Dell 10Gb Ethernet Pass Through -k for M1000e

Software User's Manual

Rev 1.00

This document is intended for administrators.

Table of Contents

About this Manual

This manual describes the installation and basic use of the Dell 10Gb Ethernet Pass Through -k for M1000e.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up the I/O module.

Related Documentation

Additional documentation available is provided in Table 1.

Table 1 - Referenced Documents

Firmware Releases	http://support.dell.com/support/

Terms, Abbreviations and Conventions

Table 2 - Abbreviations and Convention

Term	Definition
IOM	I/O Module
PTM	Pass Through Module
Downlink	Internal link – from servers to 10GbE PTM PHY (through the mid plane connector)
Uplink	External link – from 10GbE PTM PHY to external link (typically connected to Ethernet switch)
SSH	Secure Shell (also refers to a software program that allows connectivity using an SSH protocol.)
CMC	Chassis Management Controller
Component	10GbE PTM PHY device
Component numbering	Components are numbered from one (1) to three (3). When looking at the 10GbE PTM component side with external connectors (uplink) up, the components are numbered as follows: Device number 1 is the right-most component Device number 2 is the middle component Device number 3 is the left-most component Wherever applicable, device number 0 refers to the on-board micro-controller

1   Overview

This manual explains the use of the embedded software management of the 10GbE PTM. It explains how to connect to the 10GbE PTM and to the CMC, and how to update the module and device firmware and software.

This manual covers the following topics:

- The rest of this section provides a high-level overview of the I/O Module structure and capabilities
- Section 2, "Connecting to the 10GbE PTM CLI," on page 9, explains how to connect to the 10GbE PTM and issue CLI commands
- Section 3, "Command Line Interface (CLI) Reference," on page 13 documents the CLI
- Section 4, "Operating Procedures," on page 22 describes the detailed sequence of operations required to achieve tasks such as software update

1.1   Port Groups

The 10GbE PTM has 16 front panel ports divided into two groups: A and B. Group A consists of ports 1 through 8, providing service to blades 1 through 8, respectively; Group B consists of ports 9 through 16, providing service to blades 9 through 16, respectively.

The supported link protocol for all internal ports is 10GBase KR

Figure 1 shows the front panel ports and their partitioning into Group A and Group B.

Figure 1: Front Panel Link Speed Port Groups
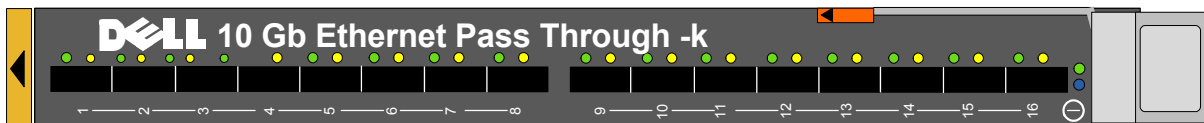
1.2   Port Link State Reflection

The 10GbE PTM reflects the link state from the uplink to the downlink. When an uplink port connected to a remote peer (e.g. an Ethernet switch) is disconnected, the respective server blade will indicate link down event. When the uplink port is connected, the respective server blade will indicate link up.

1.3   Link Protocol Mismatch Condition

A port may enter a link protocol mismatch condition. When in this condition, the port links (both uplink and downlink) will remain inactive. Mismatch condition is indicated by the port LEDs. Additional information about the mismatch condition is available via the CLI. Link protocol mismatch would occur under the following conditions:

- Downlink (server blade) does not support the link protocol of the port group to which it is attached
- Uplink (remote peer) does not support the link protocol of the port group to which it is attached

The following drawing demonstrates link protocol mismatch conditions:

Figure 2: Link Protocol Mismatch Examples
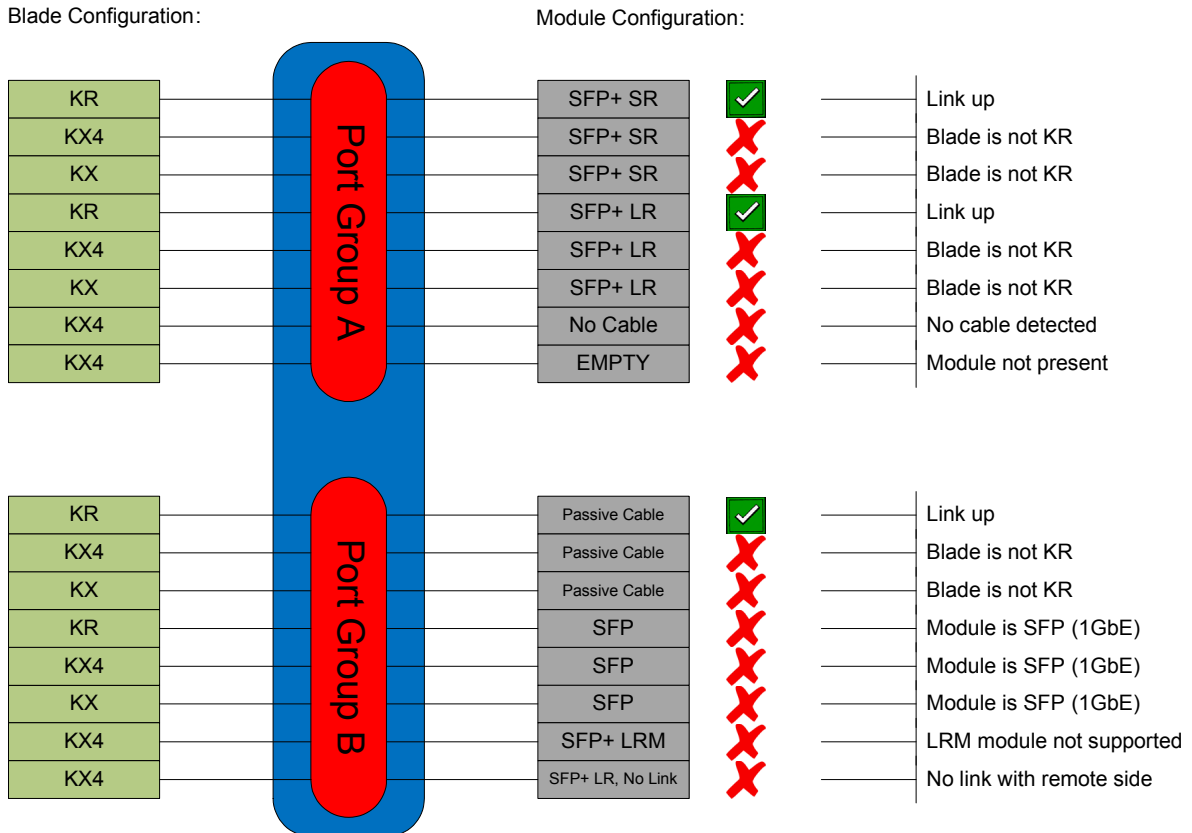
1.4 LED Behavior

The LED behavior is described in the following table:

Table 3 - LED Behavior

Condition	Green LED	Amber LED	Description
Link down	off	off	This condition occurs in the following cases: • Server blade not present, powered down, or link is inactive • Uplink port module not present • Uplink port cable not connected • One or both of the internal and/or external links is down

Table 3 - LED Behavior

Condition	Green LED	Amber LED	Description
Link up	on	off	Both the internal and external links are up
Data activity	on	blink	Link is up and data packets are sent or received
Link protocol mismatch	off	on	Refer to Section 1.3, "Link Protocol Mismatch Condition," on page 6 for details.

1.5   10GbE PTM Status Lights

The 10GbE PTM Status lights indicate whether the switch is receiving power from the chassis, and the state of the 10GbE PTM.

Figure 3: Indicator LEDs

The I/O Module is on and ready when both the blue and green LEDs are lit.

This LED can be blue or amber. A fault is indicated when the amber LED is blinking. See Table 4.
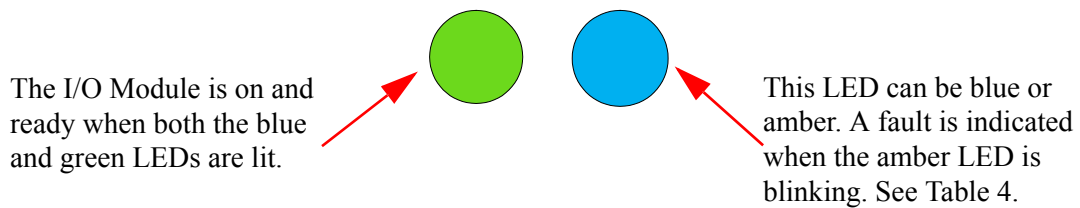
Table 4 - 10GbE PTM states and LED configurations:

LED			10GbE PTM Status
Indication	Green	Status	
	OFF	OFF	OFF
	ON	OFF	Boot in Progress 10GbE PTM not ready
	ON	BLINKING BLUE	The CMC is identifying the newly installed 10GbE PTM
	ON	ON BLUE	10GbE PTM is on and operating Normally
	ON	ON or BLINKING AMBER	Fault in System Self-diagnosed
	OFF	ON or BLINKING AMBER	Fault in System CMC-detected

2 Connecting to the 10GbE PTM CLI

If you are connecting to the system over a network, you will need an SSH client that supports ZModem file transfer. The examples in this document use Secure CommNet v2.35 (download from www.radient.com). After you download the software, some initial configuration is necessary. Please follow the next configuration steps; when using a different client software, similar settings should be available.

