UG

CLI User Guide: LIB-225 & 2MD Units

CLI guide for Liberator™ CE and 2MD Chassis

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Revision History

Rev	Date	Description
A	10/02/2016	Initial Release
B	25/04/2016	Set into new company format

Contents

1. Introduction

This document describes the basic usage and configuration of the Command Line Interface (CLI) within our Liberator™ CE and 2MD Chassis units

The CLI is a fully comprehensive management interface on the device. It is the only management interface accessible on the serial console (i.e., even if there is no network connectivity, the device can still be managed using a serial connection).

2. Starting a CLI Session

The products can be configured and managed directly or indirectly using:

HyperTerminal – offers a text-based command prompt on a remote device. The device could be a serial device, connected directly to your PC's serial port or a network device. HyperTerminal can use the local serial interface for communications or the network for switch configuration and management.

PuTTY – a free Win32 Telnet and SSH client that can be used to access the CLI to configure and manage the switch via the network.

Telnet session – uses the CLI to configure and manage the switch via the network.

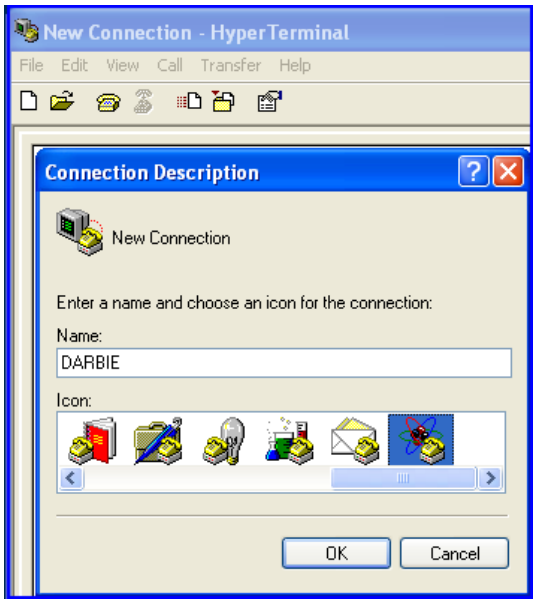
Web browser – uses any standard web browser and the IP address to access the products' web GUI for configuration and management.

SNMP (Simple Network Management Protocol) – uses public and private management information bases (MIBs) to easily integrate and manage the switch using an EMS (Element Management System).

The users computer must be running a terminal emulator such as TeraTerm or PuTTY on Windows, or Minicom on Linux. This will allow you to make a connection from a computer using the serial console port on the device (**115200** baud, **No** parity, **8** data bits, **1** stop bit, **no** flow control).

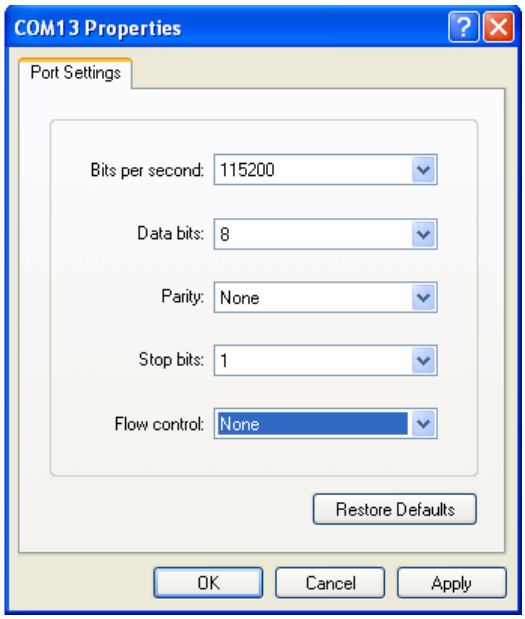
2.1. Login using Hyper Terminal

1. Connect the RJ-45 console cable from the unit to the computer.
2. On a Windows PC, go to START > Accessories > Communications > Hyper Terminal to bring up a New Connection - HyperTerminal screen.

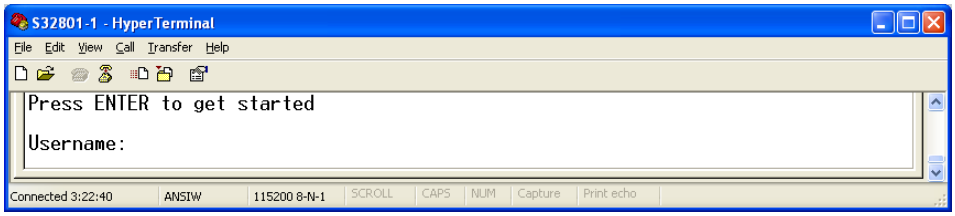


3. Type a name in the in the NAME field and select an Icon.
4. Click the OK to launch the "Connect To" dialog box. See the "Connect To" dialog box below.

5. Select a COM port on the "connect using" pulldown menu.
6. Click the OK button and the selected "COM Port Properties" dialog box appears, as shown below.
7. Set the COM Properties as shown below.

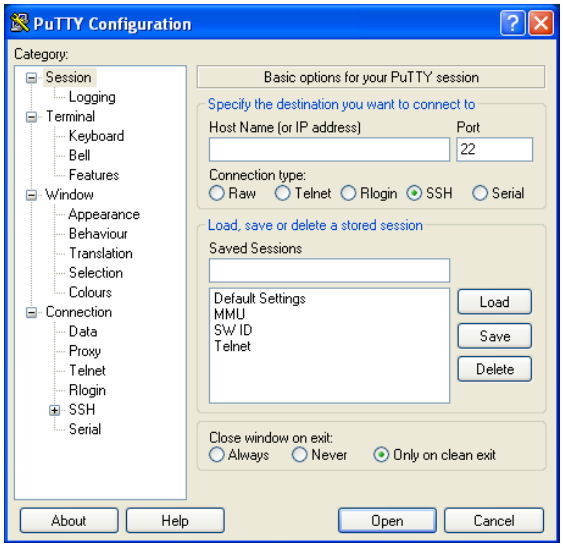


8. Click the OK button to establish the COM Port properties; the COM port dialog box will close.
9. Press the ENTER key twice to bring up the "username" prompt.
10. At the "username" prompt in lowercase type: admin, no password.
11. Press the ENTER key twice to launch the CLI interface (shown below).

