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Using the 10 Gigabit Ethernet Modules: 8681XLR and 8681XLW

Passport 8000 Series Software Release 3.7



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Preface

The 8681XLR Module and the 8681XLW Module are part of the Nortel Networks Passport line of 10GE LAN/WAN communications products. They are 128K records modules which allow support for large layer 2 and layer 3 configurations. This guide describes the features, operations, and configuration requirements for both modules.

For technical specifications and information about how to install your 10GE LAN/WAN modules, see *Installing 8600 Switch Modules*. This document is provided on the hardware documentation CD purchased with your 8000 Series Chassis, or can be found on the Nortel Networks documentation Web site at www.nortelnetworks.com/documentation, search term: Passport 8000 Series.

A complete list of related publications can be found in the release notes that accompanied your software release.

Before you begin

This guide is intended for network installers and system administrators who are responsible for installing, configuring, or maintaining networks. This guide assumes that you have the following background:

- Understanding of the transmission and management protocols used on your network
- Experience with windowing systems or graphical user interfaces (GUIs)

Text conventions

This guide uses the following text conventions:

- | | |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| angle brackets (< >) | Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: If the command syntax is <code>ping <ip_address></code> , you enter <code>ping 192.32.10.12</code> |
| bold Courier text | Indicates command names and options and text that you need to enter. Example: Use the dinfo command. Example: Enter show ip {alerts routes} . |
| braces ({}) | Indicate required elements in syntax descriptions where there is more than one option. You must choose only one of the options. Do not type the braces when entering the command. Example: If the command syntax is <code>show ip {alerts routes}</code> , you must enter either <code>show ip alerts</code> or <code>show ip routes</code> , but not both. |
| brackets ([]) | Indicate optional elements in syntax descriptions. Do not type the brackets when entering the command. Example: If the command syntax is <code>show ip interfaces [-alerts]</code> , you can enter either <code>show ip interfaces</code> or <code>show ip interfaces -alerts</code> . |
| ellipsis points (...) | Indicate that you repeat the last element of the command as needed. Example: If the command syntax is <code>ethernet/2/1 [<parameter> <value>]...</code> , you enter <code>ethernet/2/1</code> and as many parameter-value pairs as needed. |

| | |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>italic text</i> | Indicates new terms, book titles, and variables in command syntax descriptions. Where a variable is two or more words, the words are connected by an underscore. Example: If the command syntax is <code>show at <valid_route></code> , <code>valid_route</code> is one variable and you substitute one value for it. |
| plain Courier text | Indicates command syntax and system output, for example, prompts and system messages. Example: <code>Set Trap Monitor Filters</code> |
| separator (>) | Shows menu paths. Example: <code>Protocols > IP</code> identifies the IP option on the Protocols menu. |
| vertical line () | Separates choices for command keywords and arguments. Enter only one of the choices. Do not type the vertical line when entering the command. Example: If the command syntax is <code>show ip {alerts routes}</code> , you enter either <code>show ip alerts</code> or <code>show ip routes</code> , but not both. |

Acronyms

This guide uses the following acronyms:

| | |
|-------|-----------------------------|
| BER | Bit Error Rate |
| GE | Gigabit Ethernet |
| MLT | MultiLink Trunking |
| QoS | Quality of Service |
| SONET | Synchronous Optical Network |
| STG | Spanning Tree |

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Chapter 1

About 10 Gigabit Ethernet LAN/WAN Modules

This chapter describes the conceptual information and the configurable parameters for the 10 GE LAN/WAN modules, and contains the following topics:

| Topic | Page |
|--------------------------------------------------------------------|------|
| 10GE LAN/WAN Modules concepts | 17 |
| Default 10GE LAN module configuration | 20 |
| Default 10GE WAN module configuration | 21 |
| Additional configurable 10GE LAN module parameters | 22 |
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10GE LAN/WAN Modules concepts

Ten Gigabit Ethernet (10GE) differs from Gigabit Ethernet not only in supporting an order of magnitude faster media speed, but also in providing both WAN and LAN connectivity.

Extending Ethernet over metropolitan and wide area networks provides more cost-effective solutions for larger geographic areas and ensures end-to-end Ethernet connectivity. WAN Ethernet frames going across a fiber-optic link are enclosed within SONET/SDH payload. Embedding Ethernet packets inside SONET frames requires support for SONET-like management, configuration and statistics.

Unlike the WAN 10GE, the LAN version of 10GE does not use SONET as the transport mechanism. WAN and LAN mode of operations are not programmable. Due to different clock frequencies, LAN and WAN versions of the 10GE module have different module IDs and part numbers as shown in [Table 1](#).

Table 1 10GE LAN/WAN module IDs and part numbers

| Hardware | Product description | Minimum software version | Part number |
|----------------|------------------------------------------------|--------------------------|-------------|
| 8681XLW module | 1-port 10 Gigabit Ethernet (1310nm WAN serial) | 3.3.0 | DS1404052 |
| 8681XLR module | 1-port 10 Gigabit Ethernet (1310nm LAN serial) | 3.3.0 | DS1404053 |

LAN PHY features

The following 10GE [LAN PHY](#) features are available in release 3.3:

- LAN, MAN, WAN Ethernet pt-pt applications. Incompatible with SONET TDM/DWDM OC-192 optical networks
- PEC DS1404053 for single Port 1310 nm 10GE LAN serial module
- Compliant with IEEE 802.3ae standards
- 802.3 Ethernet frame format, MAC, Layer functionality
- 10.3125 Gbps data rate.
- 64B/66B line encoding
- Asynchronous Ethernet Interface
- 128K records

LAN PHY FEFI

The LAN version of 10 Gigabit Ethernet supports far end fault indication (FEFI). Remote failure is detected at the MAC level. Upon receiving FEFI notification from the remote site, the 10GE module's port changes its link state to non-operational.