If you are connecting directly to the serial port of the Chassis Management Console (CMC), skip to step (9).

1. Go to Setup => SSH2 settings, and set the compression to **none**.

Figure 4: Setup > SSH2 Settings
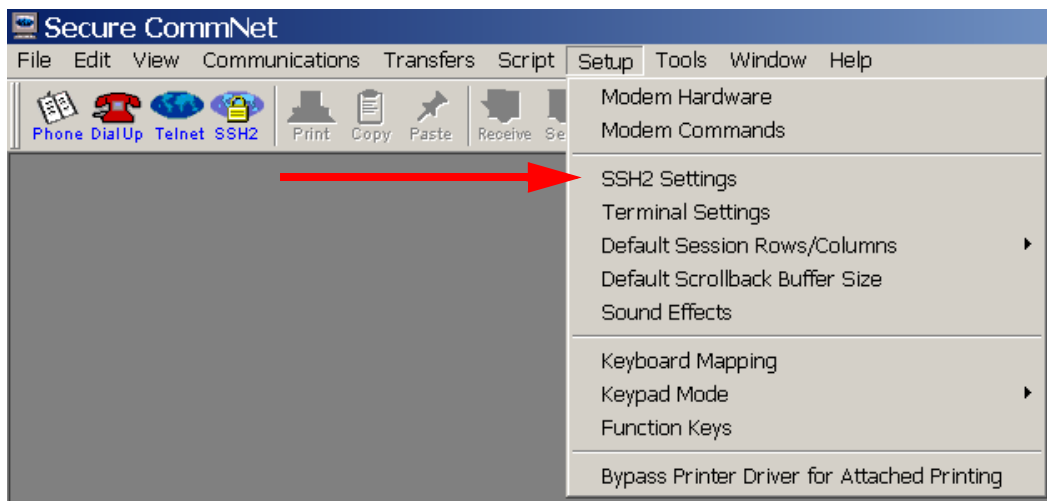
Figure 5: Set Compression to "none"
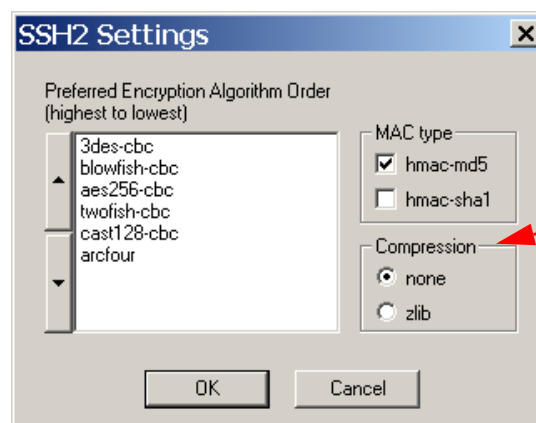
2. Go to Setup => Terminal Settings

Figure 6: Setup > Terminal Settings
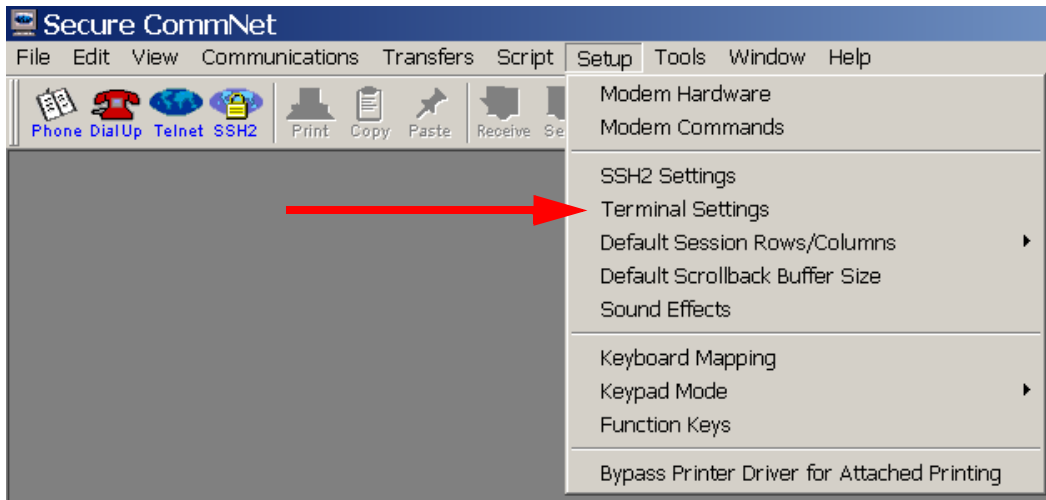
3.   Select Emulation type => SCOANSI/ANSI and VT100.
4.   Select Backspace Character => Control-H