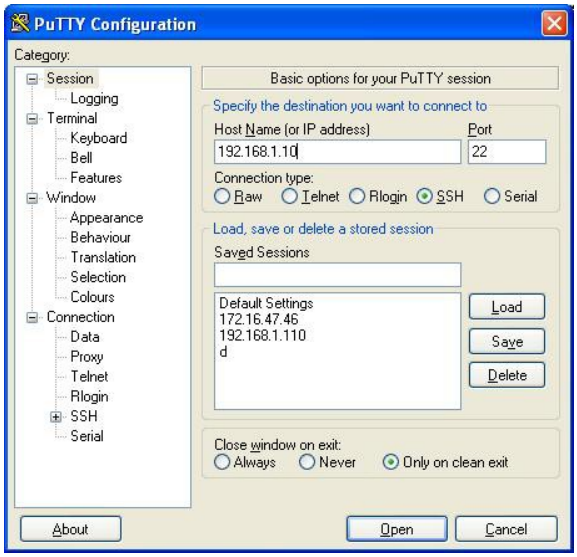


2.2. Login using Putty

1. Start a PuTTY session, and the PuTTY Configuration dialog box displays as shown below.

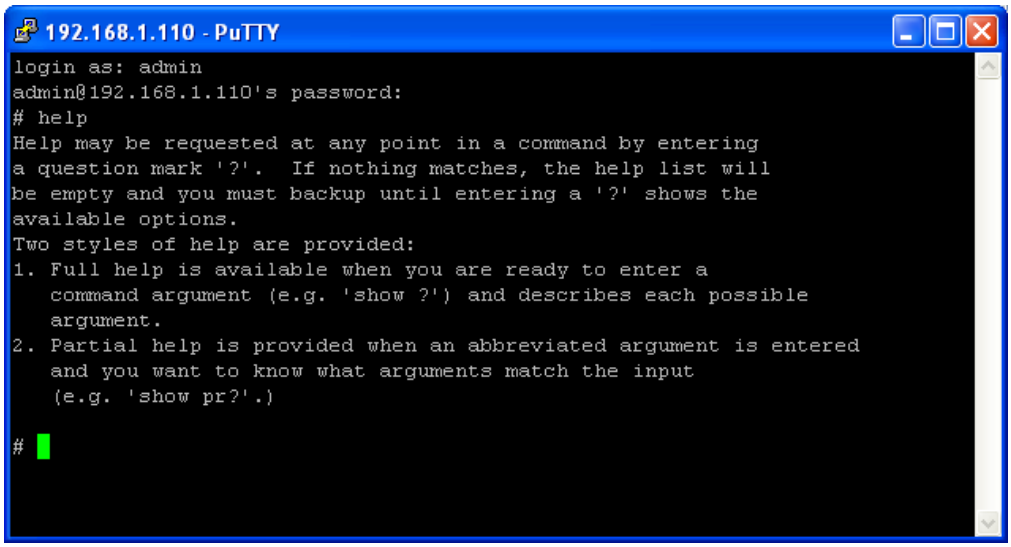


2. In the "Host Name {or IP Address}" field, enter the IP address of the switch (192.168.1.10).
3. In the Port field, enter 22.
4. Name the session in the "Saved Sessions" field.
5. Click the SAVE button and the dialog box displays as shown below.

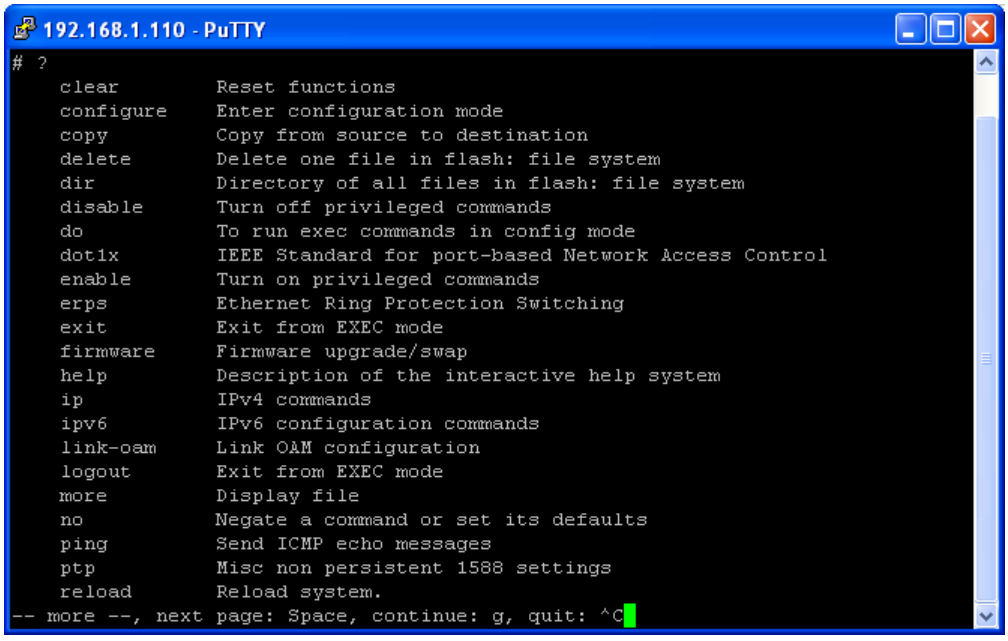


6. Click the Open button to launch the login screen, shown below. Note: If a Security Alert displays:
   - Click YES if you trust the host and the key will be added to the PuTTY cache.
   - Click NO if you do not want to register the key for this session.

7. At the login prompt, type “admin” (default/lowercase).
8. Press the ENTER key three times to bring up the command prompt (see below).
9. Type “help” and press Enter to display the initial Help page as shown below.



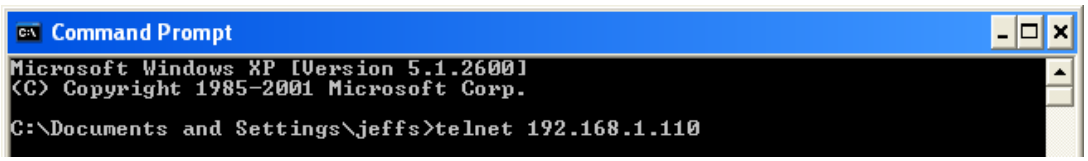
10. Type ? display the initial commands list as shown below.



11. Continue as required; either press the Space bar to continue to the next page of the commands list or press Control - C (Ctrl/C) to quit and return to the # prompt.
12. See the command group descriptions or the Quick Start section below.

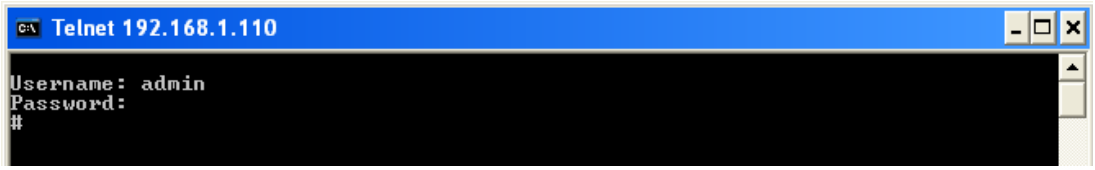
2.3. Login using Telnet

1. Using Windows, select START/Command Prompt.
2. At the prompt type telnet and then the unit IP address (e.g., 192.168.1.110 below).