WAN PHY features

The following displays the 10GE WAN PHY features available in release 3.3:

- LAN, MAN, WAN Ethernet pt-pt applications. Simple, low cost access to SONET TDM/DWDM OC-192 optical networks.
- PEC DS1404052 for single port 1310 nm 10GE WAN serial module
- Compliant with IEEE 802.3ae standards
- 9.9532 Gbps data rate. Compatible with SONET OC-192/SDH STM-64 payload rate. SONET framer and Ethernet MAC functionality
- 64B/66B line encoding and simplified SONET/SDH framer
- Asynchronous Ethernet Interface
- 128K records

WAN PHY clocking

Although the default mode for each 10GE WAN port is to generate its transmit clock from its own internal clock, a loop timing option is provided for applications involving synchronization to Sonet/SDH equipment and a timing hierarchy. You need to manually configure the Passport 8000 Switch Series to change the clock setting from internal to line timing.

When using the internal clock and directly connected to another 10GE WAN port, the other side of the link may be set to either internal or line (loop) clocking. If one side of the link is set for line clocking, care must be taken to configure the other side for internal clocking in order to avoid a potential timing loop.

Unless there is a specific requirement for loop timing in a system, internal timing is recommended, since the transmit side will then continue to operate even if there is a failure on the incoming Receive Side Signal.

For more information about WAN PHY clocking and synchronization applications, see *Network Design Guidelines (Passport 8000 Switch Series Release 3.3 Implementation Notes)* (part number 313197-B).

WAN PHY FEFI

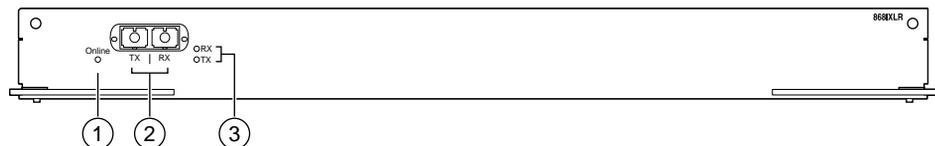
The WAN PHY version of 10GE WAN module supports FEFI. When one end of a 10GE WAN module link detects a link-down condition or is administratively disabled, it notifies the other end of the link through the use of SONET Alarm Indication Signal (AIS). Upon receiving this notification, the other end changes its link state to down.

For an in depth study of 10GE WAN technology in your network, see *Network Design Guidelines (Passport 8000 Switch Series Release 3.3 Implementation Notes)* (part number 313197-B).

Default 10GE LAN module configuration

The 8681XLR (10GE LAN) Module ([Figure 1](#)) consists of a printed circuit board with status LEDs, and one 10GBASE-LR 1310nm 10gigabit Ethernet serial LAN port. The 10GBASE-LR port (10.3 Gb/s LAN PHY) operates in full-duplex mode and provides transmission ranges of up to 10 km using 9/125 μm single-mode fiber cable.

Figure 1 8681XLR (10GE LAN) Module



- 1 = Online LED
- 2 = 10GBASE LR port
- 3 = Port RX and TX LEDs

10548EA

[Table 2](#) describes the default 10GE LAN Module configuration.

Table 2 10GE LAN Module default settings

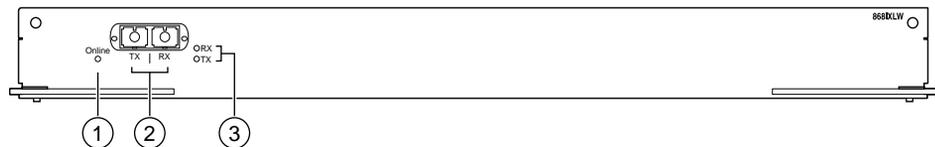
| Parameter | Default |
|-----------|----------|
| Debug | Disabled |
| Lock | False |

Table 2 10GE LAN Module default settings (continued)

| Parameter | Default |
|-------------------------------|----------|
| Oversize frame | Disabled |
| Perform tagging | Enabled |
| Spanning Tree Protocol 802.1D | Enabled |
| Tagged frame discard | Disabled |
| Unknown MAC discard | Disabled |
| Untagged frame discard | Disabled |

Default 10GE WAN module configuration

The 8681XLW (10GE WAN) Module ([Figure 2](#)) consists of a printed circuit board with status LEDs, and one 10GBASE-LW 1310nm 10 gigabit Ethernet serial WAN port. The 10GBASE-LW port (9.953 Gb/s WAN PHY) operates in full-duplex mode and provides transmission ranges of up to 10 km using 9/125 μm single-mode fiber cable.

Figure 2 8681XLW (10GE WAN) Module

- 1 = Online LED
- 2 = 10GBASE LW port
- 3 = Port RX and TX LEDs

10547EA

Table 3 describes the default 10GE WAN Module configuration.

