16:e32:da22:f01:209:5bff:fee1:5a7e/64
access-list 10 permit 10.14.1.0/24
access-list 10 permit 192.168.254.250/29
access-list 10 permit 192.168.253.249/29
access-list 10 permit 192.168.251.250/29
access-list 10 permit 192.168.252.249/29
access-list 10 permit 172.30.255.208/32
access-list 10 permit 211:211:211::211/128
access-list 10 permit 10.14.16.0/24
access-list 56 permit 200.200.200.56/32
access-list 99 permit 10.3.0.0/16
access-list 99 permit 10.14.1.0/24
```

2.4.8 app

Syntax:

```
CONF# [no] app <work-int> <prot-int>
CONF#
```

Description:

Creates an APP group.

Command Keyword Definitions

app	Adds an APP group.
[no] app	Removes an APP group.
<work-int>	Specifies the working interface to be added or removed.
<prot-int>	Specifies the protection interface to be added or removed.

2.4.8.1 app lockdown

Syntax:

```
CONF# [no] app lockdown <transport-identifier>
CONF#
```

Description:

Locks an APP group so it does not switch interfaces, effectively disabling switching but not data multicasting.

Command Keyword Definitions

app lockdown	Locks the APP group.
no app lockdown	Unlocks the APP group.
<transport-identifier>	Specifies the interface that identifies the APP group.

2.4.8.2 app revertive

Syntax:

```
CONF# [no] app revertive <transport-identifier> [holdoff reversion-holdoff]
CONF#
```

Description:

Configures an APP group to be revertive.

A revertive APP group uses the working interface any time that interface is functioning normally. APP groups are revertive by default.

Optionally, a hold-off time can be specified, which is the amount of time between when the working interface comes up and the APP group reverts to using the working interface.

A non-revertive APP group switches interfaces only when the currently used interface goes down. It has no preference for the working interface.

Command Keyword Definitions

<code>app revertive</code>	Makes the APP group revertive.
<code>no app revertive</code>	Makes the APP group non-revertive.
<code><transport-identifier></code>	Specifies the interface used to identify the APP group.
<code>[holdoff <i>reversion-holdoff</i>]</code>	Optionally specifies a time, in milliseconds, for the given interface to wait before reverting.

2.4.9 banner motd

Syntax:

```
CONF# [no] banner motd delimiter message delimiter
CONF#
```

Description:

Adds or removes a display message that appears to the user at login.

<code>banner motd</code>	Adds a display message.
<code>no banner motd</code>	Removes the display message.
<code><i>delimiter</i></code>	Delimits the displayed message. Delimiter value may be any ASCII character not used in the message, but the same delimiter value must be included at the beginning and end of the message.
<code><i>message</i></code>	The message text to appear at login.

2.4.10 boot

Syntax:

```
CONF# [no] boot {file executable-file | tftp ip-address filename | host dhcp  
[ethernet-identifier]}
CONF#
```

Description:

Selects a boot image from either a flash memory or a TFTP location.

Boot settings must be saved in `startup-config` in order to take effect during subsequent reloads.

If multiple boot locations are specified, the DarkStar system tries them in the order in which they are specified. Setting multiple boot locations provides a fallback in case the boot image in one location is missing or damaged.

Command Keyword Definitions

<code>boot <i>boot-target</i></code>	Adds the specified boot target.
<code>no boot <i>boot-target</i></code>	Removes the specified boot target.

<code>file executable-file</code>	The system boots with a configuration file in system flash memory.
<code>tftp ip-address filename</code>	The system boots from filename located at <i>ip-address filename</i> .

2.4.11 boot host dhcp

Syntax:

```
CONF# [no] boot host dhcp [<interface-identifier>]
CONF#
```

Description:

Directs Boot to acquire a configuration file from a remote Dynamic Host Configuration Protocol (DHCP) server, via TFTP. The configuration file must already exist. If DHCP identifies a boot file name and TFTP server, Boot acquires the file, and loads DXMOS with that configuration. DHCP configuration is also initiated when no configuration file (`/dxmos/config.dat`) is present in flash memory.

If Boot receives no DHCP offer after 2 minutes, Boot loads DXMOS with the local configuration file (`/dxmos/config.dat`). If no local configuration file is present, Boot loads DXMOS without a configuration.

The DarkStar system includes a DHCP client identifier in its DHCP discovery request.

For DHCPv4, the DHCP client identifier is "01:" followed by an interface MAC address. For an active interface with the MAC address `00:A0:E3:00:01:A8`, the DHCPv4 client identifier is `01:00:A0:E3:00:01:A8`

For DHCPv6, the DHCP client identifier is a DUID-EN identifier (see RFC 3315) consisting of an XKL vendor identifier `"00:02:00:00:52:9e:"` followed by the system (ETH 0) MAC address. For a DarkStar system with the system MAC address `00:a0:e3:00:03:46`, the DHCPv6 client identifier is `00:02:00:00:52:9e:00:a0:e3:00:03:46`

Ethernet and OSC interfaces have MAC addresses pre-assigned at the factory. You can determine the MAC address for an interface using the command `show interface ethernet n`. For Ethernet interfaces 0 through 3, $n=0, 1, 2, \text{ or } 3$. For OSC 0 through 3, $n=4, 5, 6, \text{ or } 7$.

Command Keyword Definitions

<code>boot host dhcp</code>	Enables boot host dhcp. On reload, directs the Boot program to acquire a configuration file remotely via DHCP.
<code>[no] boot host dhcp</code>	Disables boot host dhcp.
<code><interface-identifier></code>	Specifies the Ethernet or OSC management interface the system is to use when generating the DHCPv4 client identifier, regardless of which interface makes contact with a server.

2.4.12 clock

Syntax:

```
CONF# clock {timezone hrs-offset mins-offset | summer-time [on|off|usa|eu]}
CONF#
```

Description:

Sets the timezone and Daylight Saving Time (DST) behavior of the DarkStar system clock.

Command Keyword Definitions

`timezone hrs-offset mins-offset`

Sets the time zone for the system clock to hour-offset and minutes-offset from UTC. Most timezones have a minutes-offset of 0.

`summer-time [on|off|usa|eu]`

Alter the Daylight Savings Time (DST) setting.

`on` displays time with a forward offset of one hour from the system clock time.

`off` displays system clock time without any adjustments.

`usa` applies DST rules for the United States.

`eu` applies DST rules for the European Union.

 **NOTE**

Time zones west of Greenwich time have a negative offset from Greenwich time.

2.4.13 connect

Syntax:

```
CONF# [no] connect <trans-int1> <trans-int2> [encapsulation <encapsulation-type>]
CONF#
```

Description:

Connects a transport interface to a second interface of the same encapsulation type (e.g. 10gigabitethernet). An interface may be connected to itself.

Command Keyword Definitions

`connect`

Connect two interfaces.

`no connect`

Disconnect two interfaces.

`<trans-int1>`

Specifies the first interface for the connection.

`<trans-int2>`

Specifies the second interface for the connection.

`encapsulation <encapsulation-type>` Optionally specifies an encapsulation type, which sets the appropriate clock rate.

2.4.14 edfa

Syntax:

```
CONF# edfa [east | west | north | south] {IN|OUT}  
CONF-EDFA [IN|OUT] #
```

Description:

Places an EDFA amplifier in configuration mode.

 **NOTE**

The `edfa` command is available only on DarkStar systems with an EDFA installed.

Command Keyword Definitions

IN|OUT Identifies the EDFA amplifier.

2.4.15 edfa (DarkStar DBA-L or DRA amplifier systems only)

Syntax:

```
CONF# edfa <path-label> [IN|OUT]  
CONF-EDFA [IN|OUT] #
```

Description:

Places a DarkStar DBA-L or DRA Amplifier System in EDFA configuration mode. For DarkStar DBA-L and DRA amplifier systems only.

Command Keyword Definitions

<path-label> Identifies the EDFA amplifier path. Can be a user path name, or default system path name. The two default system path names are `e-to-w` and `w-to-e`.

IN|OUT Specifies which EDFA interface to configure.

 **NOTE**

This form of the `edfa` command is available only on DarkStar DBA-L or DRA amplification systems.

2.4.15.1 control output gain

Syntax:

```
CONF-EDFA [IN|OUT] # control output gain gain-in-dB  
CONF-EDFA [IN|OUT] #
```

Description:

Specifies target output gain as a set point for controlling the amplifier.

 **NOTE**

Only one of the three EDFA control types (control output gain, control output power, or control pump current) can be employed at any given time. When you issue an EDFA control command, it defines both the control type and the set point, invalidating previously issued control commands.

Command Keyword Definitions

gain-in-dB Sets control point in dB as a decimal value (e.g. x.y).

2.4.15.2 control output power

Syntax:

```
CONF-EDFA [IN|OUT] # control output power power-in-dBm  
CONF-EDFA [IN|OUT] #
```

Description:

Specifies target output power as a set point for controlling the amplifier.

 **NOTE**

Only one EDFA control command/method (output gain, output power, or pump current) may be employed at any given time. When you issue any EDFA control command, it re-defines the amplifier control method and set point, and invalidates previously issued control commands.

Command Keyword Definitions

power-in-dBm Sets the control point as a decimal value (e.g. x.y), in dBm.

2.4.15.3 control pump current

Syntax:

```
CONF-EDFA [IN|OUT] # control pump current current-in-mA  
CONF-EDFA [IN|OUT] #
```

Description:

Specifies a target laser-bias current as a set point for controlling the amplifier.

 **NOTE**

Only one EDFA control command/method (output gain, output power, or pump current) may be employed at any given time. Therefore, when you issue any EDFA control command, it becomes the de facto set point for amplifier control and invalidates previously issued control commands.

Command Keyword Definitions

`current-in-mA` Sets the control point as a decimal value (e.g. x.y) in milliamps.

2.4.15.4 disable

Syntax:

`CONF-EDFA [IN|OUT] # [no] disable`

`CONF-EDFA [IN|OUT] #`

Description:

Enables or disables EDFA output.



WARNING

This command is deprecated and will be removed in future versions of the software. It has been replaced by the `shutdown` command.

Command Keyword Definitions

`disable` Disable EDFA output.

`no disable` Enable EDFA output. This is the default setting.

2.4.15.5 shutdown

Syntax:

`CONF-EDFA [IN|OUT] # [no] shutdown`

`CONF-EDFA [IN|OUT] #`

Description:

Enables or disables the amplifier.

Command Keyword Definitions

`shutdown` Disables the amplifier.

no shutdown Enables the amplifier.

2.4.16 enable secret

Syntax:

```
CONF# [no] enable secret [0|5] password
CONF#
```

Description:

Sets a password to control access to the DarkStar CLI enabled mode.



WARNING

The only way to clear the enabled mode password without entering enable mode is to reload the DarkStar system in factory default mode by pressing and holding the side reset button. Reloading in factory default mode disrupts network traffic across all transport interfaces.

Command Keyword Definitions

<i>password</i>	Set the password for enabled mode to password. The DarkStar system automatically encrypts a plaintext password as an MD5 hash before storing it.
enable secret 5 <i>password</i>	Specifies a password as an MD5 hash.
enable secret 0 <i>password</i>	Specifies a password in plaintext. This command is equivalent to <code>enable secret password</code> .
no enable secret	Turns off password protection for enabled mode.

2.4.17 fan

Syntax:

```
CONF# fan fan-module-number
CONF-FAN [FAN-MODULE-NUMBER] #
```

Description:

Places the DarkStar system in fan configuration mode. DarkStar systems ship with two fan modules, numbered 0 and 2. Fan module 1 is intentionally absent. As viewed from the rear Fan 0 is on the left, Fan 2 is on the right.

Command Keyword Definitions

<i>fan-module-number</i>	Identifies the fan module that is to be configured.
--------------------------	---

2.4.17.1 reset

Syntax:

```
CONF-FAN [FAN-MODULE-NUMBER] # reset  
CONF-FAN [FAN-MODULE-NUMBER] #
```

Description:

Resets a fan module, without affecting its settings. Use `reset` on a fan that has become stuck or unresponsive.

2.4.17.2 speed

Syntax:

```
CONF-FAN [FAN-MODULE-NUMBER] # speed {auto | off | low | med | high | percent}  
CONF-FAN [FAN-MODULE-NUMBER] #
```

Description:

Sets fan speed.

Command Keyword Definitions

<code>auto</code>	Sets the fans to automatically adjust their speed. This setting is the default.
<code>off</code>	Turns the fans off.
<code>low</code>	Sets the fans to the lowest possible speed.
<code>med</code>	Sets the fans to medium speed.
<code>high</code>	Sets the fans to the highest possible speed.
<code>percent</code>	Sets the fans to a percentage of their operating speed range, from 1 to 100, inclusive.

2.4.18 hostname

Syntax:

```
CONF# hostname name  
CONF#
```

Description:

Serves as the prompt string and sets the hostname for the DarkStar system.

Command Keyword Definitions

<i>name</i>	A string defining the DarkStar system hostname.
-------------	---

2.4.19 interface

Syntax:

```
CONF# interface <interface-identifier>
CONF-INT-<INTERFACE-PROMPT> [n] #
```

Description:

Places the DarkStar system in interface configuration mode.

Command Keyword Definitions

<interface-identifier> Specifies the interface to configure.

Command Display Example

```
# configure
CONF# interface ethernet 0
CONF-INT-ETH[0] # ip address 192.168.0.1/24
CONF-INT-ETH[0] # end
# write memory
Are you sure? [yes/no] yes
```

2.4.19.1 bert logging

Syntax:

```
CONF-INT-<TRANSPORT-PROMPT> [n] # [no] bert logging [verbose] [max-log-count
<log-count> log-interval [seconds <secs-count> | minutes <mins-count> | hours
<hrs-count>] number-of-samples <sample-count>]
CONF-INT-<TRANSPORT-PROMPT> [n] #
```

Description:

Enables or disables BERT logging. By default, BERT logging is disabled on start-up.

BERT log file names are system-assigned. A BERT log file is a comma-delimited file with the format Timestamp, HostName, Interface ID, Total Errors, Elapsed BERT Time.

Command Keyword Definitions

bert logging	Enables BERT logging functionality.
[no] bert logging	Disables BERT logging functionality.
verbose	Records a line of data even if there is no error.
max-log-count <log-count>	The maximum number of BERT logs to be kept in the logging directory /home/bert. The default maximum log count is 20.
log-interval	Set time interval. The maximum interval is 9000 hours.
seconds <secs-count>	Duration of time interval, in seconds.
minutes <mins-count>	Duration of time interval, in minutes.

hours <i><hrs-count></i>	Duration of time interval, in hours.
number-of-samples <i><sample-count></i>	Set number of samples. Sample count.

2.4.19.2 bert receive

Syntax:

```
CONF-INT-<TRANSPORT-PROMPT> [n] # [no] bert receive
CONF-INT-<TRANSPORT-PROMPT> [n] #
```

Description:

Initiates reception of BERT/PRBS on selected interface.

Command Keyword Definitions

bert receive	Specifies interface for reception of BERT/PRBS.
[no] bert receive	Cancels BERT/PRBS reception on selected interface and generates final test results.

2.4.19.3 bert transmit

Syntax:

```
CONF-INT-<TRANSPORT-PROMPT> [n] # [no] bert transmit
CONF-INT-<TRANSPORT-PROMPT> [n] #
```

Description:

Initiates transmission of BERT/PRBS on selected interface.

Command Keyword Definitions

bert transmit	Specifies for transmission of BERT/PRBS.
[no] bert transmit	Cancels BERT/PRBS transmission on selected interface.

2.4.19.4 description

Syntax:

```
CONF-INT-<INTERFACE-PROMPT> [n] # [no] description string
CONF-INT-<INTERFACE-PROMPT> [n] #
```

Description:

Creates a site-configurable description used to describe the use of wave and client interfaces.

Command Keyword Definitions

<i>string</i>	Set the label for the interface to <i>string</i> .
no description	Remove the description from the interface.

2.4.19.5 encapsulation

Syntax:

```
CONF-INT-<TRANSPORT-PROMPT> [n] # encapsulation <encapsulation-type>  
CONF-INT-<TRANSPORT-PROMPT> [n] #
```

Description:

Configures interface encapsulation type.



WARNING

Changing the encapsulation on an interface carrying traffic will interrupt it.

Command Keyword Definitions

<encapsulation-type> Sets encapsulation type.

2.4.19.6 laser shutdown

Syntax:

```
CONF-INT-<TRANSPORT-PROMPT> [n] # [no] laser shutdown  
CONF-INT-<TRANSPORT-PROMPT> [n] #
```

Description:

Powers down a wave or client interface laser.



NOTE

If a write memory command is issued after a laser shutdown command, the laser shutdown command is stored in startup-config and will take effect during subsequent reloads. To power up lasers following a reload, issue a no laser shutdown command. To avoid future laser shutdowns following a reload, issue a no laser shutdown command, followed by write memory.

2.4.19.7 loopback

Syntax:

```
CONF-INT-<TRANSPORT-PROMPT> [n] # loopback {ELECTRICAL | OPTICAL}  
CONF-INT-<TRANSPORT-PROMPT> [n] #
```

Description:

Enables the chosen loopback mode on the selected interface. Only one loopback mode can be enabled at a time. If a user attempts to switch to a loopback mode not supported, the loopback mode will default to None.

2.4.19.8 virtualight

Syntax:

```
CONF-INT-<TRANSPORT-PROMPT> [n] # [no] virtualight
CONF-INT-<TRANSPORT-PROMPT> [n] #
```

Description:

Enables and disables Virtualight mode.

By default, Virtualight is enabled for client interfaces and disabled for DWDM wave interfaces.

Command Keyword Definitions

<code>virtualight</code>	Enables Virtualight mode.
<code>no virtualight</code>	Disables Virtualight mode.

2.4.19.9 ip

Syntax:

```
CONF-INT-<ETHERNET-PROMPT> [n] # [no] ip {address ip-address/netmask | helper-
address ip-address | poison-reverse | proxy-arp | rip receive version rip-
version | rip send version rip-version | rip v2-broadcast | split-horizon}
CONF-INT-<ETHERNET-PROMPT> [n] #
```

Description:

Configures IP settings for an Ethernet interface.

Command Keyword Definitions

<code>address <i>ip-address/netmask</i></code>	Sets the interface IP address to <code>ip-address</code> with a netmask of <code>netmask</code> . Netmask is specified in Classless Inter-Domain Routing (CIDR) notation.
<code>helper-address <i>ip-address</i></code>	Any DHCP request received on this interface will be forwarded to the specified ip address (IPv4 address or host name), which should be the DHCP server providing addresses for the subnet connected to the interface.
<code>poison-reverse</code>	Enables the poisoning (advertisement with infinite metric 16) of routes that have become unreachable. When combined with <code>split-horizon</code> , routes received from a given subnet are advertised with infinite metric back to the subnet to help prevent routing loops. Enabled in RIP by default.
<code>proxy-arp</code>	Deprecated. The keyword has no effect and will be removed in a future release.
<code>rip receive version <i>rip-version</i></code>	Configures the Routing Information Protocol (RIP) version that the interface will receive. Valid values for <code>rip-version</code> are 1, 2, and 1 2 (default value is 1 2). The individual rip version specified in interface

	overrides global rip setting in router rip.
<code>rip send version <i>rip-version</i></code>	Configures the RIP version that the interface will send. Valid values for <code>rip-version</code> are 1, 2, and 1 2 (the default value is 1 2). The individual rip version specified in interface overrides global rip setting in router rip.
<code>rip v2-broadcast</code>	Sends v2 updates as broadcast packets. This command is enabled by default.
<code>split-horizon</code>	Prevents RIP from advertising a route out of the interface on which it learned the route to help prevent routing loops. Works in conjunction with poison-reverse. It is enabled by default.

2.4.19.10 ipv6 address

Syntax:

```
CONF-INT-ETH [n] # [no] ipv6 address <ipv6-address> / <prefix-length>
CONF-INT-ETH [n] #
```

Description:

Configures IPv6 settings for an Ethernet interface.

An interface can have multiple IPv6 addresses. To remove one IPv6 address, e.g. 123::456/64, use the command `no ipv6 123::456/64`. To remove all IPv6 addresses from the interface, use `no ipv6`.

Command Keyword Definitions

<code>ipv6 address</code>	Configures an IPv6 address for an interface.
<code>[no] ipv6</code>	Removes all IPv6 addresses from the interface.
<code><ipv6-address></code>	An IPv6 address prefix in the form of eight segments, each a hexadecimal value from 0 to FFFF. In a segment, leading zeros can be suppressed. Each segment is separated by a colon; one consecutive run of all-zero segments can be abbreviated as "::". An example of an IPv6 address is 123::456/64.
<code><prefix-length></code>	IPv6 prefix length, an integer from 1 to 128.

2.4.19.11 shutdown

Syntax:

```
CONF-INT-<ETHERNET-PROMPT> [n] # [no] shutdown
CONF-INT-<ETHERNET-PROMPT> [n] #
```

Description:

Shuts down an Ethernet interface or brings it online.

Command Keyword Definitions

<code>shutdown</code>	Shuts down the Ethernet interface.
-----------------------	------------------------------------

<name> DNS domain name for the search path.

Command Display Example

```
Lab10X CONF# do show run host
running-config:
hostname Lab10X
ip domain-name lab.xkl.com
ip domain-name xkl.com
ip name-server fd16:e32:da21:f01:209:5bff:fee1:5a7e
ip name-server 10.14.1.99
ip host flood fd16:e32:da21:f01:209:5bff:fee1:5a7e
ip host flood 10.14.1.99
```

2.4.21 ip dhcp excluded-address

Syntax:

```
CONF# [no] ip dhcp excluded-address ip-address-start ip-address-stop
CONF#
```

Description:

Provides a set of network addresses that the DHCP server should exclude from assigning, even if they fall within the range of addresses defined by a DHCP pool.

Command Keyword Definitions

<i>ip-address-start</i>	The first address in the excluded set.
<i>ip-address-stop</i>	The last address in the excluded set.
no ip dhcp excluded-address	End the address exclusion.

2.4.22 ip dhcp pool

Syntax:

```
CONF# [no] ip dhcp pool pool-id
CONF-DHCP-POOL[n] #
```

Description:

Enters DHCP configuration submode for a specific pool of network addresses.

Command Keyword Definitions

<i>pool-id</i>	Enters DHCP configuration submode for a specific pool of network addresses. The <i>pool-id</i> argument is a convenience identifier that allows creation and management of multiple pools of networks to which DHCP should provide addresses.
no ip dhcp pool <i>pool-id</i>	Remove a pool of network addresses from DHCP.

2.4.22.1 network

Syntax:

```
CONF-DHCP-POOL [n] # network address/netmask  
CONF-DHCP-POOL [n] #
```

Description:

Assigns a network for which DHCP should provide addresses.

Command Keyword Definitions

address/netmask Defines a network for which DHCP should provide addresses.

2.4.23 ip host

Syntax:

```
CONF# [no] ip host <name> <address>  
CONF#
```

Description:

Specifies a static mapping of host to address. These are searched in the order specified. They take priority over the DNS cache and name servers.

Command Keyword Definitions

no ip host <name> <address> Specifies a static host to remove.

<name> Sets the name of the host to which an IP address is assigned.

<address> Sets the IP address for the given hostname.

Command Display Example

```
Lab10X CONF# do show run host  
running-config:  
hostname Lab10X  
ip domain-name lab.xkl.com  
ip domain-name xkl.com  
ip name-server fd16:e32:da21:f01:209:5bff:fee1:5a7e  
ip name-server 10.14.1.99  
ip host flood fd16:e32:da21:f01:209:5bff:fee1:5a7e  
ip host flood 10.14.1.99
```

2.4.24 ip name-server

Syntax:

```
CONF# [no] ip name-server <address>  
CONF#
```


Description:

Specifies an additional name server. Servers will be referenced in the order specified.

Command Keyword Definitions

<address> Defines the IP address of the DNS server .

no ip name-server *<address>* Specifies a name server to remove.

Command Display Example

```
Lab10X CONF# do show run host
running-config:
hostname Lab10X
ip domain-name lab.xkl.com
ip domain-name xkl.com
ip name-server fd16:e32:da21:f01:209:5bff:fee1:5a7e
ip name-server 10.14.1.99
ip host flood fd16:e32:da21:f01:209:5bff:fee1:5a7e
ip host flood 10.14.1.99
```

2.4.25 ip route

Syntax:

```
CONF# [no] ip route address/netmask gateway [metric]
CONF#
```

Description:

Adds a static route to the routing table.

no ip route address/netmask gateway Disables a static route in the routing table.

address/netmask Sets the IP address and netmask for the static route.

gateway Sets a gateway IP address for the static route.

metric Specifies the metric value for the static route. Valid range is 0 to 65535. The default metric is 1.

2.4.26 line

Syntax:

```
CONF# line {console | vty}
CONF-LINE- {VTY|CTY}#
```

Description:

Places the DarkStar system in line configuration mode.

Command Keyword Definitions

console	Configures the console line.
vtty	Configures the virtual terminal (VTY) lines. DarkStar systems have four VTY lines, all configured identically.

Command Display Example

```
# configure
CONF# line console
CONF-LINE-CTY# password new-password-string
CONF-LINE-CTY# end
# write memory
Are you sure? (yes/no) yes
# logout
```

2.4.26.1 access-class

Syntax:

```
CONF-LINE-{VTY | CTY}# [no] access-class list-number {in | out}
CONF-LINE-{VTY | CTY}#
```

Description:

Applies the access list to this line.

Command Keyword Definitions

<i>list-number</i>	Assign the line to be accessible only to connections in the access list identified by <i>list-number</i> .
in out	Specifies whether or not an ACL is applied in an inbound or outbound direction for VTYS.

2.4.26.2 authorization commands default

Syntax:

```
CONF-LINE-CTY# [no] authorization commands default
CONF-LINE-CTY#
```

Description:

Enables the authorization of commands used in a console session.

By default, enabling AAA command authorization turns on authorization for VTY session commands, but not for the console. A user that has access to the console is considered to have access to the physical machine and, as such, already has privileges equivalent to root access.

Command Keyword Definitions

[no]	Disables authorization commands default.
------	--



WARNING

This command forces the authorization of console commands in addition to VTY commands. Consider carefully the use of console authorization. An improperly configured system could deny access to essential management commands.

2.4.26.3 login

Syntax:

```
CONF-LINE-{VTY | CTY}# [no] login [local]  
CONF-LINE-{VTY | CTY}#
```

Description:

Enables or disables remote login to VTY lines.

VTY lines refuse telnet connectivity attempts until VTY login is enabled or AAA new model is set. Logins are always enabled for the console line.

NOTE

Login settings are over-ridden by AAA rules when `aaa new-model` is selected.

NOTE

VTY lines must have a password set before telnet or ssh access is granted unless `aaa new-model` or `login local` is set with a user database.

NOTE

To use stored usernames and passwords with the `login local` option, users must first be created with the `user` command.

Command Keyword Definitions

<code>login</code>	Enables logins for VTY lines, using only a password for authentication.
<code>login local</code>	Enables logins for VTY lines, using stored usernames and passwords for authentication.
<code>no login</code>	Disables logins for VTY lines.

2.4.26.4 monitor

Syntax:

```
CONF-LINE- {VTY | CTY}# [no] monitor
CONF-LINE- {VTY | CTY}#
```

Description:

Enables or disables the DarkStar system's message display on console or VTY lines.

Message display is enabled by default for the console line and disabled by default for the VTY lines.

Command Keyword Definitions

monitor	Enables message display.
no monitor	Disables message display.

2.4.26.5 password

Syntax:

```
CONF-LINE- {VTY | CTY}# [no] password [0|5] password
CONF-LINE- {VTY | CTY}#
```

Description:

Enforces password protected access to console or VTY lines. The command `aaa new-model` can override the password.

Command Keyword Definitions

<i>password</i>	Sets the password for the line to <i>password</i> . DarkStar systems automatically encrypt a plaintext password as an MD5 hash before storing it.
<i>password 5 password</i>	Specifies password as an MD5 hash.
<i>password 0 password</i>	Specifies plaintext password. This syntax is equivalent to <code>password password</code> .
<i>no password</i>	Removes password protection from the line. Removing the vty password disables all vty access.

2.4.26.6 session-timeout

Syntax:

```
CONF-LINE- {VTY | CTY}# session-timeout n
CONF-LINE- {VTY | CTY}#
```

Description:

By default there is no timeout. The argument in the command specifies the number of minutes until an idle session times out. Setting the argument to zero will return to the default setting of no timeout.

Command Keyword Definitions

n Specifies number of minutes until idle session times out.

2.4.26.7 transport input

Syntax:

```
CONF-LINE-{VTY | CTY}# transport input [all | ssh | telnet]
CONF-LINE-{VTY | CTY}#
```

Description:

Enables or disables Secure Shell (SSH) and telnet access to VTY lines. Configuring telnet access on one VTY line applies it globally to all VTY lines. The default setting is `transport input all`.

NOTE

The default setting is `transport input all`. To completely disable logins through VTY lines, use the `no login` and `no aaa new-model` commands.

Command Keyword Definitions

<code>all</code>	Allows VTY access via both telnet and SSH. This is the default setting.
<code>ssh</code>	Allows VTY access only via SSH.
<code>telnet</code>	Allows VTY access only via telnet.

2.4.27 logging

Syntax:

```
CONF# [no] logging {buffer events | host address | mark mark-interval | rate-limit limit}
CONF#
```

Description:

Configures the logging of DarkStar system events.

NOTE

The contents of the local circular logging buffer are lost upon system reload. They are also cleared upon execution of the `no logging buffer` or `logging buffer 0` commands.

Command Keyword Definitions

<code>buffer events</code>	Sets the maximum number of events to store in the local circular logging buffer. Values from 1 to 512, inclusive, turn on logging. A
----------------------------	--

	buffer counter of 0, or the <code>no logging buffer</code> command turns off event logging to the local buffer.
<code>host address</code>	Sets <i>address</i> as the host to receive syslog messages, and turns on syslog message generation. Use multiple host logging commands to specify multiple hosts. The <code>no logging host address</code> command stops syslog logging to the specified host.
<code>mark mark-interval</code>	Sets the mark interval in minutes. The DarkStar system sends a “mark” time-keeping message to syslog hosts at this interval. The commands <code>no logging mark</code> and <code>logging mark 0</code> both turn off mark event generation. Valid range for <i>mark-interval</i> is 0-60.
<code>rate-limit limit</code>	Sets the message rate limit in messages per second. Valid range for <i>limit</i> is 0-10000. The rate limit applies only to syslog logging.

2.4.28 path-label

Syntax:

```
CONF# path-label <current-path-name> <new-path-name>
CONF#
```

Description:

Changes the amplifier path label. The path label can be a user path name, or a default system path name. For DBA-L and DRA Amplification Systems only, the two default system path names are *e-to-w* and *w-to-e*. The config file will contain a `path-label` entry if the current name is not the default.

Command Keyword Definitions

<code><current-path-name></code>	The current user or default system path name.
<code><new-path-name></code>	The new user or default system path name.

NOTE

Applies to DBA-L and DRA Amplification Systems only.

2.4.29 radius-server host

Syntax:

```
CONF# [no] radius-server host host [auth-port port] [acct-port port] [key
host-specific-key]
CONF#
```

Description:

Adds or removes a RADIUS host server to be used with AAA. When adding a server, you can optionally specify an authorization port, an accounting port, or a RADIUS server key. When removing a server, specify only the server host name or IP address.

Command Keyword Definitions

<code>host</code>	Specifies the host or IP address of a RADIUS server. If multiple RADIUS servers are specified, the DarkStar system will make attempts using this configuration order.
<code>[auth-port port]</code>	When adding a server, optionally specifies a host-specific authorization port.
<code>[acct-port port]</code>	When adding a server, optionally specifies a host-specific accounting port.
<code>[key host-specific-key]</code>	When adding a server, optionally specifies a host-specific RADIUS server key. The key must be the last entry on the command line.
<code>no radius-server host host</code>	Removes a RADIUS server.

Command Display Example

```
CONF# no radius-server host 10.15.1.99
```

2.4.30 radius-server key

Syntax:

```
CONF# radius-server key <global-shared-key>
CONF#
```

Description:

Sets radius server key.

Command Keyword Definitions

<code><global-shared-key></code>	Optionally, specifies a global shared key for a radius server. Specifying a host-specific key overrides <code>global-shared key</code> .
--	--

2.4.31 raman (for DRA Amplifier Systems only)

Syntax:

```
CONF# raman <path-label> in
CONF-RAMAN [<PATH-LABEL> IN] #
```

Description:

Places the DarkStar DRA Amplifier System in Raman configuration mode.

Command Keyword Definitions

<code><path-label></code>	Identifies the Raman amplifier path. Can be a user path name, or default system path name. The two default system path names are <code>e-to-w</code> and <code>w-to-e</code> .
---------------------------------	--

in Specifies which Raman interface to configure.

 **NOTE**

This form of the `raman` command is available only on DarkStar DRA amplification systems.

2.4.31.1 apr osc detection

Syntax:

```
CONF-<AMPLIFIER-PROMPT> # [no] apr osc detection
CONF-<AMPLIFIER-PROMPT> #
```

Description:

Enables detection of a remote optical service channel (OSC) signal as a part of the Automatic Power Reduction (APR) control system.

This mechanism is disabled by default.



WARNING

Disabling this safety feature may cause this device to operate outside of its laser safety classification.

2.4.31.2 control output gain

Syntax:

```
CONF-RAMAN [<PATH-LABEL> {IN|OUT}]# control output gain <gain-in-dB>
CONF-RAMAN [<path-label> in]#
```

Description:

Specifies target output gain as a set point for controlling the amplifier.

Command Keyword Definitions

`<gain-in-dB>` Sets the control point in dB as a decimal value (e.g. x.y) in dB.

2.4.31.3 fiber-type

Syntax:

```
CONF-{RAMAN | RAMAN-EAST | RAMAN-WEST}[n]# fiber-type {g652 | g653 | g654 |
g655 leaf | g655 teralight | g655 truewave}
CONF-RAMAN [<path-label> in]#
```


Description:

Sets the type of fiber in the customer facilities that the Raman amplifier is being used with. The default fiber type is set to match the fiber type of internal dispersion compensation modules. If none are present, the fiber type will default to `g655 truewave` (G.655 TrueWave).

Attributes of the amplifier's control system are adjusted when `fiber-type` is changed because different fiber types have different physical properties with regard to Raman amplification.

 **NOTE**

If you are changing the fiber type, be aware that different fiber types have different physical properties with regard to Raman amplification gain. Be careful to match the new fiber type setting with the fiber type of your fiber optic cable.

Command Keyword Definitions

`fiber-type <fiber-type>` Specifies fiber type for use with Raman amplifier.

2.4.31.4 label

Syntax:

```
CONF- {RAMAN | RAMAN-EAST | RAMAN-WEST} [n]# [no] label label-text
CONF-RAMAN [<path-label> in]#
```

Description:

Appends a user-specified metadata label to the Raman amplifier's UI.

A metadata label allows for the inclusion of information about the link's purpose, location, and other similar data. By default there is no label.

Command Keyword Definitions

`label` Append metadata label to Raman amplifier UI.
`no label` Exclude metadata label from Raman amplifier UI.
`<label-text>` Text to be used for the table.

2.4.31.5 shutdown

Syntax:

```
CONF- {RAMAN | RAMAN-EAST | RAMAN-WEST} [n]# [no] shutdown
CONF-RAMAN [<path-label> in]#
```

Description:

Enables or disables amplification.

By default amplification is `no shutdown`.

Command Keyword Definitions

<code>shutdown</code>	Disables amplification.
<code>no shutdown</code>	Enables amplification.

2.4.32 router rip

Syntax:

```
CONF# [no] router rip
CONF-RIP#
```

Description:

Places the DarkStar system in RIP configuration mode.

Command Keyword Definitions

<code>router rip</code>	Enables RIP and enters <code>rip</code> configuration mode.
<code>no router rip</code>	Disables RIP.

2.4.32.1 default-information originate

Syntax:

```
CONF-RIP# default-information originate
CONF-RIP#
```

Description:

Causes a system to both advertise and accept a default (0/0) route, if one is configured.

2.4.32.2 distance

Syntax:

```
CONF-RIP# [no] distance rip-distance
CONF-RIP#
```

Description:

Sets the RIP distance.

Command Keyword Definitions

<code>distance <i>rip-distance</i></code>	Sets the RIP distance value to <code>rip-distance</code> .
<code>no distance</code>	Removes RIP distance setting.

2.4.32.3 network

Syntax:

```
CONF-RIP# [no] network address
```

CONF-RIP#

Description:

Turns on RIP for a given interface.

Command Keyword Definitions

`network address`

Turns on RIP for interfaces with addresses that belong to the specified network.

`no network address`

Disables RIP for the specified network. If an interface is a subnet of another interface, the `no` variant for the smaller subnet will also be applied to the larger subnet, even if router RIP is turned on in separate network commands.

2.4.32.4 passive-interface

Syntax:

CONF-RIP# [no] passive-interface [<ethernet-identifier>]

CONF-RIP#

Description:

Disables sending of routing updates.

Command Keyword Definitions

`passive-interface <ethernet-identifier>`

Disables sending of routing updates on the specified interface.

`no passive-interface <ethernet-identifier>`

Enables sending of routing updates on the specified interface.

2.4.32.5 redistribute

Syntax:

CONF-RIP# [no] redistribute static [metric value]

CONF-RIP#

Description:

Redistributes routes from other routing protocols via RIP.

Command Keyword Definitions

`static [metric value]`

Specifies the routing `metric` to use. Without the metric keyword, `redistribute static` defaults to a metric of 1.

`no redistribute static`

Disables redistribution of static routes.

2.4.32.6 version

Syntax:

```
CONF-RIP# [no] version version-number
CONF-RIP#
```

Description:

Sets which version of RIP is used by the DarkStar system.

This setting can be overridden by specific interfaces with `ip rip send version` and `ip rip receive version` commands.

Command Keyword Definitions

<i>version-number</i>	Sets the RIP version number to <i>version-number</i> . Valid values for <i>version-number</i> are 1 or 2.
<code>no version</code>	Returns RIP version to its default value of 2/1 compatibility mode.

 **NOTE**

The RIP version configured on an interface will override the RIP version set globally by the router `rip` command on that particular interface.

2.4.33 snmp-server disable-v2c

Syntax:

```
CONF# [no] snmp-server disable-v2c
CONF#
```

Description:

Disables responses to SNMP version 2c requests.

2.4.34 snmp-server

Syntax:

```
CONF# [no] snmp-server {chassis-id string | community string | contact string
| enable traps [snmp | xkl | xkl-generic] | host address [community-string] |
location string}
CONF#
```

Description:

Configures SNMP settings. For a trap to be sent to a host, either the global SNMP community must be set, or a host-specific community must be set.

Command Keyword Definitions

<i>chassis-id string</i>	The <i>chassis-id</i> is not currently used.
--------------------------	--

<code>community string</code>	Start a read-only SNMP agent using the community string specified by <code>string</code> . The <code>no snmp-server community</code> command turns off the SNMP agent.
<code>contact string</code>	Sets SNMP-retrievable contact information to the value of <code>string</code> . This value may be accessed through the SNMP variable <code>SNMPv2-MIB::sysContact.0</code> . The <code>no snmp-server contact</code> command sets this value to an empty string.
<code>enable traps [snmp xkl xkl-generic]</code>	Turn on sending of SNMP traps. A host address is also required. By itself, <code>enable</code> turns on all SNMP traps. Turn on only SNMP standard traps, XKL-specific or XKL-generic traps by appending <code>snmp</code> , <code>xkl</code> or <code>xkl-generic</code> respectively. The <code>no snmp-server enable traps</code> command disables sending of SNMP traps.
<code>host address [community-string]</code>	Sends SNMP traps to a specific host, specified by <code>address</code> . The <code>address</code> parameter may be either a hostname or an IP address. Multiple hosts may be specified, one per invocation of this command. The <code>no snmp-server host</code> command removes an existing target host. The <code>community-string</code> argument will cause traps to use this community string rather than the global community string specified for SNMP read operations.
<code>location string</code>	Set SNMP-retrievable location information to the value of <code>string</code> . This value may be accessed through the SNMP variable <code>SNMPv2-MIB::sysLocation.0</code> . The <code>no snmp-server location</code> command sets this value to an empty string.

2.4.35 sntp

Syntax:

```
CONF# [no] sntp server address
CONF#
```

Description:

Configures one or more SNTP servers for setting the system clock.

Command Keyword Definitions

`address` IP address or hostname of the SNTP server from which the DarkStar system should set its system clock.

2.4.36 tacacs-server host

Syntax:

```
CONF# [no] tacacs-server host host [key <host-specific key>]
CONF#
```

Description:

Adds or removes a TACACS+ host server to be used with AAA. When adding a server, you can optionally specify a TACACS+ server key. When removing a server, specify only the server host name or IP address.

Command Keyword Definitions

<code>host</code>	Specifies the host or IP address of a TACACS+ server. If multiple TACACS+ servers are specified, the DarkStar system will contact them in the order listed.
<code>key <host-specific-key></code>	When adding a server, optionally specifies the host-specific TACACS+ server key.
<code>no tacacs-server host host</code>	Removes a TACACS+ host server.

2.4.37 tacacs-server key

Syntax:

```
CONF# [no] tacacs-server key
CONF#
```

Description:

Sets the global TACACS+ server key.

Command Keyword Definitions

<code><global-shared-key></code>	Specifies a global shared key for a TACACS+ server. Specifying a host-specific key overrides a global shared key.
--	---

2.4.38 terminal pager

Syntax:

```
CONF# [no] terminal pager [n]
CONF#
```

Description:

The terminal pager displays a page of text and pauses to provide time to review console output. When the console output pauses, the user may proceed to the next page by pressing the space bar.

By specifying a value for [n], you can enable or disable the terminal pager, or set the maximum number of lines in the page. These configured settings will be saved to the config file upon a write memory command.

On first installation, the terminal pager is disabled (n=0).

Command Keyword Definitions

<code>terminal pager 0</code>	Disables the terminal pager.
<code>terminal pager n</code>	Enables the pager and sets the page size to n lines.
<code>no terminal pager</code>	Disables the terminal pager.

2.4.39 user

Syntax:

```
CONF# [no] user username password [0|5] password  
CONF#
```

Description:

Creates a user account for logging in to the DarkStar system.

 **NOTE**

To enable user accounts, use the `login local` command or `setup aaa`.

Command Keyword Definitions

<i>username</i>	Sets the name for the new account to <i>username</i> , which may contain only letters, digits, and the following characters: -_
[0 5]	Sets password input type. If the value is 0, <i>password</i> is treated as a plaintext string. If the value is 5, <i>password</i> is treated as an MD5-hashed password. The default is 0.
<i>password</i>	Sets the password for the account to <i>password</i> .
no user <i>username</i>	Removes <i>username</i> and its associated password from the local user database.

2.5 copy

Syntax:

```
# copy source-storage-location destination-storage-location  
#
```

Description:

Copies configuration data, software images, and gateway images between storage areas.



WARNING

Before using copy to install a new `/dxmos/config.dat` file, be sure the enable password in the new file is known or empty. After installing a new `dxmos/config.dat` file, to make the new configuration effective, the system must be reloaded. Beware that a `write memory` command will overwrite the new file with the running configuration.



WARNING

If you attempt to overwrite an executable file with a data file, or vice versa, you will receive a warning that the two files are of different modes. You will be prompted to confirm your decision before the file overwrite begins.

2.6 debug

Syntax:

```
# [no] debug argument  
#
```

Description:

Turns on verbose debugging information for a specified subsystem.

This command should only be used to diagnose specific problems. When debug output is active, system performance may be degraded and the amount of output may make typing additional commands difficult, especially when the system is under heavy load. A heavy load may cause a watchdog timeout and subsequent reload. These messages are only visible on the console unless monitor is activated.

Command Keyword Definitions

debug	Enables verbose debugging.
no debug	Disables verbose debugging.

2.7 delete

Syntax:

```
# delete file-name  
#
```


Description:

Deletes the specified file from the file system, if the file is not read only.

Command Keyword Definitions

file-name Specifies the file to be deleted.

2.8 dir

Syntax:

```
# dir [directory | filename]
#
```

Description:

Provides a directory listing for the specified file or directory. If no argument is present, provides a listing of the root directory.

Command Keyword Definitions

directory Specifies directory to list.

filename Specifies file to list.

2.9 disable

Syntax:

```
# disable
>
```

Description:

Exits enabled mode and returns to disabled mode.

2.10 enable

Syntax:

```
> enable
#
```

Description:

Enters enabled mode.

 **NOTE**

If an enabled mode password is set, the DXMOS prompts for the password before entering enabled mode.

2.11 logout

Syntax:

```
> logout  
>
```

Description:

Disconnects from the DarkStar system.

The `logout` command disconnects any telnet or SSH session and releases the VTY line for use by others.

When performed on the console, `logout` resets the console line. If a console password has been set, you must enter a password to return to the disabled mode prompt.

2.12 more

Syntax:

```
> more <file-path>  
>
```

Description:

Displays the contents of the specified regular file. Use the `dir` command to list directories and files in the file system.

2.13 ping

Syntax:

```
> ping [remote-host-name / ip-address]  
>
```

Description:

Sends test packets to a specific IPv4 address. Use the `ping6` command for IPv6 addresses. The `ping` command sends 5 ICMP echo request packets and reports whether or not it receives responses for each. An exclamation

point (!) is displayed for each successful packet and a period (.) is displayed for each unsuccessful packet.

🎯 NOTE

DNS must be configured with the `ip name-server` command for `remote-host` to work with a hostname instead of an IP address.

Command Keyword Definitions

remote-host Sets the destination hostname or IPv4 address to which `ping` sends packets.

2.14 ping6

Syntax:

```
> ping6 [remote-host-name | ip-address]
>
```

Description:

Sends test packets to a specific IPv6 address. The `ping` command sends 5 ICMP echo request packets and reports whether or not it receives responses for each. An exclamation point (!) is displayed for each successful packet and a period (.) is displayed for each unsuccessful packet. Use the `ping` command for IPv4 addresses.

Command Keyword Definitions

remote-host Sets the destination hostname or IPv6 address to which `ping` sends packets.

Command Display Example

```
localhost> ping6 fd16:e32:da22:f01:209:5bff:fee1:5a7e
Ping fd16:e32:da22:f01:209:5bff:fee1:5a7e
(fd16:e32:da22:f01:209:5bff:fee1:5a7e)
!!!!!!
Done pinging fd16:e32:da22:f01:209:5bff:fee1:5a7e - 5 of 5 packets received
localhost> ping 10.15.1.110
```

2.15 reboot

Syntax:

```
# reboot { file <file_source> | next | none | running | tftp <tftp_server>
<tftp_file_source> }
#
```

Description:

Reloads the DXMOS software from a manually designated boot file. You may designate a DXMOS boot file from either the DXMOS file system, or from a remote (TFTP) server. The `reboot` command loads the designated DXMOS boot file and starts it.

See also the `reload` command that reloads DXMOS, but leaves the choice of boot file up to the system boot loader.

The `reboot` command, like the `reload` command, triggers a "warm boot" of DXMOS without power-cycling or updating system hardware. If the old and new DXMOS running configurations are the same, customer traffic is not disrupted by a warm boot.

Command Keyword Definitions

<code>reboot file <file_source></code>	Loads and starts the boot file from a DXMOS file system location. <code>reboot next</code> Boots from the next location in the list of boot targets defined in the boot configuration file.
<code>reboot none</code>	Returns control to the system boot loader.
<code>reboot running</code>	Reloads and restarts the currently running DXMOS version, by re-executing the previous boot command, whether it was issued manually or by the boot loader.
<code>reboot tftp</code>	Boots from the designated TFTP server.
<code><tftp_server></code>	IP address or hostname of the designated TFTP server.
<code><tftp_file_source></code>	Designated boot file on the TFTP server.

Command Display Example

```
# reboot tftp 10.14.1.99 dxmos_prod300_latest.exe
# reboot running
```

2.16 reload

Syntax:

```
# reload
#
```

Description:

Reloads the DXMOS software.

The `reload` command causes a warm boot that does not affect the transport interfaces (client and wave) unless there is a difference between the saved configuration (`startup-config`) and the running configuration. To ensure that the transport interfaces are unaffected by `reload`, use the `write memory` command before the reload.

2.17 show commands

Show commands display information about how the DarkStar system is configured.

2.17.1 show

Syntax:

```
# show [access-list | amplifiers | app | banner | boot | dhcp | fan | host |
interface <interface-identifier>] | line | logging | rip | snmp | sntp |
static-routes | switch]
#
```

Description:

Displays current active configuration settings. Run in configuration mode, the `show` command is similar to the `show running-config` command available in enabled mode.

Without options, the `show` command displays full configuration information, starting with a string of eight semicolons (`;;;;;;;;`). This information can be captured in a text file, starting with the semicolons, and placed on a TFTP server for later download via the `tftp` command.

Command Keyword Definitions

<code>access-list</code>	Displays current access-list settings
<code>app</code>	Displays current APP settings in systems with an electric crossbar.
<code>banner</code>	Displays current banner settings.
<code>boot</code>	Displays current boot settings.
<code>dhcp</code>	Displays current DHCP settings.
<code>fan</code>	Displays current fan settings.
<code>host</code>	Displays current hostname.
<code>interface [<interface-identifier>]</code>	Displays current settings for the specified interface. Without an <code><interface-identifier></code> , settings are displayed for all interfaces.
<code>line</code>	Displays current line settings.
<code>logging</code>	Displays current logging settings.
<code>rip</code>	Displays current RIP settings.
<code>snmp</code>	Displays current SNMP settings.
<code>sntp</code>	Displays current SNTP settings.
<code>static-routes</code>	Displays current static routes.
<code>switch</code>	Displays current electric crossbar switch settings.

2.17.2 show app

Syntax:

```
> show app  
>
```

Description:

Displays information about the settings and current status of APP groups.

See the `app` command for more information about path protection.

2.17.3 show arp

Syntax:

```
> show arp [<ethernet-identifier> | <hostname>]  
>
```

Description:

Displays the ARP cache for Ethernet interfaces.

See also the `show ip arp` command.

Command Keyword Definitions

`<ethernet-identifier>`

Displays the ARP cache for the specified interface. Without an `<ethernet-identifier>`, `show arp` displays the cache for all interfaces.

`<hostname>`

Displays the ARP cache for the specified host name.

2.17.4 show bert

Syntax:

```
> show bert  
>
```

Description:

Can be used on any transport interface to obtain results up to the time the command was issued. This command displays all transport interfaces running BERT in the console output.

2.17.5 show bert logging

Syntax:

```
> show bert logging  
>
```

Description:

Displays the current BERT log file on the console. For each BERT sample, the log file shows Timestamp, HostName, Interface ID, Total Errors, and Elapsed Bert Time.

2.17.6 show calendar

Syntax:

```
> show calendar  
>
```

Description:

Displays the current time and date according to the DarkStar system calendar chip.

2.17.7 show chassis front panel

Syntax:

```
# show chassis front panel  
#
```

Description:

Shows the wave assignments for the fiber pairs showing on the front panel.

Command Display Example

```
localhost# show chassis front-panel
```

```
Chassis front panel:
```

```
OSC 0
```

```
  Fiber pair 0:
```

```
    OSC 0
```

```
Waves 0-9
```

```
  Fiber pair 0: NC
```

```
  Fiber pair 1:
```

```
    Wave 1
```

```
  Fiber pair 2:
```

```
    Wave 3
```

```
... ..
```

Wave 5

2.17.8 show clock

Syntax:

```
> show clock  
>
```

Description:

Displays the current time and date according to the DarkStar system clock.

2.17.9 show connections

Syntax:

```
> show connections [<transport-identifier>]  
>
```

Description:

Displays information about the wave and client interface connections, line status, and line rates.

Each line in the displayed table describes an active connection between lf1 and lf2. See `connect` command for additional information.

Command Keyword Definitions

<code><transport-identifier></code>	Display connections to the specified interface. Without a <code><transport-identifier></code> , the <code>show connections</code> command displays information for all transport interfaces.
---	--

2.17.10 show connections verbose

Syntax:

```
> show connections verbose  
>
```

Description:

Displays details and descriptions of the connected interfaces.

2.17.11 show debug

Syntax:

```
> show debug
```


>

Description:

Displays a list of debug flags currently enabled.

2.17.12 show edfa

Syntax:

```
> show edfa [<trunk>] <optical component id>
>
```

Description:

Displays status of EDFA devices, settings and alarms.



The `show edfa` command is available only on DarkStar systems with an EDFA installed.

Command Keyword Definitions

<code>[trunk]</code>	Optionally, specifies trunk if DarkStar system is split-trunk system.
<code>optical component id</code>	Specifies the optical component id.

2.17.13 show environment

Syntax:

```
> show environment [all | fans | power | temp]
>
```

Description:

Displays operating environment information, including temperature, status of fans, and status of power systems.

Issuing the `show environment` command without any arguments is equivalent to issuing `show environment all`.

Command Keyword Definitions

<code>all</code>	Displays summary of fan and power system status.
<code>fans</code>	Displays detailed fan status and operational parameters.
<code>power</code>	Displays detailed power system status and operational parameters.
<code>temp</code>	Displays current temperature readings and temperature operating ranges for many DarkStar systems.

2.17.14 show file

Syntax:

```
# show file {descriptors | info | systems}
#
```

Description:

Shows information pertaining to the file system.

Command Keyword Definitions

descriptors	Displays which files are currently in use.
info	Equivalent to <code>dir</code> command.
systems	Displays information about file systems present.

2.17.15 show flash

Syntax:

```
# show flash
#
```

Description:

Lists system flash memory and flash static files such as `factory-boot`.

2.17.16 show hardware

Syntax:

```
> show hardware
>
```

Description:

Displays serial numbers, manufacturing dates, and hardware revision data for DarkStar system hardware components. Displays the presence of passive optical components such as attenuators.

2.17.17 show hostkey

Syntax:

```
# show hostkey {private | public}
#
```

Description:

Displays the public and private DSA keys used by SSH.

Command Keyword Definitions

<code>private</code>	Prints the private hostkey for this system.
<code>public</code>	Prints the public hostkey for this system.

2.17.18 show hosts

Syntax:

```
# show hosts
#
```

Description:

Displays the DNS hosts table. You can manually configure the hosts table using the `ip host` command.

2.17.19 show led

Syntax:

```
> show led
>
```

Description:

Prints a readout of the front panel LEDs and a summary of system status.

2.17.20 show interface

Syntax:

```
> show interface [summary] | [full] | [ type] | [<int-ID>] | [<int-ID>
[verbose]]
>
```

Description:

Displays interface information. Without any arguments, the `show interface` command displays full information for all interfaces, for all types.

Command Keyword Definitions

<code>show interface</code>	Displays information about the specified interface. Equivalent to <code>show interface summary</code> .
<code>show interface summary</code>	Displays a short summary of the interface information.
<code>show interface full</code>	Displays full information for all interfaces, of all types.
<code>show interface <type></code>	Displays full information for all interfaces of the given type.
<code>show interface <int-ID></code>	Displays full information for the designated interface.
<code>show interface <int-ID> verbose</code>	Displays verbose information for the designated interface.
<code>int-ID</code>	[<type> [<direction>] <unit#> [<lane#>]]