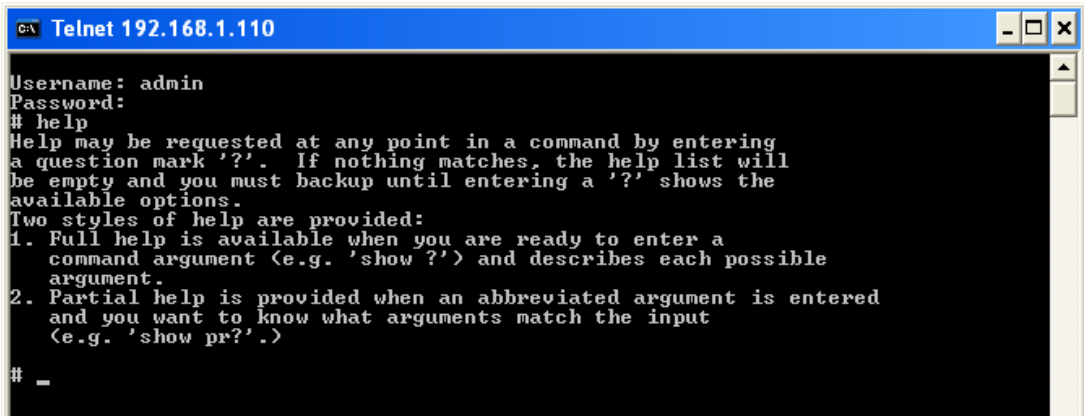


3. Click the OK button to launch the Telnet login screen, as shown below.

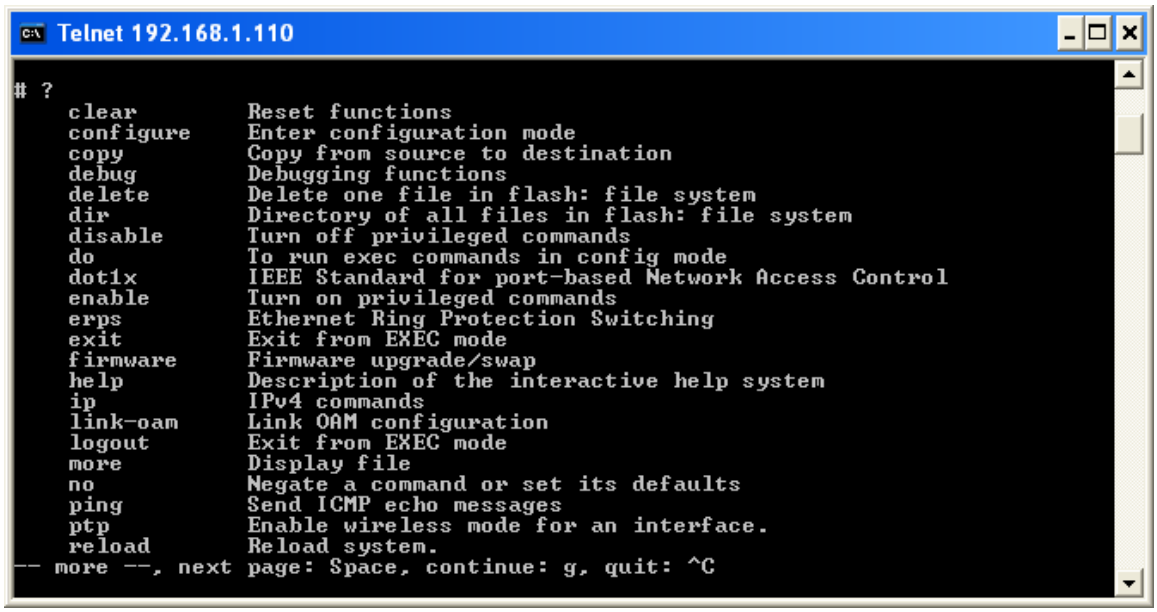
4. Enter the username “admin” (lowercase).
5. Press the ENTER key twice to bring up the # prompt as shown below.



6. Type “help” and press Enter to display the initial Help page as shown below.



7. Type ? display the initial commands list as shown below.



8. Continue as required; either press the Space bar to continue to the next page of the commands list or press Control - C (Ctrl/C) to quit and return to the # prompt.
9. See the command group descriptions or the Quick Start section below

3. Quick Start

This section is provided to help you quickly:

- Log in and reset configuration to factory defaults.
- Set device hostname and admin user password.
- Set VLAN 1 IP address.
- Configure a management VLAN and IP address and verify connectivity using 'ping'.
- Display the current configuration and save it to FLASH storage.

The following assumes the device is powered on and has a functional connection to a computer using the serial console port on the device (115200 baud, No parity, 8 data bits, 1 stop bit, no flow control).

The computer must be running a terminal emulator such as PuTTY on Windows, or Mini-com on Linux.

3.1. Login In and Reset Configuration to Factory Defaults

Press Enter one or more times until the 'Username:' prompt appears. Then type '**admin**' and press the Enter key and at the 'Password:' prompt press Enter (there is no default password). This completes the login sequence and displays the prompt, '#'.

```
Username: admin
Password:
#
```

At this point the 'admin' user is operating at the highest privilege level, level 15. This means full control over the device and its configuration, and it is therefore possible to re-set the configuration to factory defaults – this can be done by typing '**reload defaults**' as seen below:

```
# reload defaults
% Reloading defaults. Please stand by.
# Reloading defaults complete.
#
```

When the prompt returns, the system has reverted to factory defaults.

Note: After power up, the unit will have DHCP enabled. If a DHCP server is available, the unit will obtain an IP address from the DHCP server. If no DHCP server is available, after 70 seconds, the unit will fall back to the default IP address of 192.168.0.1/24.

3.2. Set Device Hostname and admin User Password

The CLI has several different modes. The current mode is called exec mode; it allows the user to perform operations related to configuration files, reloading defaults, displaying system information, etc., but it does not allow the user to change detailed configuration. Such operations are performed while in the configuration mode.

Thus, in order to set the device hostname, first change to configuration mode, then enter the 'hostname' command along with a suitable name, and finally 'exit' configuration mode:

```
# configure terminal
(config)# hostname my-device
my-device(config)# exit
my-device#
```

The commands are executed immediately, so 'hostname' changes the device hostname right away; this is reflected in the prompt as well.

A password should be set for the 'admin' user:

```
my-device# configure terminal
my-device(config)# username admin privilege 15 password unencrypted very-secret
my-device(config)# exit
my-device#
```

Please note: If you change the admin user password, and then lose it, it becomes impossible to access the unit as there is no other admin user set up. Please ensure you have kept a copy of the new password stored safely before changing it on the unit.

3.3. Set VLAN 1 IP Address

By default, the unit will have VLAN 1 as the first available interface – additional VLAN interfaces can be created manually.

To manually set the IP address for VLAN 1, you must set the box into configuration mode (by typing '**configure terminal**') and then access the VLAN interface submode (by typing '**interface VLAN 1')**

Once in this sub-mode you can set the static IP address by typing the following:

ip address <*ipv4 address*> <*ipv4 subnet*>

Once completed, you can type '**Exit'** to exit the sub-mode. Please see the below example:

```
my-device# configure terminal
my-device(config)# interface vlan 1
my-device(config-if-vlan)# ip address 172.16.1.2 255.255.0.0
my-device(config-if-vlan)# exit
my-device(config)#
```

You can also set a fallback IP address if the unit has its DHCP server enabled – this means that the unit will have a default IP to fall back on if the DHCP server is unavailable or not responding.
To do this you must put the unit into configuration mode and, under the VLAN interface you wish to edit, use the following command:

ip address dhcp fallback <*ipv4 address*> <*ipv4 subnet*>

3.3.1. Creating a Management VLAN and Set IP Address

Under a basic IP configuration, as above, all Ethernet ports are members of VLAN 1 by default. This means that the unit can be managed by accessing any available Ethernet port – you can, however, configure the unit to have a management VLAN, where the management traffic can run in a separate address page and only be accessible via a specific port (tagged traffic). Please see the below example:

```
my-device# configure terminal
my-device(config)# interface vlan 1
my-device(config-if-vlan)# no ip address
my-device(config)# vlan 42
my-device(config-vlan)# name management
my-device(config-vlan)# interface vlan 42
my-device(config-if-vlan)# ip address 172.16.1.2 255.255.0.0
my-device(config-if-vlan)# interface GigabitEthernet 1/1
my-device(config-if)# switchport mode trunk
my-device# show vlan id 42
VLAN   Name                            Interfaces
----   --------------------------------        ----------
42     management          GigabitEthernet 1/1

my-device# show ip interface brief
Vlan   Address             Method       Status
----   --------------------        --------     ------
 42    172.16.1.2/16       Manual       UP
my-device#
```

In the above screenshot, VLAN 1 is replaced with a new VLAN (VLAN 42), renamed to 'Management' and an Ethernet port (Gigabit Ethernet 1/1) is set as a trunk port

The final two commands are used to verify settings:

- First, 'show vlan id 42' displays information about VLAN 42: Name and the interfaces that are members, in this case exactly GigabitEthernet 1/1; the other interfaces on the device remain members of VLAN 1.
- Second, 'show ip interface brief' displays configured and active IP interfaces. Note how the status should be 'UP'.