Table 3 10GE WAN Module default settings

| Parameter | Default |
|---------------------------------|----------|
| Clock source | Internal |
| Debug | Disabled |
| Framing | SONET |
| Lock | False |
| Oversize frame | Disabled |
| Perform tagging | Enabled |
| Spanning Tree Protocol RFC 1638 | Enabled |
| Tagged frame discard | Disabled |
| Unknown MAC discard | Disabled |
| Untagged frame discard | Disabled |

Additional configurable 10GE LAN module parameters

Table 4 describes the additional parameters that can be configured for the 10GE LAN Module.

Table 4 10GE LAN Module configurable parameters

| Parameter | Option | Default setting |
|--------------------------------------------------------------------|----------------------------------|------------------|
| <code>config ethernet <slot/port> lock</code> | true (enable) false (disable) | false (disabled) |
| <code>config ethernet <slot/port> name</code> | <name> (1..20 characters) | No name assigned |
| <code>config ethernet <slot/port> enable-diffserv</code> | true (enable) false (disable) | false (disabled) |
| <code>config ethernet <slot/port> access-diffserv</code> | true (enable) false (disable) | false (disabled) |

Table 4 10GE LAN Module configurable parameters (continued)

| Parameter | Option | Default setting |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------|
| config ethernet <slot/port> qos-level For more information about quality of service (Qos), see "Quality of Service (QoS)" on page 29 . | 0 = none 1 = standard 2 = bronze 3 = silver 4 = gold 5 = platinum 6 = premium 7 = net control | 1 |
| config ethernet <slot/port> unknown-mac-discard | enable disable | disabled |
| config ethernet <slot/port> default-vlan-id | <vlan id> (1..4092) | 1 |
| config ethernet <slot/port> tagged-frames-discard | enable disable | disabled |
| config ethernet <slot/port> perform-tagging | enable disable | enabled |
| config ethernet <slot/port> untagged-frames-discard | enable disable | disabled |
| config ethernet <slot/port> loop-detect | enable disable | disabled |
| config ethernet <slot/port> state | enable (up) disable (down) test | up |
| config ethernet <slot/port> linktrap | enable disable | enabled |
| config ethernet <slot/port> rate-limit <multicast broadcast> | enable disable | disabled |
| config ethernet <slot/port> tx-flow-control | enable disable | disabled |
| config ethernet <slot/port> fc-pause0 | enable disable | enabled |

Table 4 10GE LAN Module configurable parameters (continued)

| Parameter | Option | Default setting |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| config ethernet <slot/port> fc-pause-time | (1..65535) This parameter is set in slots. One slot equals 512-bit transmission time. For 10Gb/s, one slot corresponds to ~51.2 nanoseconds. | 65535 |
| config ethernet <slot/port> cp-limit | enable disable | enabled |
| Additional parameters: multicast-limit broadcast-limit | multicast control frame rate (1000..100000) broadcast frame rate (1000..100000) | multicast-limit 15000 broadcast-limit 10000 |

Additional configurable 10GE WAN module parameters

[Table 5](#) describes the parameters that can be configured for the 10GE WAN Module.

Table 5 10GE WAN Module configurable parameters

| Parameter | Option | Default setting |
|------------------------------------------------|----------------------------------|------------------|
| config ethernet <slot/port> lock | true (enable) false (disable) | false (disabled) |
| config ethernet <slot/port> name | <name> (1..20 characters) | No name assigned |
| config ethernet <slot/port> enable-diffserv | true (enable) false (disable) | false (disabled) |
| config ethernet <slot/port> access-diffserv | true (enable) false (disable) | false (disabled) |

Table 5 10GE WAN Module configurable parameters (continued)

| Parameter | Option | Default setting |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------|
| config ethernet <slot/port> qos-level | 0 = none 1 = standard 2 = bronze 3 = silver 4 = gold 5 = platinum 6 = premium 7 = net control | 1 (standard) |
| config ethernet <slot/port> unknown-mac-discard | enable disable | disabled |
| config ethernet <slot/port> default-vlan-id | <vlan id> (1..4092) | 1 |
| config ethernet <slot/port> tagged-frames-discard | enable disable | disabled |
| config ethernet <slot/port> perform-tagging | enable disable | enabled |
| config ethernet <slot/port> untagged-frames-discard | enable disable | disabled |
| config ethernet <slot/port> loop-detect | enable disable | disabled |
| config ethernet <slot/port> state | enable (up) disable (down) test | up |
| config ethernet <slot/port> linktrap | enable disable | enabled |
| config ethernet <slot/port> rate-limit <multicast broadcast> | enable disable | disabled |
| config ethernet <slot/port> clock-source | line internal | internal |
| config ethernet <slot/port> framing | sonet sdh | sonet |
| config ethernet <slot/port> tx-flow-control | enable disable | disabled |

Table 5 10GE WAN Module configurable parameters (continued)

| Parameter | Option | Default setting |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| config ethernet <slot/port> fc-pause0 | enable disable | enabled |
| config ethernet <slot/port> fc-pause-time | (1..65535) This parameter is set in slots. One slot equals 512-bit transmission time. For 10Gb/s, one slot corresponds to ~51.2 nanoseconds. | 65535 |
| config ethernet <slot/port> cp-limit | enable disable | enabled |
| Additional parameters: multicast-limit broadcast-limit | multicast control frame rate (1000..100000) broadcast frame rate (1000..100000) | multicast-limit 15000 broadcast-limit 10000 |

Chapter 2

Configuration considerations and limitations

This chapter describes configuration limitations and interoperability issues that you should consider when configuring your 10GE LAN/WAN modules.