Figure 7: Set Emulation Type and Backspace Character
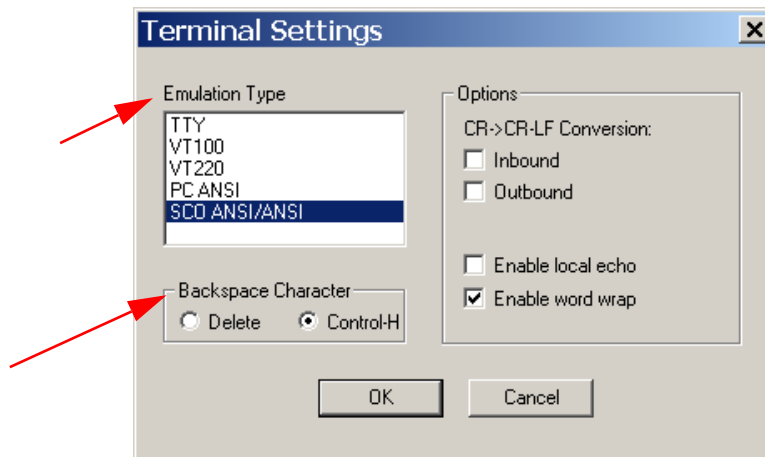
5.   Go to Communications => Open SSH2 connection. This will open the SSH2 Connection dialog box.

Figure 8: Communications > Open SSH Connection
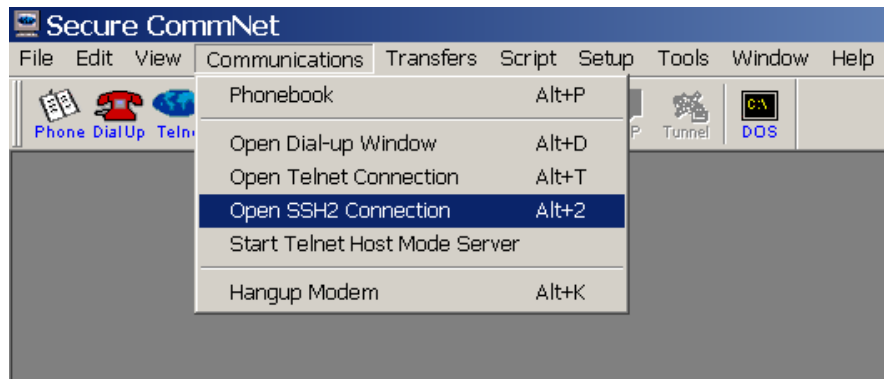
6. Fill in the hostname or IP address of your system.
7. Fill in the user name and the password.

Figure 9: Enter Hostname and Password
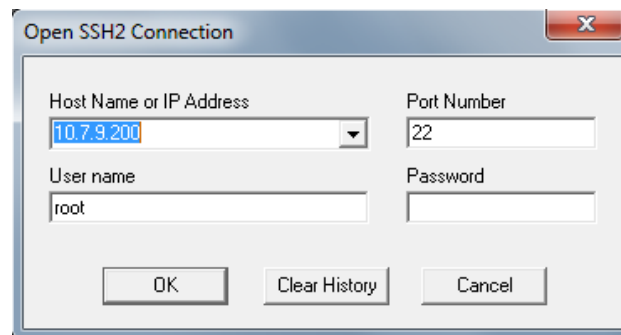
8. Your SSH connection will open. You will see a welcome banner and a user prompt (#)

Figure 10: SSH Connected

9. To list all the devices in the system, enter the following command:

```
# getioinfo
```

Figure 11: getioinfo

```
Welcome to the CMC firmware version 3.10.X04.201008170221

$ getioinfo
<IO>      <Name>                        <Type>           <Presence>  <POST>
      <Power>     <Role>
Switch-1  Dell Ethernet Pass-Through    Gigabit Ethernet  Present     OK
      ON          Master
Switch-2  N/A                           None             Not Present  N/A
      N/A         N/A
Switch-3  Dell 10GbE KR PTM             10 GbE (KR only)  Present     OK
      ON          Master
Switch-4  N/A                           None             Not Present  N/A
      N/A         N/A
Switch-5  N/A                           None             Not Present  N/A
      N/A         N/A
Switch-6  N/A                           None             Not Present  N/A
      N/A         N/A
$
```

The 10GbE PTM is listed by the system as "10Gb PT KR" "DELL 10GbE KR PTM".