```

type                ['osc' | 'eth' | 'loop' | 'wave' | 'client' | 'all']
direction           ['west' | 'east' | 'north' | 'south']
unit#               Transceiver unit number.
lane#               Transceiver lane number.

```

Command Display Example

```

localhost# show interface summary
Interface  Admin Line      Rate    RxPow      Ch.  Status      Last Line Chng.
-----
Client 0   Up    Absent    10GE      N/A      N/A  Absent      0:00:03:07
Client 1   Up    Absent    10GE      N/A      N/A  Absent      0:00:03:06
... ..
Client 4   N/A           N/A      N/A      N/A  N/A         N/A
  Lane 0   Up    Down      10GE      <-40.0 dBm  N/A  OK          0:00:03:06
... ..
Client 5   N/A           N/A      N/A      N/A  N/A         N/A
  Lane 0   Up    Down      10GE      <-40.0 dBm  N/A  OK          0:00:03:07
  Lane 1   Up    Down      10GE      <-40.0 dBm  N/A  OK          0:00:03:07
... ..

```

2.17.21 show ip arp

Syntax:

```

> show ip arp [<ethernet-identifier> | <hostname>]
>

```

Description:

Displays the ARP cache for an Ethernet interface.

See also `show arp` command.

Command Keyword Definitions

<ethernet-identifier> Display the ARP cache for the specified interface. Without an <ethernet-identifier>, the `show ip arp` command displays the cache for all Ethernet interfaces.

<hostname> Displays the ARP cache for the specified host name.

2.17.22 show ip routes

Syntax:

```

> show ip routes [detailed]
>

```

Description:

Displays the current system routing table.

Command Keyword Definitions

detailed

Displays more details, including link layer information.

Command Display Definitions

C

Connected.

S

Static.

R

RIP.

2.17.23 show ip traffic

Syntax:

```
> show ip traffic
>
```

Description:

Displays current IP traffic statistics.

2.17.24 show lines

Syntax:

```
> show lines
>
```

Description:

Shows the status of console and VTY lines.

2.17.25 show logging

Syntax:

```
# show logging
#
```

Description:

Displays the contents of the circular logging buffer.

2.17.26 show optical itu-grid

Syntax:

```
> show optical itu-grid
>
```

Description:

Displays an ITU Grid containing channels, frequencies, and wavelengths. The grid spacing is 50 GHz.

2.17.27 show optical pathways

Syntax:

```
# show optical pathways
#
```

Description:

Shows the device types on each of the client and OSC optical pathways.

Command Display Example

```
localhost# show optical pathways

Path Rx_OSC0
  Device 01: LC Optical Adapter
  Device 02: OSC Transceiver
Path RX1
  Device 01: MPO Optical Adapter
Path RX2
  Device 01: MPO Optical Adapter
  Device 02: XFP Optical Transceiver Wave
Path RX3
  Device 01: MPO Optical Adapter
  Device 02: XFP Optical Transceiver Wave
... ..
```

2.17.28 show optical pathways verbose

Syntax:

```
# show optical pathways verbose
#
```

Description:

Shows the input and output device types on each of the client and OSC optical pathways.

Command Display Example

```
localhost# show optical pathways verbose

Path Rx_OSC0
  Device 01: LC Optical Adapter
  In: Rx_OSC0
```

```
    Out: OSC0_Rx
Device 02: OSC Transceiver
    In:  OSC0_Rx
    Out: OSC 0 Rd
Path RX1
Device 01: MPO Optical Adapter 1
    In:  RX1
    Out: NC
Path RX2
Device 01: MPO Optical Adapter 2
    In:  RX2
    Out: MPO0_RX-2
Device 02: XFP Optical Transceiver 1 Wave 1
    In:  MPO0_RX-2
    Out: Wave 1 sw_rd
... ..
```

2.17.29 show optical wavelength-map

Syntax:

```
> show optical wavelength-map
>
```

Description:

Displays a reference table of optical channels and their frequencies and wavelengths. This command may be deprecated in the future in favor of the `show optical itu-grid` command.

2.17.30 show peers

Syntax:

```
> show peers
>
```

Description:

Displays peer addresses and status.

2.17.31 show raman

Syntax:

```
> show raman <raman-identifier>
>
```

Description:

Displays information about Raman amplifier state and function.

Command Keyword Definitions

<raman-identifier> Specifies the Raman amplifier.

2.17.32 show run access-list

Syntax:

```
> show run access-list
>
```

Description:

Displays the running configuration access list.

Command Display Definitions

```
> show run access-list
running-config:
access-list 1 deny 10.14.16.98/32
access-list 1 permit 10.14.16.99/32
access-list 1 permit fd16:e31:da22:f01:2a0:e3ff:fe00:2e1/128
access-list 1 permit fd16:e31:da22:f01:209:5bff:fee1:5a7e/128
access-list 50 permit fd16:e31:da22:f01:2a0:e3ff:fe00:371/128
access-list 50 permit 10.14.1.0/24
access-list 50 permit 10.3.0.0/16
access-list 50 permit 172.30.255.210/32
```

2.17.33 show running-config

Syntax:

```
> show running-config [access-list | amplifiers | app | banner | boot | dhcp
| fan | host | interface <interface-identifier>] | line | logging | rip |
snmp | sntp | static-routes | switch]
>
```

Description:

Displays current active configuration settings.

Without options, the `show running-config` command displays full configuration information, starting with a string of eight semicolons (`;;;;;;;;;`). This information can be captured in a text file, starting with the semicolons, and placed on a TFTP server for later download via the `tftp` command.

The `show running-config` command is identical to `write terminal`.



WARNING

The running config may not yet have been preserved as a file. To preserve it, use the `write memory` command.

Command Keyword Definitions

<code>app</code>	Displays current APP settings in systems with an electric crossbar.
<code>banner</code>	Displays current banner settings.
<code>boot</code>	Displays current boot settings.
<code>dhcp</code>	Displays current DHCP settings.
<code>fan</code>	Displays current fan settings.
<code>host</code>	Displays current hostname.
<code>interface</code> [<code><interface-identifier></code>]	Displays current settings for the specified interface. Without an <code><interface-identifier></code> , settings are displayed for all interfaces.
<code>line</code>	Displays current line settings.
<code>logging</code>	Displays current logging settings.
<code>rip</code>	Displays current RIP settings.
<code>snmp</code>	Displays current SNMP settings.
<code>sntp</code>	Displays current SNTP settings.
<code>static-routes</code>	Displays current static routes.
<code>switch</code>	Displays current electric crossbar switch settings.

2.17.34 show sntp

Syntax:

```
> show sntp
>
```

Description:

Shows SNTP status, including the IP address and last sync time of the currently selected SNTP server.

2.17.35 show startup-config

Syntax:

```
# show startup-config  
#
```

Description:

Displays DarkStar system startup and backup configurations from customer flash memory.

2.17.36 show time

Syntax:

```
> show time  
>
```

Description:

This command is a synonym for `show clock`. See the `show clock` command.

2.17.37 show tech-support

Syntax:

```
# show tech-support  
#
```

Description:

Displays all system information in a format useful to customer support engineers for diagnostics.

2.17.38 show version

Syntax:

```
> show version [verbose]  
>
```

Description:

Displays DXMOS, boot, and gateway version information, and the time and type of the last boot.

Command Keyword Definitions

<code>verbose</code>	Display additional version information and component revision numbers.
----------------------	--

2.18 telnet

Syntax:

```
> telnet <ip_address>
>
```

Description:

Establishes a telnet connection to the specified host name or IP address. The host replies with a definition of the escape character and a login prompt. You can close the connection with a `logout` command.

Command Display Example

```
localhost> telnet 10.14.1.99
Establishing connection to 10.14.1.99:23.
Connected.
The escape character is '^' (Control-Shift-6) (octal 036).
Debian GNU/Linux 6.0

flood login: ...
Password: ...
Last login: Fri Jan 18 16:16:44 PST 2013 from ...