This chapter includes the following topics:

| Topic | Page |
|---------------------------------------------------|------|
| Switching fabric recommendations | 28 |
| Multimode fiber (MMF) | 28 |
| Jumbo packet support | 28 |
| Internal MLT | 29 |
| Quality of Service (QoS) | 29 |
| Flow control | 30 |
| Trunk vs access mode | 31 |
| Non-supported features | 31 |
| LED information | 31 |
| Setting the STG priority | 32 |
| 10GE WAN SONET/SDH overhead bytes | 32 |

Switching fabric recommendations

The 10GE LAN/WAN modules are 128K records modules which allows support for large layer 2 and layer 3 configurations. These modules only operate with 8000 Series software release 3.3 and later.

For 128K record support the following configurations are required:

- For best performance of the 10GE LAN/WAN modules, Nortel Networks recommends that you install two SF CPU modules. If the chassis includes a 8690SF module, the mode defaults back to 32K mode.
- All modules installed in the chassis must support 128K records (M modules) running 3.3 and later software.
- MMode (128K records mode) must be enabled. If one, or more modules installed in the chassis is a 32K records module, these modules will be disabled if the chassis is configured to operate in MMode (128K records mode). For instructions on enabling MMode, see *Platform and System Management*.

For more information about your hardware and software compatibility, see *Important information about your hardware and supporting software release compatibility* (part number 314937-A).

Multimode fiber (MMF)

There is no support for MMF in WAN or LAN interfaces.

Jumbo packet support

Jumbo packets are larger than the maximum Ethernet frame size specified in the IEEE 802.3 standard. For untagged frames, the maximum standard size is 1518 bytes. For tagged frames, it increases by 4 bytes to 1522 bytes.

The default maximum Ethernet frame size supported by the Passport 8000 Switch Series is 1950 bytes. The 10GE LAN/WAN module also supports this frame size. Passport 8000 Switch Series has a box-wide jumbo frame enable feature, where *all* of the ports in the system can support 9600 byte frames. With the addition of this feature, the 10GE LAN/WAN modules support the increased frame size. Note that if a jumbo frame enters on a 10GE LAN/WAN interface, and is destined to egress a chassis interface which does not support jumbo frames, it is gracefully dropped.

Internal MLT

Every 10GE LAN/WAN module uses one MLT ID of the 32 MLT IDs available in the Passport 8000 Switch Series. The MLT ID is configured automatically when a 10GE LAN/WAN module is detected in the chassis. For more information about internal MLT and load balancing, see *Network Design Guidelines (Passport 8000 Switch Series Release 3.x Implementation Notes)*.

Quality of Service (QoS)

10GE LAN/WAN modules provide quality of service features, including 802.1p and DiffServ support. Eight levels of QoS are supported. The highest level is reserved for control packets, while the remaining three levels, high, medium and low priority are used for data traffic.

[Table 6](#) provides the default mappings for differentiated services code point (DSCP) to 10GE Class of Service (CoS).

Table 6 DSCP to 10GigE CoS default mapping

| DSCP | Traffic Service Class | 10GigE CoS |
|-----------------------------------------------------------|-----------------------|------------|
| CS7 (111000), CS6 (110000) | Network | High |
| EF (101110), CS5 (101000) | Premium | High |
| AF41 (100010), AF42 (100100), AF43 (100110), CS4 (100000) | Platinum | Medium |
| AF31 (011010), AF32 (011100), AF33 (011110), CS3 (011000) | Gold | Medium |

Table 6 DSCP to 10GigE CoS default mapping

| DSCP | Traffic Service Class | 10GigE CoS |
|-----------------------------------------------------------|-----------------------|------------|
| AF21 (010010), AF22 (010100), AF23 (010110), CS2 (010000) | Silver | Medium |
| AF11 (001010), AF12 (001100), AF13 (001110), CS1 (001000) | Bronze | Low |
| DE (000000) and all undefined codepoints | Standard | Low |
| User-defined codepoints | Standby | Low |

[Table 7](#) provides the default mappings for 802.1p to 10GE CoS.

Table 7 QoS 802.1p to 10GigE CoS default mapping

| .1p value | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|-------------|------|------|-----|-----|-----|-----|-----|-----|
| 10 GigE CoS | High | High | Med | Med | Med | Low | Low | Low |

You can change CoS default mappings by using the following CLI commands:

- `config qos ingressmap ds`
- `config qos ingressmap 1p`

To change Quality of Service (QoS) mappings, you can use a module-level command to control QoS settings for all modules in the Passport 8000 Switch Series, including 10GE LAN/WAN modules. In addition, for 10 GigE, this command also controls CoS settings for the previously-mentioned QoS registers.

Flow control

The Passport 8000 Switch Series 10GE LAN module interface supports IEEE 802.3x flow control. The 10GE LAN module interface can generate 802.3x flow control PAUSE frames when it becomes congested. It also responds to 802.3x PAUSE frames entering on the other side of the link. The 10GE module interface temporarily halts packet transmission when an 802.3x PAUSE frame is received from the remote end.

Trunk vs access mode

By default, the 10GE LAN/WAN module port comes up as a trunk port with tagging enabled. This is opposite behavior to Passport 8000 Switch Series 10/100 and GigE modules where tagging is disabled by default. As a result, the 10GE LAN/WAN module port belongs to multiple VLANs and STGs by default. When you change tagging mode from trunk (port mode) to access, the port's previous association of VLANs and STGs is lost.