10. Run the following command to connect to the 10GbE PTM CLI:

    ```
    # connect switch-3
    ```

Figure 12: 10GbE PTM Welcome Banner

```
Welcome to the CMC firmware version 3.10.X04.201008170221

$ getioinfo
<IO>      <Name>                        <Type>           <Presence>  <POST>
      <Power>     <Role>
Switch-1  Dell Ethernet Pass-Through    Gigabit Ethernet  Present     OK
      ON          Master
Switch-2  N/A                           None             Not Present  N/A
      N/A         N/A
Switch-3  Dell 10GbE KR PTM             10 GbE (KR only)  Present     OK
      ON          Master
Switch-4  N/A                           None             Not Present  N/A
      N/A         N/A
Switch-5  N/A                           None             Not Present  N/A
      N/A         N/A
Switch-6  N/A                           None             Not Present  N/A
      N/A         N/A
$ connect switch-3
connect: acquiring remote port.
stty: /dev/ttyS1: unable to perform all requested operations: No such file or di
rectory
Connected to remote port.
Escape character is '^\'.

Welcome to the DELL IOM Management Console firmware 2.0.081-201010191902-304

#
```

11. Change privilege level if required. To login as an administrator, run the command

    ```
    login admin
    ```

    You are now connected to the 10GbE PTM and can start entering commands.

12. To show the list of available commands, run the command:

    ```
    # help
    ```

3 Command Line Interface (CLI) Reference

10GbE PTM management is done via the 10GbE PTM CLI. You can use the commands described in this section after successfully connecting to the 10GbE PTM CLI according to the procedure described in Section 2, "Connecting to the 10GbE PTM CLI," on page 9.

3.1 CLI Privilege Levels

The 10GbE PTM supports the following user privilege levels:

• USER - Common user level, indicated by the # prompt

• ADMIN - Administrator level, indicated by the & prompt

Different commands are available in different privilege levels. The command reference indicates the required privilege level for each command that requires a privilege level higher than USER.

3.2 Quick Reference

Table 5 provides a quick reference to the CLI commands:

Table 5 - List of Commands

Command name	Short Description	Reference
General Commands		
help	Shows the list of available commands	Section 3.4.1, "help," on page 14
login	Change privilege level	Section 3.4.2, "login (ADMIN)," on page 15
exit	Exit current privilege level	Section 3.4.3, "exit," on page 15
reload	Restart the module: Hardware reset and software reload	Section 3.4.4, "reload," on page 15
Software Image Commands		
show image ver	Shows the software image version	Section 3.5.1, "show image ver," on page 16
copy image from-file	Upload new software image to the PTM	Section 3.5.2, "copy image from-file," on page 16
Device Commands		
show device temp	Shows the temperature of a specified device	Section 3.6.1, "show device temp (ADMIN)," on page 17
Port Commands		

Table 5 - List of Commands

Command name	Short Description	Reference
set port test	Sets port test mode attributes	Section 3.7.1, "set port test (ADMIN)," on page 18
show port link	Shows port link state	Section 3.7.2, "show port link," on page 18
show port module	Shows uplink module parameters	Section 3.7.3, "show port module," on page 19
show port test	Shows ports test mode status	Section 3.7.4, "show port test (ADMIN)," on page 20
Debug Commands		
cr_read	To read a 32 bit register from device number device_num.	Section 3.8.1, "cr_read (ADMIN)," on page 20
cr_write	To write a data_dword to address `0xHex_address` to device number device_num.	Section 3.8.2, "cr_write (ADMIN)," on page 20

3.3   CLI Command Reference Conventions

This section describes the PTM CLI commands.

For each command, the following information is provided:

- Synopsys:
  Lists the command name and any required or optional parameters. Variable parameters (like port numbers) are shown in *italics*. Optional parameters are shown in square brackets, e.g. [*optional_parameter*]. Required parameters are shown with no brackets.
- Description:
  Provides a detailed description of the command and of all its parameters
- Example:
  Usage example and command output.
- For purpose of automation, the symbol '#' is used to indicate a comment that extends until the next new-line character.