If it isn't, then the reason could be that there is no link on GigabitEthernet 1/1.

3.4. Display and Save Configuration to FLASH

The current configuration of the device can be displayed in the form of a virtual file containing the full set of commands necessary to create an identical configuration (with a few exceptions; certain items, such as private SSH keys, are not displayed.). This file is called '**running-config**' and it is only held in virtual memory. This means that, if the unit is rebooted or power-cycled, the unit configuration reverts back to default or back to the last saved configuration. It is therefore necessary to save 'running-config' to FLASH storage under the name 'startup-config' – this file is read and is executed at every boot and is therefore responsible for restoring the running configuration of the system to the state it had when the last save occurred.

The 'running-config' is displayed with this command '**show running-config**' – this gives you a breakdown of the configuration items currently running on the unit:

```
my-device# show running-config
Building configuration...
hostname my-device
username admin privilege 15 password encrypted dmVyeS1zZWNyZXQ=
!
vlan 1
 name default
!
vlan 42
 name management
!
spanning-tree mst name 00-01-c1-00-ad-80 revision 0
! [...]
!
interface GigabitEthernet 1/1
 switchport mode trunk
!
interface GigabitEthernet 1/2
!
interface GigabitEthernet 1/3
!
! [...]
!
interface 2.5GigabitEthernet 1/1
!
interface 2.5GigabitEthernet 1/2
!
interface vlan 1
 no ip address
!
interface vlan 42
 ip address 172.16.1.2 255.255.0.0
!
!
!
line console 0
!
line vty 0
```

To save the running config you can use the following command:

Copy running-config startup-config

See below example

```
# copy running-config startup-config
Building configuration...
% Saving 2216 bytes to flash:startup-config
#
```

Once the cursor returns to **#** you will know that the configuration has been saved.

4. Circuit Emulation Service configuration

The CES configuration options can be accessed in both the main menu as well as the terminal configuration submenu. The available options can be viewed as follows:

From the main menu, type '**CES ?**'

```
# ces ?
    break-calls     Break calls on TDM Port
    debug           CES Debug Tracing
    jitter          CES Link Jitter Configuration
    loop            CES Logical Link Loop Configuration
#
```

From the terminal configuration menu, type '**CES ?**'

```
# configure terminal
(config)# ces ?
    clock           Set Clock Priority
    event-report    CES Event Reporting configuration
    global          CES Ethernet Port Global configuration
    jitter          CES Link Jitter Configuration
    link            CES Logical Link Configuration
    multicast       CES Ethernet Port Multicast configuration
    port            CES TDM Port configuration
    serial          CES Serial Port configuration
    vlan            CES Link VLAN Configuration
```

4.1. CES Main Menu

4.1.1. TDM break calls

Any TDM calls that are established via a logical link on the TDM ports can be broken/disconnected via this command.

The command is split between the TDM port and the Serial port (if available on the unit).

```
# ces break-calls ?
    port       CES TDM Port configuration
    serial     CES Serial Port configuration
```

For each one, you must select the port number that applies to the logical links you wish to break. For TDM ports the command will be like the following:

```
# ces break-calls port 1
#
```

The above breaks the calls for all logical links on TDM port 1

For Serial ports the command will be like the following:

```
# ces break-calls Serial 1
#
```

The above breaks the calls for all logical links on TDM serial port 1.

4.1.2. CES debug

The CES debug command allows the user to turn on debug tracing on various functions for CES. To see all the available debug options you must type the following:

'CES debug ?'

```
# ces debug ?
    <0-255>     Port/Link Number (255 = ALL)
    all         All CES Debug
    arp         Address Resolution Protocol Debug
    control     Control Debug
    dump        CES Debug Configuration Dump
    fpga        CES Debug Register Dump
    link        Stream Debug
    llcont      Stream Control Debug
    llglob      Stream Global Debug
    off         Disable CES Debug
    on          Enable CES Debug
    sip         Session Initiation Protocol Debug
    tdm         TDM Port Debug
    <cr>
```

You can specify the port you wish to turn debug on by specifying the port number (typing 255 will cover all ports).

```
# ces debug 1 ?
    all         All CES Debug
    arp         Address Resolution Protocol Debug
    control     Control Debug
    link        Stream Debug
    llcont      Stream Control Debug
    llglob      Stream Global Debug
    off         Disable CES Debug
    on          Enable CES Debug
    sip         Session Initiation Protocol Debug
    tdm         TDM Port Debug
    <cr>
```

Whether you specify a port number or not, the above debug submenu will break down into the following options**:**

First part of command	Available Sub_option	Comments
Ces debug <*port number*> All	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables all debug options for the specified port/link
Ces debug <*port number*> Arp	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables ARP debug options for the specified port/link
Ces debug <*port number*> Control	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables ARP debug options for the specified port/link
Ces debug <*port number*> Dump	**N/A**	Shows the entire configuration dump of the unit
Ces debug <*port number*> FPGA	**N/A**	Shows the register dump for the unit
Ces debug <*port number*> Link	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables Link debug options for the specified port/link
Ces debug <*port number*> LLcont	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables stream control debug options for the specified port/link
Ces debug <*port number*> LLglob	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables Global debug options for the specified port/link
Ces debug <*port number*> Off	N/A	Disables all debug options

		for the specified port/link
Ces debug <*port number*> On	N/A	Enables all debug options for the specified port/link
Ces debug <*port number*> SIP	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables Session Initiation Protocol Debug options for the specified port/link
Ces debug <*port number*> TDM	**off** Disable CES Debug **on** Enable CES Debug	Enables/Disables port debug options for the specified port

4.1.3. CES Jitter

The CES jitter option allows the user to 'nudge' packets within the jitter buffer of the unit. This means that you can move early or late packets in the queue so that they can be included within the jitter buffer.

The command needed should be typed as the following:

Ces jitter link <*link number*> nudge <-*128 to 128*>

4.1.4. CES Loop

The CES Loop option allows the user to set a software loop on a either a port or a logical link.