Nortel Networks recommends that you use the 10GE LAN/WAN module port as trunk only.

Non-supported features

The following features are not supported by the 10GE LAN/WAN modules.

- **External MLT:** Nortel Networks recommends that you use a layer 3 protocol for resiliency, for example, OSPF associated to Equal Cost MultiPath (ECMP)
- **APS** (Automatic Protection Switching) is a SONET feature, which per IEEE P802.3ae is not supported for 10 GBASE Ethernet)
- **IPX** routing
- **Egress port mirroring**
- **Split MultiLink Trunking (SMLT)**
- **WSM feature set**

LED information

The 10GE LAN/WAN module LEDs for TX and RX are in opposite positions of those on other 8600 modules.

When a 10 GE LAN/WAN module is in a chassis with redundant CPU configuration, the Switch Utilization LEDs report switch utilization on the primary CPU only. (Q00259692)

Setting the STG priority

Nortel Networks recommends that you keep the value of the STG priority for a port to as low a value as possible (which should guarantee that this port is active after the STP calculation). While the default is typically 128, it is recommended that you use a value equal to or less than 10. To set the Priority parameter using Device manager, select Edit > Port > STG. To set the priority parameter using the CLI, use the command `config stg <sid> priority <number>` (Q00259692)

10GE WAN SONET/SDH overhead bytes

The Sonet/SDH overhead bytes: D1-D3, E1, F1, D4-12, and E2, which are unused and not supported by the 10GE WAN module, are set to values of all ones in the first STS-1, while they are zeros in all other STS-Ns (where N=2...192).



Note: For more information about these limitations, contact your local Nortel Networks representative.

Chapter 3

Configuring and monitoring the 10GE LAN/WAN modules using Device Manager

Two management tools enable you to configure your 10GE LAN/WAN modules: Device Manager and the command line interface (CLI). This chapter describes only those Device Manager tasks specific to the 10GE LAN/WAN module. For information on other configuration options, refer to your release notes for a list of related publications for your software release.

Device Manager is an SNMP-based graphical user interface tool designed to manage single devices. To use Device Manager, you must have network connectivity to a management station running Device Manager on one of the supported platforms. For information on all aspects of installing and running Device Manager, refer to *Installing and Using Device Manager*.

This chapter includes the following topics:

| Topic | Page |
|------------------------------------------------------|------|
| Configuring the 10GE LAN/WAN module | 34 |
| Viewing 10GE LAN/WAN port statistics | 47 |

Configuring the 10GE LAN/WAN module

This section describes the specific commands used to configure the 10GE LAN/WAN modules using Device Manager, and includes the following topics:

- [“Configuring the WAN clock source,”](#) next
- [“Changing the module’s administrative status”](#) on page 34
- [“Configuring the port’s administrative status”](#) on page 36
- [“Configuring the WAN framing type”](#) on page 40
- [“Configuring flow control”](#) on page 42
- [“Performing a 10GE LAN/WAN loopback test”](#) on page 43
- [“Viewing the Trap Log”](#) on page 45

Configuring the WAN clock source

You use the CLI to configure the 10GE WAN module clock source. See [“Configuring the clock source”](#) on page 70.

Changing the module’s administrative status

To enable or disable the 10GE LAN/WAN module’s administrative status:

- On the Device View, double-click on the 10GE LAN/WAN module ([Figure 3](#)).

Figure 3 Device View with the 10GE LAN/WAN module selected



The Card dialog box opens (Figure 4).

Figure 4 Card dialog box

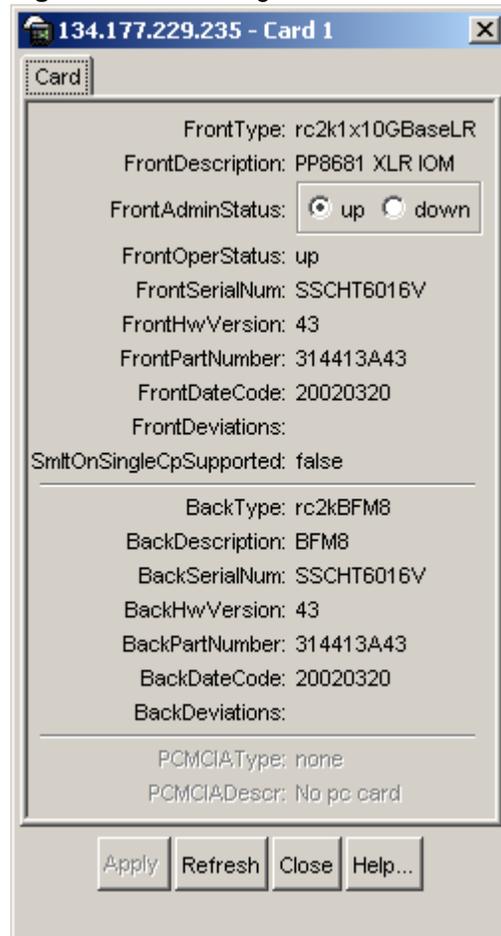


Table 8 describes the Card dialog box fields.