*****
***      Welcome to NEW Flood      ***
*****

flood > logout
Connection closed.
```

2.19 terminal pager

Syntax:

```
> [no] terminal pager [n | default]
>
```

Description:

The terminal pager displays a page of text and pauses to provide time to review console output. When the console output pauses, the user may proceed to the next page by pressing the space bar.

By specifying a value for [n], you can enable or disable the terminal pager, or set the maximum number of lines in the page. Use `terminal pager default` to set the number of lines to the default value specified in configuration mode, or to turn off paging if the default value is not set. You need to be in configuration mode to have these settings saved to the config file.

On first installation, the terminal pager is disabled (n=0).

Command Keyword Definitions

<code>terminal pager 0</code>	Disables the terminal pager.
<code>terminal pager 1</code>	Enables the terminal pager, with 2 lines per page.
<code>terminal pager n</code>	Sets the page size to n lines.
<code>terminal pager default</code>	Sets page size as specified in configuration mode. If not specified, disables terminal paging.
<code>no terminal pager</code>	Disables the terminal pager.

2.20 tftp

Syntax:

```
# tftp {get | put} tftp-server source-file-name destination-file-name  
#
```

Description:

Retrieves or sends files from one location to another via the DarkStar network. Use of the `tftp` command requires a functioning TFTP server. Configuring TFTP servers is beyond the scope of this documentation.

NOTE

Factory files are not writable and attempts to do so will fail.

NOTE

DNS must be configured with the `ip name-server` command for `tftp-server` to work with a hostname instead of an IP address.



WARNING

It is possible to corrupt valid storage locations using the `tftp` command. No checks are made to ensure the downloaded data files are legitimate DarkStar system data files. Use the `checksum` command on the retrieved file and manually verify its integrity.

Using `tftp` to create copies can take several minutes. To avoid creating a corrupted or incomplete copy, do not interrupt the `tftp` command. Interruption of flash memory write operations with

`CTRL+C` *generates a warning that corruption may occur.*



WARNING

If you attempt to overwrite an executable file with a data file, or vice versa, you will receive a warning that the two files are of different modes. You will be prompted to confirm your decision before the file overwrite begins.



WARNING

Using `tftp` to create copies can take several minutes. To avoid creating a corrupted or incomplete copy, do not interrupt the `tftp` command. Interruption of flash memory write operations with `CTRL+C` generates a warning that corruption may occur. It is possible to corrupt valid storage locations using the `tftp` command. No checks are made to ensure the downloaded data files are legitimate DarkStar system data files. Use the `checksum` command on the retrieved file and manually verify its integrity.



WARNING

It is possible to use `tftp` to obtain a configuration whose enable password is unknown. Be sure to write down each configuration's enable password in a safe place. Once the password is set and you leave enabled mode, there is no way to configure the DarkStar system without entering the password to return to enabled mode. If the password is saved to the startup configuration using the `write memory` command, the only way to clear the enabled mode password without entering enable mode is to reload the DarkStar system in factory default mode by pressing and holding the side reset button. Reloading in factory default mode disrupts network traffic across all transport interfaces.

Command Keyword Definitions

<code>get</code>	Retrieves a file from a remote TFTP server.
<code>put</code>	Places a file on a remote TFTP server.
<code>tftp server</code>	Specifies the IP address or the hostname of the TFTP server.
<code>source-file name</code>	Specifies the file to be transferred.
<code>destination-file name</code>	Specifies the target location for the file to be transferred.

2.21 tune

Syntax:

```
# tune channel | frequency | wavelength
#
```

Description:

Used in interface config mode, the `tune` command tunes a wave interface to a specific channel, frequency, or wavelength.

Command Keyword Definitions

<code>channel</code>	ITU grid channel /spacing indicator. A decimal number (xx.5), where "xx" indicates the channel number and ".5" indicates 50GHz spacing.
<code>frequency</code>	ITU grid frequency (GHz).
<code>wavelength</code>	ITU grid wavelength (nm).

2.22 tunebulk

Syntax:

```
# tunebulk <MPO>, <ITU-Channel-Range>
#
```

Description:

Tunes the wavelengths of a Multifiber Push-On (MPO) connector to a continuous range of channels in the ITU channel grid. Use the `tunebulk` command to tune multiple wavelengths at one time. The `tunebulk` command is available only for filterless DarkStar systems.

Command Keyword Definitions

<code><MPO></code>	MPO number. The MPO number references a particular set of waves, 0 being the first 10 waves, and 1 being the next 10, etc.
<code><ITU-Channel-Range></code>	A decimal number (0-7) indicating an ITU Channel Range: 0: channels 14.0-19.5 1: channels 20.0-25.5 2: channels 26.0-31.5 3: channels 32.0-37.5 4: channels 38.0-43.5 5: channels 44.0-49.5 6: channels 50.0-55.5 7: channels 56.0-61.5

2.23 undebug

Syntax:

```
# undebug argument  
#
```

Description:

Turns off verbose debugging information. Using this command is the equivalent of `no debug`.

Debugging information is useful only for diagnosing system problems. The commands `debug` and `undebug` do not provide information that is useful during normal DarkStar system operation. If the amount of debugging information is so extreme as to interfere with operation, `undebug all` is the quickest way to recover without reloading.

2.24 version

Syntax:

```
> version  
>
```

Description:

Displays the version of the DXMOS software currently loaded.

2.25 write erase config

Syntax:

```
# write erase config  
#
```

Description:

Erases configuration information from non-volatile storage (flash memory).

2.26 write memory

Syntax:

```
# write memory [storage-location-config]  
#
```

Description:

Writes current configuration information to non-volatile storage (flash memory).

Command Display Definitions

`<storage-location-config>` Writes the current configuration to the specified storage location. Without a `<storage-location-config>`, write memory writes to the `startup-config` location.

2.27 write network

Syntax:

```
# write network tftp-server filename  
#
```

Description:

Writes current configuration information to a remote server using TFTP.

NOTE

XKL strongly encourages a backup of the `startup-config` data on a remote TFTP server. In the event that backups of the configuration in the DarkStar system flash memory become corrupted, a TFTP backup of your settings allows you to restore your DarkStar system and customer traffic to normal conditions.

NOTE

DNS must be configured with the `ip name-server` command for `tftp-server` to work with a hostname instead of an IP address.

Command Keyword Definitions

`tftp-server`

Specifies the IP address or hostname of a TFTP server to which the `write network` command copies the current `running-config`.

`filename`

Specifies the name of the file to which the `write network` command copies the current configuration. If the file already exists at the remote location, `write network` overwrites it.

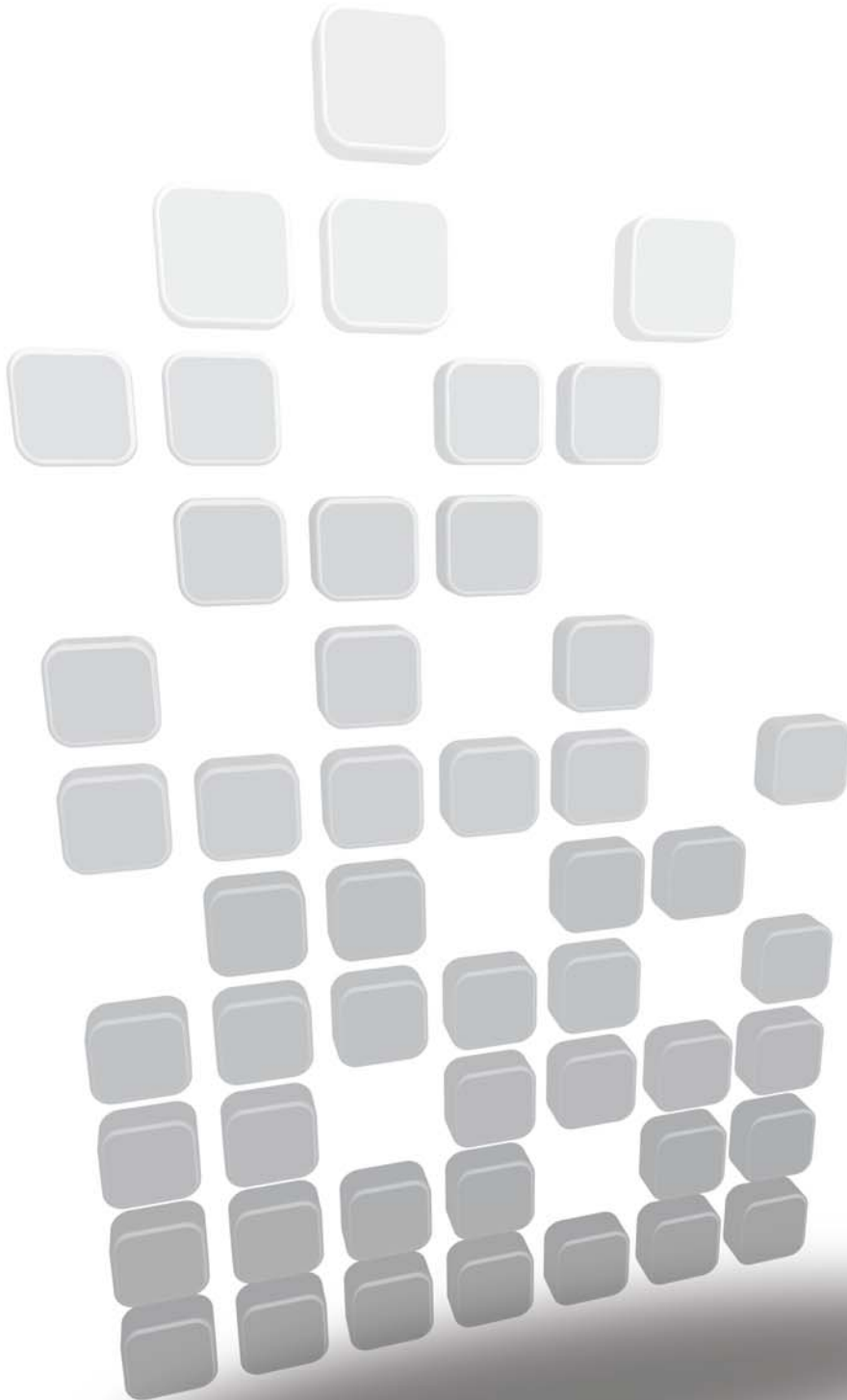
2.28 write terminal

Syntax:

```
# write terminal  
#
```


Description:

Writes the current configuration to the console. Identical to the `show running-config` command.



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