To see all the available debug options you must type the following:

'Ces loop ?'

```
# ces loop ?
    link        CES Logical Link Loop Configuration
    port        CES TDM Port configuration
    serial      CES Serial Port configuration
```

The link sub-option allows you to specify a link number and then set it as either a local or a remote link

'ces loop link <*link number*> ?'

```
# ces loop link 1 ?
    local      CES Link Local Loop Configuration
    remote     CES Link Remote Loop Configuration
    <cr>
```

Once you choose either local or remote, you can enable or disable the loop

'ces loop link *<link number> <local or remote> <On or Off>*'

Loops you can also be set on a port level – the below command only applies to the TDM port

'ces loop port *<port number> <local or remote> <On or Off>*'

```
# ces loop port 1 ?
    local      CES TDM Port Local Loop Configuration
    remote     CES TDM Port Remote Loop Configuration
    <cr>
# ces loop port 1 local ?
    off     CES TDM Port Local Loop disabled
    on      CES TDM Port Local Loop enabled
```

Any logical link associated with the specified port will receive the software loop.

The same command can be applied to any serial port as well (if available)

'ces loop serial *<serial port number> <local or remote> <On or Off>*'

```
# ces loop serial 1 ?
ces loop serial { <port> } [ local { on | off } ] [ remote { on | off } ]
# ces loop serial 1 Local ?
    off     CES Serial Port Local Loop disabled
    on      CES Serial Port Local Loop enabled
```

4.2. CES Configuration menu

To access the CES configuration options, you will first need to set the unit into configuration mode. This can be done with the following command

'configure terminal'

Once the unit is set into configuration mode, you can see the available CES options by typing 'ces **?'** See below screenshot as an example:

```
(config)# ces ?
    clock            Set Clock Priority
    enhance-clock    CES Enhance Clocking configuration
    event-report     CES Event Reporting configuration
    global           CES Ethernet Port Global configuration
    jitter           CES Link Jitter Configuration
    link             CES Logical Link Configuration
    multicast        CES Ethernet Port Multicast configuration
    port             CES TDM Port configuration
    rs530            CES RS530 Serial Port configuration
    vlan             CES Link VLAN Configuration
```

4.2.1. CES Clock priority configuration

This clock option allows you to set the clock priority of your logical links – clock priority can be set against a logical link, a TDM/Serial port or the units' internal clock.

The options can be seen by typing the following:
'ces clock ?'

```
(config)# ces clock ?
    1588        Set 1588 Clock Priority
    internal    Set Internal Clock Priority
    link        Circuit Emulation Services
    port        Clock Priority Port
```

Please note:

- **The 1588 clock functionality is not available as of the writing of this manual**
- **The 2MD chassis unit does not have an internal clock priority option. The priority is set to internal by default**

The command for setting the clock priority across all 3 options must follow the below format:

'ces clock internal <*priority number*>'

'ces clock link <*link number*> <*priority number*>'

'ces clock port <*port number*> <*priority number*>'

Please note:

- The lowest priority number gives the highest priority to your allocated link/port. For example: If you have given the Internal clock priority 2 and then give logical link 1 a priority of 4, the unit will treat the Internal clock as the highest priority.
- With the 2MD chassis, the only way you can set the Internal clock as the highest priority is by giving **all** the other clock sources the highest priority number (lowest priority)

4.2.2. CES Enhance-clock

This option allows you to enable and configure the enhanced clocking functionality. Please note that this option & functionality is not available on the 2MD chassis.

To see the available options you will need to use the following command:

'ces enhance-clock ?'

```
(config)# ces enhance-clock ?
    disable     Disable CES Enhance Clocking
    enable      Enable CES Enhance Clocking
    link        Show CES Logical Link Configuration
    <cr>
```

To enable or disable the enhance clocking option, you can use the following command:

'ces enhance-clock <*enable/disable*>'

To select which link you can enable it for, you can use the following command:

'ces enhance-clock link <*link number*>

4.2.3. CES event reporting

The event reporting option allows the user to configure which CES traps they want to generate, as well what the event thresholds should be before an event is generated.

To see what options are available you need to type the following:
'ces event-report ?'

```
(config)# ces event-report ?
    dco          CES Event Reporting DCO value
    early        CES Event Reporting Early Packet Threshold
    interval     CES Event Reporting Interval value
    late         CES Event Reporting Late Packet Threshold
    threshold    CES Event Reporting Threshold value
    underrun     CES Event Reporting Underrun Threshold
    <cr>
```

1st part of command	Submenu option	Comments
Ces event-report DCO	0 – 65536 (0 = Disabled)	Derived Clock Offset Threshold Value
Ces event-report Early	0 – 65536 (0 = Disabled)	Early Packet Threshold Value
Ces event-report Interval	1 – 1440 minutes	Interval value
Ces event-report Late	0 – 65536 (0 = Disabled)	Late Packet Threshold Value
Ces event-report Threshold	1 – 5	Threshold value for events
Ces event-report Underrun	0 – 65536 (0 = Disabled)	Underrun Packet Threshold Value

4.2.4. CES Global Port configuration

The protocol options of the CES port can be configured via this menu. To see the list of the available options you must type the following:

'ces global ?'

```
(config)# ces global ?
    ipv4                Local IPv4 Address and Mask/Prefix
    ipv6                Local IPv6 Address and Prefix
    management          Enable/Disable device management on the CES IP address
    protocol            CES LAN Port Psuedo-wire Protocol Type
    recovery-filter     CES LAN Port Recovery Filter Type
    recovery-mode       CES LAN Port Recovery Mode
    ssrc                Enable/Disable SSRC Checking
    tolerance           Frequency Tolerance
    udp                 UDP Base Port Number
    underrun-byte       Underrun Byte Value
    underrun-type       Underrun Type (Fixed or Last Byte)
    <cr>
```

First part of Command	Submenu option	Comments
Ces global ipv4	IPv4 Address/subnet mask i.e **192.168.0.1/24**	IP for CES traffic under IPv4 format
Ces global ipv6	Ipv6 address/subnet mask	IP for CES traffic under IPv6 format
Ces global management	**Off**: Disable device management **On**: Enable device management	Enables/disables the option for the user to manage the device using the CES IP as well as the management IP
Ces global protocol	**Ethernet**: Pseudo-wire Ethernet **IP**: Pseudo-wire IP Type **Udp/rtp**: Pseudo-wire UDP/RTP Type	Allows the user to set the wire type for the CES packets
Ces global recovery-filter	**1** or **2**	Allows the user to set the recovery filter for the clock recovery process
Ces global recovery-mode	**1**, **2** or **3**	Allows the user to set the recovery mode for the clock acquisition process

Ces global ssrc	**Off:** Disable SSRC checking **On:** Enable SSRC checking	Allows user to manage SSRC checking on the link
Ces global tolerance	**5-200** Ppm	Sets the ces protocol tolerance
Ces global UDP	**0 – 65472**	Sets the UDP base port number
Ces global underrun-byte	**0 -255**	Sets the Underrun byte value
Ces global underrun-type	**Fixed:** Use the fixed byte value for Underrun **Last:** Use Last Byte value for Underrun	Sets the Underrun type set (Will require the Underrun byte parameter to be set if selecting the Fixed Type)

4.2.5. CES Jitter configuration

The jitter option allows the user to configure the Jitter Buffer scheduler. To see the list of the available options you must type the following:

'ces jitter link <*link number*> ?'

```
(config)# ceS jitter link 1 ?
    adjust      CES Link Jitter Schedule Adjust value
    schedule    CES Link Jitter Schedule
    when        CES Link Jitter Schedule When (Never, Always on, schedule, once
                only)
```

The scheduler allows the user to set a jitter adjustment across the following 2 methods:

- **Adjust: Jitter adjustment runs once after a preset time value**
- **Schedule: Jitter Adjustment runs for a preset time period (Day & Time)**

'ces jitter link <*link number*> Adjust <*3-999*>'

```
(config)# ces jitter link 1 adjust ?
    <3-999>    Logical Link's Jitter Schedule Adjust <3-999>
(config)# ces jitter link 1 adjust 4
```

The value will set the time period (in minutes) which the scheduler will run after

'ces jitter link <*link number*> Schedule ?'

```
(config)# ces jitter link 1 schedule ?
    adjust        CES Link Jitter Schedule Adjust value
    friday        CES Link Jitter Friday Schedule
    monday        CES Link Jitter Monday Schedule
    saturday      CES Link Jitter Saturday Schedule
    sunday        CES Link Jitter Sunday Schedule
    thursday      CES Link Jitter Thursday Schedule
    tuesday       CES Link Jitter Tuesday Schedule
    wednesday     CES Link Jitter Wednesday Schedule
    when          CES Link Jitter Schedule When (Never, Always on, schedule,
                  once only)
```

The schedule option allows you to set a start and end date that the jitter buffer can run within.

The format of the command for setting a time period goes as follows:

'ces jitter link <*link number*> Schedule <*StartDay*> <*Starttime (HH:MM)*> <*End-Time(HH:MM)*> <*EndDay*> <*Starttime(HH:MM)*> <*EndTime(HH:MM)*>'

Please see below an example for setting a scheduler to run on Monday and Wednesday, for 1 hour on each day

```
(config)# ces jitter link 1 schedule Monday 00:00 01:00 Wednesday 01:00 02:00
(config)#
```

The scheduler mode determines how often the schedule runs – the available options are as follows:

Never: The scheduler is disabled and does not run

'ces jitter link <*link number*> when Never'

Always: The scheduler is always on – start of the scheduler is determined by the Adjust value.

'ces jitter link <*link number*> when Always'

Once: The scheduler runs once only – start of the scheduler is determined by the Adjust value.

'ces jitter link <*link number*> when Once'

Scheduled: The scheduler runs on a user set schedule – schedule will need to be set separately

'ces jitter link <*link number*> when Scheduled'

4.2.6. CES Link configuration

These options allow the user to configure a logical link on the unit. You can see the available sub-options by using the following command:

'ces link <*link number*> ?'

```
(config)# ces link 1 ?
    chansel        CES Link Channel Selection
    direction      CES Link Remote Direction Configuration
    frames         CES Link frames per packet
    jitter-len     CES Link jitter length
    name           CES Link Name Configuration
    qos            CES Link Quality of Service
    remoteip       CES Link Remote IP Address
    remoteip2      CES Link Second Remote IP Address
    remotelink     CES Link Second Remote Link number
    schedule       CES Link Schedule Configuration
    <cr>
```

'ces link <*link number*> chansel port <*port number*> channels <*w, x-z*>

The channel select option requires you to choose a logical link number as well as a port number. You can specify a specific channel number to be selected or you can pick a range of channels

```
(config)# ces link 1 chansel port 1 channels 1-3
(config)# ces link 1 chansel port 1 channels 4
```

First part of Command	Submenu option	Comments
Ces link <*link number*> *Direction*	**Both**: Traffic travels in both directions **Disable:** Link is disabled **Rx:** Unit can only receive data **Tx :** Unit can only transmit data	Determines the traffic flow as well as whether the link is disabled or not
Ces link <*link number*> *Frames*	**1 – 128**	Determines number of frames per packet
Ces link <*link number*> *jitter-len*	**1 – 400**	Determines the size of the jitter buffer
Ces link <*link number*> *name*	<20 character string>	Sets a name against the logical link
Ces link <*link number*> *qos*	**Diffserv:** Set the QoS type to Diffserver **Tos:** Set the QoS type to ToS	Sets the type of the QoS service
Ces link <*link number*> *remoteip*	***<IPv4 or IPv6 address>***	Sets the remote IP address for the logical link – can be either IPv4 or IPv6
Ces link <*link number*> *remoteIP2*	***<IPv4 or IPv6 address>***	Sets the secondary remote IP – this can only be used if the Direction is set to **Rx Only**
Ces link <*link number*> *remotelink*	***1 – 33***	Sets the logical link number – the range can be extended on the 2MD unit

'ces link <*link number*> *schedule ?*

```
(config)# ces link 1 schedule ?
    chansel       CES Link Channel Selection
    direction     CES Link Remote Direction Configuration
    enable        CES Link Schedule Enable/Disable
    frames        CES Link frames per packet
    friday        CES Link Friday Schedule
    jitter-len    CES Link jitter length
    monday        CES Link Monday Schedule
    name          CES Link Name Configuration
    qos           CES Link Quality of Service
    remoteip      CES Link Remote IP Address
    remoteip2     CES Link Second Remote IP Address
    remotelink    CES Link Second Remote Link number
    saturday      CES Link Saturday Schedule
    sunday        CES Link Sunday Schedule
    thursday      CES Link Thursday Schedule
    tuesday       CES Link Tuesday Schedule
    wednesday     CES Link Wednesday Schedule
    <cr>
```

The schedule option allows you to set a start and end date that the logical link will be active for.

The format of the command for setting a time period goes as follows:

'ces link <*link number*> Schedule <*StartDay*> <*Starttime (HH:MM)*> <*EndTime(HH:MM)*> <*EndDay*> <*Starttime(HH:MM)*> <*EndTime(HH:MM)*>'

Please see below an example for setting a scheduler to run on Monday and Wednesday, for 1 hour on each day

4.2.7. CES Multicast configuration

The multicast option allows the user to configure the unit to connect to a multicast group.

The command required is the following

'**ces multicast address <*multicast IP address*>'**

```
(config)# ces multicast address ?
    <ipv4_mcast>    Multicast IP Address (224.0.0.0 to 239.255.255.255)
    <ipv6_mcast>    Multicast IP Address
                    (FF00:0000:0000:0000:0000:0000:0000:0000 and above)
(config)# ces multicast address 224.0.0.0
(config)#
```

The address can be an IPv4 or an IPv6 address.

4.2.8. CES Port configuration

The port configuration option allows you to configure the TDM port available on the unit.

To see the list of available port commands, you must type the following:

'ces port <*port number*> ?

```
(config)# ces port 1 ?
    crc4                TDM Port's CRC4
    impedance           TDM Port Impedance settings (75 or 120 ohm)
    intf                TDM Port's Interface Type (G703 or G704)
    presentation        TDM Port's Presentation (e1 or t1)
    t1-framing          Framing on T1 TDM Port (esf or d4)
    t1-linecode         Line Code on T1 TDM Port (b8zs or ami)
    termination         Enable/Disable TDM Port Termination
    ts0-passthrough     Enable/Disable TDM Port TS0 Passthrough
    type                TDM Port Type (TE or NT)
    <cr>
```

First part of Command	Submenu option	Comments
Ces port <*port number*> crc4	**Off:** CRC4 disabled **On**: CRC4 Enabled	Configures the CRC 4 check on the port
Ces port <*port number*> impedance	**120**: 120 ohm **75:** 75 ohm	Port impedance
Ces port <*port number*> intf	**Fractional**: Channelized **Full**: Unframed	Determines whether the port is configured for G704 or G703
Ces port <*port number*> presentation	**E1** or **T1**	Configures the network presentation for the port
Ces port <*port number*> t1-framing	**D4** or **ESF**	Port framing for T1 presentation only
Ces port <*port number*> t1-linecode	**Ami** or **B8zs**	Line code for T1 presentation only
Ces port <*port number*> termination	**Off:** Disable termination on port **On:** Enable termination on port	Configures the 'Shutdown Connections on Failure' option

Ces port *<port number> ts0-passthrough*	**Off:** Disable pass-through **On:** Enable pass-through	Configures the timeslot zero passthrough

Please note that the port type option under the CES port configuration refers to the ISDN port type which has not been implemented in this product version.