Table 8 Card dialog box fields

| Field | Description |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FrontType/BackType | Used to indicate module types in the 8000 Series. <i>Front</i> refers to the I/O portion of the module. |
| FrontDescription/BackDescription | Model number of the module (for example, 8681XLW). |
| FrontAdminStatus | Allows you to change the administrative status of the module, up (enabled) or down (disabled). |
| FrontOperStatus | Indicates the operational status of this module. |
| FrontHwVersion/BackHwVersion | Hardware version of the I/O module. |
| FrontPartNumber/BackPartNumber | Part number of the module. |
| FrontDateCode/BackDateCode | Manufacturing date code for the module. |
| FrontDeviations/BackDeviations | Deviations. |
| SmltOnSingleCpSupported | Read-only field. Indicates whether the I/O module supports this feature. The valid options are false (no) or true (yes). |
| PCMCIAType | Used to indicate the type of PCMCIA card currently installed in this CPU module, if any. For non-CPU modules, this variable has no meaning and will always be set to none. |
| PCMCIADescr | PCMCIA description. |

Configuring the port's administrative status

To change the a port's administrative status on the 10GE LAN/WAN module:

- 1 On the Device view, double-click on the 10GE LAN/WAN port (Figure 5).

Figure 5 Device view with 10GE LAN/WAN port selected

The Port dialog box opens with the 10GE Interface tab displayed (Figure 6).

Figure 6 10GE Interface tab—Port dialog box

The screenshot shows a web-based configuration interface for a network device. The title bar reads "192.32.99.152 - Port 7/1". Below the title bar is a navigation menu with tabs: "10GE Interface", "10GE WIS", "VLAN", "STG", "MAC Learning", "Rate Limiting", "Test", "IP Address", "ARP", "DHCP", "DVMRP", "IGMP", "OSPF", "RIP", "PIM", "PGM", "VRRP", and "Ro".

The main content area is divided into several sections:

- General Information:** Index: 448; Name: (empty text box); Descr: 10GbLW Port 7/1; Type: rc10GbLW; Mtu: 1950; PhysAddress: 00:e0:7b:b7:5d:00; VendorDescr: (empty).
- Status and Control:** AdminStatus: up down testing; OperStatus: up; LastChange: 00h:35m:11s; LinkTrap: enabled disabled.
- Operational Parameters:** OperDuplex: full; OperSpeed: 10000.
- Quality of Service (QoS):** QoSLevel: level0 level1 level2 level3 level4 level5 level6 level7; DiffServEnable: ; DiffServType: none access core.
- Advanced Features:** TelephonyAndMultimediaFilterEnable; MultimediaPlatformAndDevice: (empty dropdown menu).
- Security and Locking:** Mltid: 0; Locked: false; UnknownMacDiscard; DirectBroadcastEnable.
- Actions:** Action: none flushMacFdb flushArp flushIp flushAll triggerRipUpdate clearLoopDetectAlarm; Result: none.

At the bottom of the dialog box are four buttons: "Apply", "Refresh", "Close", and "Help..."

Table 9 describes the 10GE Interface tab fields.

Table 9 10GE Interface tab field descriptions

| Field | Description |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Index | Unique value assigned to each interface. The value ranges between 16 and 255. |
| Name | Displays the name of this port. To assign or change a name to the port, highlight the field and enter alphanumeric characters. |
| Descr | Displays the port type of this interface and the slot/port number. |
| Type | Displays the media type of this interface. |
| Mtu | The size of the largest packet, in octets, that can be sent/received on the interface. |
| PhysAddress | MAC address assigned to a particular interface. |
| VendorDescr | Vendor description. |
| AdminStatus | Sets the port to either of the following states: <ul style="list-style-type: none"> • up • down • testing When a managed system initializes, all interfaces start with AdminStatus in the down state. As a result of either management or configuration action, the AdminStatus is changed to the up state (or remains in the down state). |
| OperStatus | Displays the current operational state of the interface: <ul style="list-style-type: none"> • up • down If AdminStatus is down, then OperStatus should be down. If AdminStatus is changed to up, then OperStatus should change to up if the interface is ready to transmit and receive network traffic. It should remain in the down state if and only if there is a fault that prevents it from going to the up state. |
| LastChange | Displays the value of sysUpTime at the time the interface entered its current operational state. If the current state was entered prior to the last reinitialization of the local network management subsystem, the value is zero. |
| LinkTrap | Indicates whether or not link Up/link Down traps should be generated for this interface. |
| OperDuplex | The current operational duplex mode of the port (always full for the 10GE LAN/WAN module). |

Table 9 10GE Interface tab field descriptions (continued)

| Field | Description |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OperSpeed | Displays the current operating speed of the 10GBASE-LR/LW port. |
| QosLevel | Quality of service level. |
| DiffServEnable | Used to enable differentiated services on this port. |
| DiffServType | Sets the type of differentiated service to none, access or core. |
| TelephonyAndMultimediaFilterEnable | Enables IP telephony and MultiMedia Filters. |
| MultiMediaPlatformAndDevice | Opens a dialog box that allows you to select the platform and device for multimedia. |
| MlTld | MultiLink Trunk to which the port is assigned (if any). |
| Locked | Displays whether or not the port is locked. When locked, the port configuration cannot be changed. To lock or unlock a port, select Edit > Security > Port Lock. |
| UnknownMacDiscard | If rcUnknownMacDiscard is set to True, then a packet with an unknown source MAC address is dropped on that port, and other ports then will discard any packets with this MAC address in the destination field. For example, suppose 11:22:33:44:55:66 is an unknown source MAC. Packets with source MAC 11:22:33:44:55 coming from this port are discarded; furthermore, packets with destination MAC 11:22:33:44:55:66 coming from other ports are also discarded, unless this address is later learned on another port or the restriction ages out. |
| DirectBroadcastEnable | Used to indicate whether this interface should forward direct broadcast traffic. |
| Action | Sets one of the following port-related actions: <ul style="list-style-type: none"> • none • flushMacFdb—flush MAC forwarding table for port • flushArp—flush ARP table for port • flushIp—flush IP route table for port • flushAll—flush all tables for port • triggerRipUpdate—manually update the RIP table |
| Result | Displays result from the last system action. |