3.4   General Commands

3.4.1 help

Synopsys:

```
help
```

Description:

Show the list of all available commands.

ADMIN: when in ADMIN mode, this command will also show commands that require ADMIN privilege level.

Example:

```
# help

Commands list:
?                        Show this help message
help                     Show this help message
copy image from-file     Upload new software image to the PTM
...
#
```

3.4.2 login (ADMIN)

Synopsys:

```
login user|admin
```

Description:

Change the privilege level. The user is required to login to the CLI before any operations take place.

Example:

```
# login user
# login admin
&
```

3.4.3 exit

Synopsys:

```
exit
```

Description:

Exit current privilege level.

Example:

```
& exit
```

3.4.4 reload

Synopsys:

```
reload
```

Description:

Use this command to restart the module components. When this command is issued, PTM components go through a full hardware reset, followed by software reload.

Options:

- device_number: specify a single device to reset

Example:

```
$ reload
```

3.5   Software Update Commands

3.5.1   show image ver

Synopsys:

```
show image ver
```

Description:

Display the current software image version.

ADMIN: This command also displays the firmware version of each component.

Example:

```
# login admin
& show image ver
Software image short version: V Z.ZZ
Software image version: X.X.XXX-<date stamp>
Component #1 firmware version: Y.Y.YYY
Component #2 firmware version: Y.Y.YYY
Component #3 firmware version: Y.Y.YYY
& login user
```

3.5.2   copy image from-file

Synopsys:

```
copy image from-file [device_number]
```

Description:

Update the firmware the PTM software image. In ADMIN mode, it allows selective upgrade of a single device in the PTM. Immediately after running this command, the CLI waits for the user to send the firmware image using the ZModem protocol. To abort this operation, use CTRL-C. For additional details on the firmware update procedure refer to Section 4, "Operating Procedures," on page 22.

ADMIN:

- device_number: device number onto which to upload the image
  (0..3, where 0 indicates micro-controller image)

Example:

```
# copy image from-file
# login admin
& copy image from-file 2            # Update image on device no. 2
& login user
#
```

3.6   Device Commands

3.6.1   show device temp (ADMIN)

Synopsys:

```
show device temp device_number
```

Description:

Show the temperature of the specified device:

- device_number: device number from which to read temperature (1..3)

Example:

```
& show device temp 1
Device no. 1 temperature: 42 [Celsius]
&
```

3.7   Port Commands

3.7.1 set port test (ADMIN)

Synopsys:

```
set port test port_number [prbs31 on|off|start|stop]
```

Description:

Configure test mode on a port. Test mode is used to measure link quality and calibrate link tuning parameters.

- port_number: downlink port number on which to enable / disable test mode
- prbs31: industry-standard pseudo-random binary sequence for link tuning
  - prbs31 on: move the port to test mode
  - prbs31 start: initalize prbs31 mechanism and start error counting
  - prbs31 stop: terminate prbs31 error counting
  - prbs31 off: move the port back to operational mode

  Note: After "prbs31 on" and before "prbs31 start", configure prbs31 on the remote peer.

Example:

```
& set port test 6 prbs31 on
& # enable prbs31 on remote peer now
& set port test 6 prbs31 start
& show port test 6
port 6 prbs31 on: 0 errors
& set port test 6 prbs31 stop
& set port test 6 prbs31 off
```

3.7.2 show port link

Synopsys:

```
show port link [port_number]
```

Description:

This command displays detailed port information. If an uplink port number is specified ([port_number]), then the command displays information only for this port; otherwise, the command displays information for all the ports.

The command displays the following information per port:

- Port number
- Port group identifier and speed: A, B, followed by the configured speed (10G)
- Pass through connection status, may have one of the following values:
  down - either uplink or downlink is not connected

mismatch - both uplink and downlink are connected, but there is a mismatch
10G - uplink and downlink are connected at 10GbE

- • Downlink port link state:

  - - down: blade not present

  - - 10G: 10GbE link

- • Detailed downlink port link states (available in ADMIN level only):

  - - 10G KR [AN]: 10GBASE-KR link;
      AN indicates that 802.3ap autonegotiation is active

- • Uplink port link state:

  - - empty: No module present

  - - module_type [no link]: Module is present (module type is shown);
      no link: optical fiber cable is disconnected