4.2.9. CES RS530 (Serial) port configuration

The serial port configuration option allows the user to set the rate for the port as well as enabling Asynchronous clocking. The command for showing all the available options is as follows:

'**ces rs530 <*port number*> ?'**

```
(config)# ces rs530 2 ?
    async          Set Synchronous or Asynchronous on Serial Port
    rate           CES RS530 Port Rate
    subrate        CES RS530 Port Subrate
    termination    Enable/Disable Serial Port Termination
    <cr>
```

First part of Command	Submenu option	Comments
Ces rs530 <port number> async	**Off**: Disabled **On**: Enabled	Enables the Asynchronous mode on the serial port
Ces rs530 <port number> rate	**64 – 2048**	Sets the serial port rate
Ces rs530 <port number> subrate	**19k2, 1k2, 2k4, 38k4, 4k8, 56k, 9k6**	Sets the serial port subrate (speeds < 64K)
Ces rs530 <port number> termination	**Off**: Disabled **On**: Enabled	Configures the 'Shutdown Connections on Failure' option

4.2.10. CES Vlan configuration

The VLAN configuration option allows you to configure the VLAN tagging for the CES frames only. Please note that this does change or affect Ethernet port VLAN tagging.

To enable VLAN tagging you must type the following:

'ces vlan link <*link number*> tag <*off* or *on*> ID <*vlan ID*> priority <*priority number*>

This allows you to specify which logical link you wish to tag with a VLAN ID as well as what that ID should be and what priority it should have – please see the below example of setting VLAN ID of 4 on logical link 1, with a priority of 2:

```
(config)# ces vlan link 1 tag on ID 4 priority ?
ces vlan link <linkno> tag { on | off } [ id { <vlanid> } priority { <vlanpriori
ty> } ]
(config)# ces vlan link 1 tag on ID 4 priority 2
```

4.3. CLI Show Commands

The 'show' commands allow the user to monitor the status of the unit via the CLI window. For the CES functions the command you need is as follows:

'Show ces ?'

```
# show ces ?
   calls            CES Call Status
   channel-usage    Show CES Port Channel Usage
   clock            Show CES Clock Priority
   debug            CES Debug Tracing
   enhance-clock    Show CES Enhance Clocking
   event-report     CES Event Reporting configuration
   global           Show CES Ethernet Port Global settings
   jitter           Show CES Logical Link Jitter Configuration
   link             Show CES Logical Link Status
   loop             CES Logical Link Loops
   multicast        Show CES Ethernet Port Multicast settings
   port             CES TDM Port configuration
   rs530            CES RS530 Serial Port
   status           CES Status
   temperature      CES Temperature Settings
```

'Show ces calls'

This command shows all the active calls against a logical link

```
# show ces calls

CES Call Status
Call started: 15/06/2016-07:52:56 TDM1:00->LL1:00 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:01->LL1:01 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:02->LL1:02 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:03->LL1:03 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:04->LL1:04 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:05->LL1:05 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:06->LL1:06 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:07->LL1:07 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:08->LL1:08 orig: Y dest: / source: / Connected
Call started: 15/06/2016-07:52:56 TDM1:09->LL1:09 orig: Y dest: / source: / Connected
-- more --, next page: Space, continue: g, quit: ^C
```

'Show ces channels'

This command shows the channel allocation against all the ports

```
# show ces channel-usage

TDM Ports, Used Channels

Channels ('.' = Free, '#' = Used or Invalid)
P 0 0 0 0 0 0 0 0 0 0 1 1 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 3 3
t 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

1 # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # #

2 # . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

#
```

‘Show ces clock?’

The clock options gives the use the choice of seeing the clock priority set up on the unit as well as the clock history of a specific stream/link

```
# show ces clock ?
    link        CES Link's Clock Priority
    priority    Clock Priority
```

‘Show ces clock link <*link number*> ‘

Shows the clock stream activity and history for link 1

```
# show ces clock link 1

Clock Recovery Statistics for CLock Stream 1

00:00 Stream 1 Acquiring 92
00:10 Stream 1 Acquiring 64
00:20 Stream 1 Acquiring 35
00:30 Stream 1 Acquiring 9
00:40 Stream 1 Holdover  0
345:40 Stream 1 Freerun   0
```

‘Show ces clock priority’

Shows the complete link priority list as well as the status for Streams/ links 1-4

```
# show ces clock priority

CES Clocking Status
Lock Mode:       Normal
Mode Type:       Slave
Clock Source:    LL 1

Stream:  1 status: Acquired  mode: 1 (Adaptive ) DCO: 219 Min: 0 Max: 219 Avg: 31
Stream:  2 status: Freerun   mode: 0 (Disabled ) DCO: 0 Recovery inactive
Stream:  3 status: Freerun   mode: 0 (Disabled ) DCO: 0 Recovery inactive
Stream:  4 status: Freerun   mode: 0 (Disabled ) DCO: 0 Recovery inactive

CES Clock Source Priorities

Internal:        19
TDM Port  1:     19
Serial Port  2:  19
Logical Link  1:  0
Logical Link  2: 19
Logical Link  3: 19
Logical Link  4: 19

1588 Clock       :19
```

‘Show ces debug’

CES debug shows the status of the debug currently running on the unit. Setting the debug mode is further explained in the Configuration section of this manual.

```
# show ces debug

CES Debug settings

TDM 1 Interface          : OFF
TDM 2 Interface          : OFF
Logical Link  1          : OFF
Logical Link  2          : OFF
Logical Link  3          : OFF
Logical Link  4          : OFF
Logical Link  5          : OFF
Logical Link  6          : OFF
Logical Link  7          : OFF
Logical Link  8          : OFF
Logical Link  9          : OFF
Logical Link 10          : OFF
Logical Link 11          : OFF
Logical Link 12          : OFF
Logical Link 13          : OFF
Logical Link 14          : OFF
Logical Link 15          : OFF
Logical Link 16          : OFF
Logical Link 17          : OFF
Logical Link 18          : OFF
Logical Link 19          : OFF
Logical Link 20          : OFF
Logical Link 21          : OFF
Logical Link 22          : OFF
Logical Link 23          : OFF
Logical Link 24          : OFF
Logical Link 25          : OFF
Logical Link 26          : OFF
Logical Link 27          : OFF
Logical Link 28          : OFF
Logical Link 29          : OFF
Logical Link 30          : OFF
Logical Link 31          : OFF
Logical Link 32          : OFF
Logical Link 33          : OFF

Control                  : OFF
ARP                      : OFF
SIP                      : OFF
LL Control               : OFF
```

‘Show ces enhanced clock’

This command shows the current status of Enhanced clocking

```
# show ces enhance-clock
ces_show_enhance_clock

CES Enhanced Clocking Configuration Settings

Enhanced Clocking Enabled                : Yes

Asymmetric on TDM/Logical Link  1        : No
Asymmetric on TDM/Logical Link  2        : No
Clocking mode on LL  1                   : Plesiosynchronous
Clocking mode on LL  2                   : Plesiosynchronous
Clocking mode on LL  3                   : Plesiosynchronous
Clocking mode on LL  4                   : Plesiosynchronous
#
```

Please note that this option is not currently available on the 2MD chassis product.