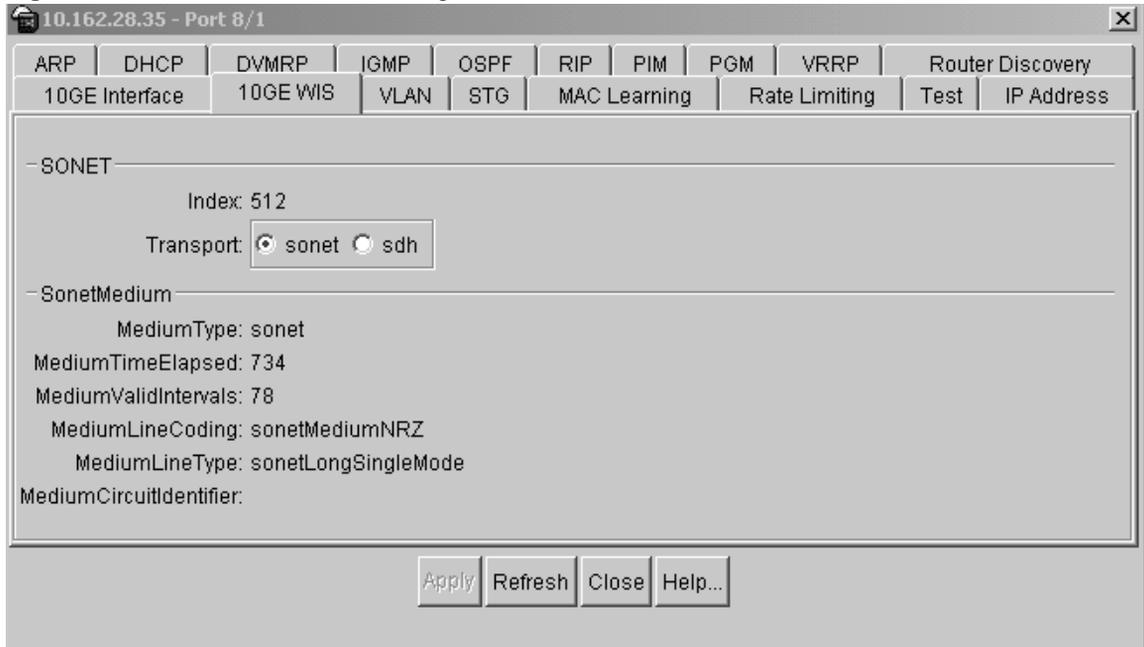
Configuring the WAN framing type

To configure the WAN framing type:

- 1 On the Device View, double-click on the 10GE WAN port (Figure 5).
The Port dialog box opens with the 10GE Interface tab displayed (Figure 6).
- 2 Click the 10GE WIS tab.
The 10GE WIS tab opens (Figure 7).



Note: The 10GE WIS tab is displayed only when configuring the 10GE WAN module. If you attempt to configure the transport type of the 10GE LAN module, the error message `noSuchInstance` will display.

Figure 7 10GE WIS tab—Port dialog box.

[Table 10](#) describes the 10GE WIS tab fields.

Table 10 10GE WIS tab fields

| Field | Description |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Index | Unique value assigned to each interface. The value ranges between 16 and 255. |
| Transport (framing) | Select your framing type based on your WAN connection type: <ul style="list-style-type: none"> sonet (SONET - Synchronous Optical Network); standard format in North America sdh (SDH - Synchronous Digital Hierarchy); standard format used in Europe |
| MediumType | The current framing (SONET or SDH) operating on this interface. |
| MediumTimeElapsed | Number of seconds, including partial seconds, that have elapsed since the beginning of the current measurement period. If, for some reason, such as an adjustment in the system's time-of-day clock, the current interval exceeds the maximum value, the agent will return the maximum value. |

Table 10 10GE WIS tab fields

| Field | Description |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MediumValidIntervals | Number of previous 15-minute intervals for which performance monitoring data was collected. |
| MediumLineCoding | Line coding for this interface. This is always Non-Return to Zero (NRZ) for 10GE WAN. |
| MediumLineType | Line type for this interface. Currently, this will be only LongSingle, indicating long-range, single-mode fiber. |
| MediumCircuitIdentifier | Transmission vendor's circuit identifier, for the purpose of facilitating troubleshooting. Note that the circuit identifier, if available, is also represented by ifPhysAddress. |

Configuring flow control

Flow control for 10GE LAN/WAN modules can be configured only using the command line interface. See [“Configuring flow control” on page 70](#) for instructions on how to configure flow control.

Performing a 10GE LAN/WAN loopback test

This section describes the loopback test features in Device Manager available for the 10GE LAN/WAN Module.

You can perform two types of loopback test, internal and external. The internal loopback test is the default.



Note: All ports must be in test mode to conduct any testing.

To test for loopback:

- 1 On the Device View, double-click on the port (Figure 5 on page 36).
The Port dialog box opens with the Interface tab displayed (Figure 6 on page 37).
- 2 In the AdminStatus field, click testing.
- 3 Click Apply.
- 4 Click the Test tab.