Example:

```
# show port link
Port  Group        Connect     Downlink   Uplink     Status
----------------------------------------------------------------
1     A (10G)      10G         10G        SFP+ SR    Link Up
2     A (10G)      10G         10G        SFP+ SR    Link Up
3     A (10G)      10G         10G        SFP+ LR    Link Up
4     A (10G)      10G         10G        SFP+ SR    Link Up
5     A (10G)      10G         10G        SFP+ SR    Link Up
6     A (10G)      mismatch    10G        SFP SX     Link Down
7     A (10G)      down        down       SFP+ SR    Link Down
8     A (10G)      down        down       empty
9     B (10G)      mismatch    10G        SFP SX     Link Down
10    B (10G)      mismatch    10G        SFP SX     Link Down
11    B (10G)      mismatch    10G        SFP SX     Link Down
12    B (10G)      mismatch    10G        SFP LX     Link Down
13    B (10G)      down        down       empty
14    B (10G)      down        10G        SFP+ SR    Link Down
15    B (10G)      mismatch    1G         SFP+ SR    Link Down
16    B (10G)      mismatch    1G         SFP+ SR    Link Down
#
# show port link 7
Port  Group        Connection  Downlink   Uplink     Status
----------------------------------------------------------------
7     A (10G)      down        down       SFP+ SR    Link Down
#
```

3.7.3 show port module

Synopsys:

```
show port module port_number
```

Description:

Show the transceiver module information for the specified uplink port.

Example:

```
# show port module 1
Status......................................... OK
Gigabit Ethernet Compliance Codes.............. 10GBASE-SR
Vendor Name.................................... FINISAR CORP.
Vendor Part Number............................. FTLX8571D3BCL-ME
Vendor Serial Number........................... UDD01@A
Vendor Revision Number......................... A
#
```

3.7.4 show port test (ADMIN)

Synopsys:

```
show port test port_number
```

Description:

Show test mode on the specified downlink port port_number.

Example:

```
& show port test 4
port 4 test off
& show port test 6
port 6 prbs31 on: 0 errors
```

3.8   Debug Commands

3.8.1 cr_read (ADMIN)

Synopsys:

```
cr_read device_number 0xaddress [number_of_registers]
```

Description:

Read one or more internal PhyX device register. This command accepts the following parameters:

- device_number – the device from which to read a register (1..3)
- address – the register memory location from which to read (32-bit address)number_of_registers (Optional) - Specifies the number of registers to read (default 1)

Example:

- `& cr_read 2 0xf0014`

```
0x000f0014:0x00a217d4
```

3.8.2 cr_write (ADMIN)

Synopsys:

```
cr_write device_number 0xaddress 0xdata
```

Description:

Write data to an internal register on a PhyX device. This command accepts the following parameters:

- device_number – the device to which memory the data should be written
- address – memory location of the internal register (32-bit address)
- data – the data to be written to the internal register

Example:

```
cr_write 1 0xf0010 0x1
```

4   Operating Procedures

4.1   Procedure for Updating Software

The 10GbE PTM consists of three PhyX® devices and a micro-controller (CPU). This procedure describes how to update both CPU SW & PhyX® FW using a single .pfw binary file.

The 10GbE PTM is delivered with the latest firmware available at the time of production. New firmware versions will be posted on the Dell support page. The latest firmware can be found at:

http://support.dell.com/support/

Step 1   Download the 10GbE PTM firmware .zip file and extract the .pfw binary file.

Step 2.   Connect to the 10GbE PTM using an SSH Client as described in Section 2, "Connecting to the 10GbE PTM CLI," on page 9.

Step 3.   From the CMC command line, connect to the 10GbE PTM CLI. Enter:

Note: At least 20 seconds must have passed since the last power cycle of the 10GbE PTM module before running the following connect command.

```
$ connect switch-<n>
```

where <n> is the number of the switch -- 2 in our example.

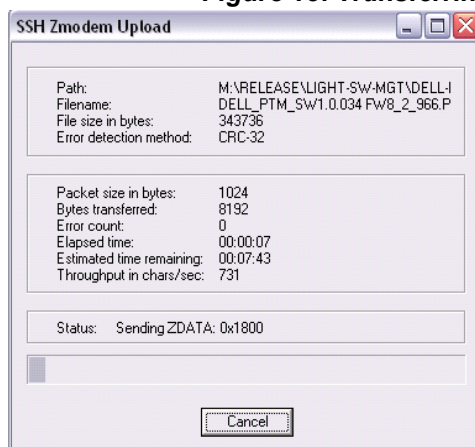The prompt should change to #.