'Show ces event-report'

This command shows the current settings for the CES event generation/traps

```
# show ces event-report

CES Event Reporting

Event Reporting Threshold:   2
Event Reporting Interval:    60 mins
Early Packets Threshold:     0
Late Packets Threshold:      0
Underrrun Threshold:         0
DCO Threshold:               0
```

'Show ces global'

This command shows the current status of the 'Protocol' settings on the unit – this includes the CES IP and clock recovery modes.

```
# show ces global

CES Global Configuration

Protocol Type                 : Pseudo-wire over IP
Clock Recovery Mode           : Mode 1
Clock Recovery Filter         : Type 1
UDP Base Port Number          : 49152
PPM Tolerance                 : 20
Underrun Type                 : Last Byte

Local IPV4 address            : 192.168.100.2/24
Local IPV6 address            : 0000:0000:0000:0000:0000:0000:0000:0000/0
Allow management on CES IP    : Yes
```

'Show ces jitter link ?'

This command shows the jitter status of the unit – this can be narrowed down to a specific logical link or it can be for all logical links

```
# show ces jitter link ?
   <1-33>    Logical Link Number
   all       All Logical Links
```

'Show ces jitter link *<Link number>*'

```
# show ces jitter link 1

CES Logical Link 1 Statistics

Link Number:          1
Name:                 lientest
State:                active
Number of Channels:   32
ARP State:            resolved
Remote MAC Address:   00-c0-f2-00-00-01
Remote IP Address:    192.168.100.1
Remote Link Number:   1
Queue Lengths:        Min: 12 (30.0 ms) Max: 13 (32.5 ms) Ave: 12.50 (31.3 ms)
Packets:              Rx: 1324996 Tx: 9640293 Last: 1322647
Jitter buffer:        Early: 0 Late: 0 Underrun: 0 Lost: 0
                      Slips-: 0 Slips+: 0
```

‘Show ces jitter link all’

```
# show ces jitter link all

CES CONFIGURED LOGICAL LINKS: STATISTICS

LL  1  active  ARP resolved  chans 32  remote 192.168.100.1 (00-c0-f2-00-00-01)
```

Note: This command will only show the active logical links on the unit.

‘Show ces link ?’

This command shows the link status of the unit – this can be narrowed down to a specific logical link or it can be for all logical links

```
# show ces link ?
   <1-33>    Logical Link Number
   all       Show All CES Logical Links Status
```

‘Show ces link *<link number>*’

```
# show ces link 1

CES Logical Link 1 Statistics

Link Number:          1
Name:                 lientest
State:                active
Number of Channels:   32
ARP State:            resolved
Remote MAC Address:   00-c0-f2-00-00-01
Remote IP Address:    192.168.100.1
Remote Link Number:   1
Queue Lengths:        Min: 12 (30.0 ms) Max: 13 (32.5 ms) Ave: 12.50 (31.3 ms)
Packets:              Rx: 1533693 Tx: 9848991 Last: 1531686
Jitter buffer:        Early: 0 Late: 0 Underrun: 0 Lost: 0
                      Slips-: 0 Slips+: 0
```

‘Show ces link all’

```
# show ces link all

CES CONFIGURED LOGICAL LINKS: STATISTICS

LL  1  active  ARP resolved  chans 32  remote 192.168.100.1 (00-c0-f2-00-00-01)

#
```

'Show ces loops ?'

This command shows the status of the software loops on the unit – these are split between logical links, TDM port and Serial ports

```
# show ces loop ?
   link     CES Logical Link
   port     CES TDM Port
   rs530    CES RS530 Serial Port
```

The format for the logical link command is as follows:

'Show ces loops link *<logical link number>*'

```
# show ces loop link 1

Logical Link 1, Local Loop is Disabled, Remote Loop is Disabled
```

The format for the port loop command is as follows:

'Show ces loops port *<port number>*'

```
# show ces loop port 1

TDM Port 1, Local Loop is Disabled, Remote Loop is Disabled
```

The format for the serial port loop command is as follows:

'Show ces loops RS530 2'

```
# show ces loop rs530 2

RS530 Serial Port 2, Local Loop is Disabled, Remote Loop is Disabled
```

This command only applies to the LIB-225 product

'Show ces loops serial *<serial port number>*'

```
# show ces loop serial 1

RS530 Serial Port 1, Local Loop is Disabled, Remote Loop is Disabled
```

This command only applies to the 2MD product

'Show ces multicast'

This command group shows the status of the multicast option

```
# show ces multicast

CES Multicast Group Configuration

Multicast Group Address        : Disabled
```

'Show ces port <*port number*>'

This command shows the connection status of the TDM ports on the unit

```
# show ceS port 1

TDM Port  1 Status

Port State  : LOS rx: Rx lvl less than -30.0 dB, Transmit Pair Open Circuit
```

'Show ces RS530 2'

This command shows the current status of the serial port on the unit – this only applies to the LIB-225 product

```
# show ces rs530 2

Serial Port  2 Status
Type    : V11 DCE
C   <-  : Off
I   ->  : Off


SERIAL PORT 2 CONFIGURATION

Rate                          : 64 Kbps
Shutdown Connections on Failure : No

Type                          : Sync
```

‘Show ces serial <*port number*>’

‘Show ces serial all’

The above 2 commands only apply to the 2MD chassis product – this shows the status of either a specific serial port or all the serial ports

```
# show ces serial 1

Serial Port  1 Status
Type    : X21 DTE
DTR ->  : Off
DCD <-  : On
RTS ->  : On
CTS <-  : Off
DSR <-  : Off


SERIAL PORT 1 CONFIGURATION

Rate                          : 64 Kbps
Shutdown Connections on Failure : No

Type                          : Sync

Configuration                 : X21 DTE
# show ces serial all

Serial Port Status
Port  1 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  2 State  : X21 DCE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  3 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  4 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  5 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  6 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  7 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  8 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port  9 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port 10 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port 11 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port 12 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port 13 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port 14 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port 15 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
Port 16 State  : X21 DTE  DTR: Off DCD: On RTS: On CTS: Off DSR: Off
```

‘Show ces status’

This command shows the protocol status of the CES traffic – this includes failed packets based on checksum or protocol mismatch

```
# show ces status

CES Status Report

CESoP processor version
05 0B 061df8a5 00000000 ZL50117 2.5.0 - Mon Feb  1 2010 15:41:00

Protocol Match
 1                : 10513763
 2                : 0
 3                : 0
 4                : 0
 None             : 183833

Classify fail     : 0
Verify fail       : 0
IPV4 checksum fail : 0
UDP checksum fail  : 0
```

‘Show ces temperature’

This command shows the current temperature for the board and the processor hardware

```
# show ces temperature

Temperature Status

Type                    Celsius     Fahrenheit
Board Temperature:       49.5         121.1
Processor Temperature:   63.6         146.4
```

5. Contacts

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