Step 4.   To start the upgrade process, run the command:

```
# copy image from-file
```

The system will now wait for a ".pfw" file to be transferred from the SSH client.

Step 5.   In your SSH client, initiate file transfer by pulling down the Transfers menu and clicking Send Files. Provide the path to the ".pfw" file and send it.

Figure 13: Transferring the .pfw File

After loading the .pfw file, both the software and firmware will be programmed onto the 10GbE PTM.

Note: The update process takes a few minutes.

At the end of this process, the following message will be displayed at the prompt:

```
# Received update image successfully. Changes will take effect after
next reboot.
#
```

Step 6. Exit the 10GbE PTM CLI to the CMC command line. Run:

```
# exit
```

Step 7. Power cycle the 10GbE PTM for the firmware to take effect. From the CMC command line type the following command:

```
$ racadm chassisaction -m switch-<n> powercycle
```

Step 8. Wait for 20 seconds, and then connect to the 10GbE PTM. Run:

```
$ connect switch-<n>
```

You will be able to view the progress of the SW update.

Step 9. At the end of a successful SW update process, the following message will be displayed:

```
FW updated successfully!
Welcome to the Dell 10GbE PTM Management Console firmware X.X.XXX-<date
stamp>
#
```

Step 10. Login to the 10GbE PTM CLI as admin. Run:

```
# login admin
```

Step 11. To confirm that all PhyX® chips have the same firmware version, run the command:

```
& show image ver
Software image version: X.X.XXX-<date stamp>
Component #1 FW version: Y.Y.YYY
Component #2 FW version: Y.Y.YYY
Component #3 FW version: Y.Y.YYY
&
```

5   Troubleshooting

This section provides troubleshooting information for common error conditions. If the described procedure does not solve the problem, please contact your Dell representative for assistance.

Please use the following table to identify the required correctional operation:

Table 6 - Error Conditions and Correctional Operation

Error Condition	Correctional Operation
10GbE PTM power LED does not turn on	See Section 5.1, "Resolving 10GbE PTM Power Problems," on page 24
Downlink connection to a blade server does not come up	See Section 5.2, "Resolving Link Connectivity Problems," on page 24
Uplink connection to remote switch does not come up	See Section 5.2, "Resolving Link Connectivity Problems," on page 24
Unable to connect to 10GbE PTM10GbE PTM CLI	See Section 5.4, "Resolving CLI Connectivity Problems," on page 25
10GbE PTM CLI hangs during operation	See Section 5.5, "Recovery From Non-Responsive 10GbE PTM CLI," on page 25
10GbE PTM software update procedure fails	See Section 5.6, "Recovery From a Software Update Failure," on page 25

5.1   Resolving 10GbE PTM Power Problems

Make sure the system is powered on.

Take out the 10GbE PTM, wait for 10 seconds and plug it back in.

5.2   Resolving Link Connectivity Problems

1. Check that external cables and/or optical modules are properly inserted.
2. Make sure the cables/modules are supported by the 10GbE PTM.
3. Log in to 10GbE PTM CLI and run the "show port link" command. Check the status of the downlink and uplink in the relevant port – see Section 3.7.2 for details.
   a. If a blade is inserted but not recognized by the 10GbE PTM – restart the network device in the blade and check again. Reboot the blade if the problem is not resolved.
   b. If an Ethernet NIC or switch is connected to an 10GbE PTM external port but the link is down for the 10GbE PTM external port – check cables/modules connectivity in the external device and reboot the external device if not resolved.

If none of the above resolves the issue – reboot the 10GbE PTM through the CMC CLI using the following command:

```
chassisaction –m switch-<n> powercycle
```
where <n> is the switch number [1-6].

5.3   Resolving a Link Protocol Mismatch

Log in to 10GbE PTM CLI and run the "show port link" command. Check the status of the down-link and uplink in the relevant port to identify the mismatch – see Section 3.7.2 for details.

5.4   Resolving CLI Connectivity Problems

Reboot the 10GbE PTM through the CMC CLI using the following command:
```
chassisaction –m switch-<n> powercycle
```
where <n> is the switch number [1-6].

5.5   Recovery From Non-Responsive 10GbE PTM CLI

Reboot the 10GbE PTM through the CMC CLI using the following command:
```
chassisaction –m switch-<n> powercycle
```
where <n> is the switch number [1-6].

5.6   Recovery From a Software Update Failure

1.   Reboot the 10GbE PTM through the CMC CLI using the following command:
```
chassisaction –m switch-<n> powercycle
```
where <n> is the switch number [1-6].
2.   Restart the software update process.