The Test tab opens (Figure 8).

Figure 8 Port dialog box—Test tab

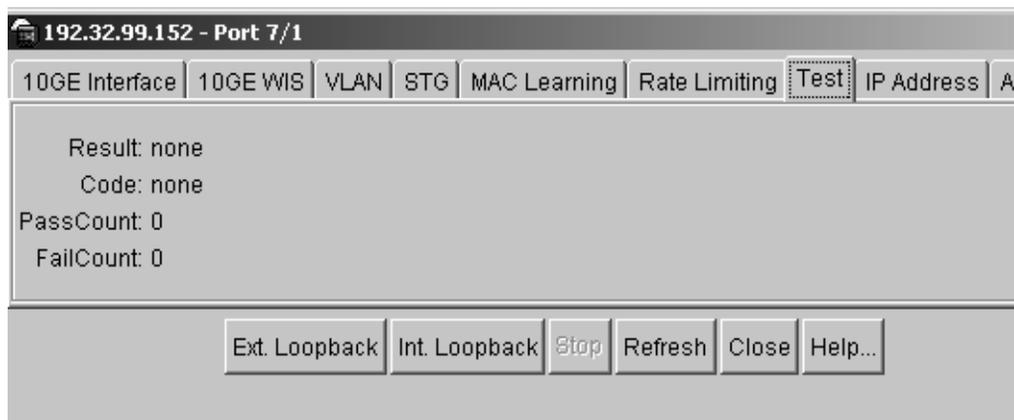


Table 11 describes the Test tab fields.

Table 11 Test tab fields

| Field | Description |
|-----------|-----------------------------------------|
| Result | Result of the test. |
| Code | Code used for test. |
| PassCount | Number of events which passed the test. |
| FailCount | Number of events which failed the test. |

- 5 Click Ext. Loopback to test the external loopback or click Int. Loopback to test the internal loopback.

A dialog box displays the test results.

- 6 Click Stop to cease testing.
- 7 Click Close.
- 8 Click the Interface tab.
- 9 In the AdminStatus field, click up.
- 10 Click Apply.



Note: To run the external loopback test, you need a loopback cable on that port.

The test statistics are available only when the test has finished, unlike Ethernet ports where the test statistics can be viewed during testing.

Viewing the Trap Log

To view the Trap Log that contains SONET-specific traps:

- Click the bell icon on the toolbar.



The Trap dialog box opens (Figure 9).

Figure 9 Trap Log dialog box

| Trap Log | | | |
|---------------|---------------------|----------------|----------------------------------------------|
| Node | Time | Type | Description |
| 192.32.99.152 | 2002/08/19-09:29:54 | linkDown.0 | Index.0=4/1 , AdminStatus.0=up , OperStat |
| 192.32.99.152 | 2002/08/19-09:29:54 | rc2kCardDown.0 | rc2kCardIndex.0=4 , rc2kCardFrontAdminS |
| 192.32.99.152 | 2002/08/19-09:29:58 | rcStpTCN.0 | rcStgId.0=1 , rcPortIndex.0=9/6 , rcStgBridg |
| 192.32.99.152 | 2002/08/19-09:29:59 | linkUp.0 | Index.0=4/1 , AdminStatus.0=up , OperStat |
| 192.32.99.152 | 2002/08/19-09:30:00 | linkDown.0 | Index.0=4/1 , AdminStatus.0=up , OperStat |
| 192.32.99.152 | 2002/08/19-09:30:01 | linkUp.0 | Index.0=4/1 , AdminStatus.0=up , OperStat |
| 192.32.99.152 | 2002/08/19-09:30:09 | linkDown.0 | Index.0=4/1 , AdminStatus.0=up , OperStat |
| 192.32.99.152 | 2002/08/19-09:30:09 | rc2kCardDown.0 | rc2kCardIndex.0=4 , rc2kCardFrontAdminS |
| 192.32.99.152 | 2002/08/19-09:30:28 | rc2kCardDown.0 | rc2kCardIndex.0=7 , rc2kCardFrontAdminS |
| 192.32.99.152 | 2002/08/19-09:30:35 | rc2kCardDown.0 | rc2kCardIndex.0=7 , rc2kCardFrontAdminS |

Export... Clear ▼ Close

Table 12 describes the fields in the Trap Log dialog box.

Table 12 Trap Log dialog box fields

| Field | Description |
|-------------|---------------------------------------------------|
| Node | IP address of the device sending SONET trap. |
| Time | Timestamp in the trap. |
| Type | Type of SONET trap: Section/Line/Path alarm. |
| Description | Description of the alarm: LOS, LOF, and so forth. |

Table 13 lists the alarms that are specific to the 10GE WAN module. The alarms are listed in order of priority.

Table 13 10GE WAN alarms

| Name | Description |
|-----------------------|----------------------------------------------------------------------------------------------------------------------|
| Section alarms | |
| NO DEFECT | No SONET/SDH defects are present. |
| LOS | Loss of signal - not enough Rx power or fiber disconnected. |
| LOF | Loss of frame - unable to frame the signal correctly, possibly due to improper timing setup. |
| Line Alarms | |
| L-AIS | Alarm Indication Signal - sent out when a port is disabled or indicates another line failure. |
| L-RDI | Remote Defect Indication - the result of a L-AIS or LOS/LOF at the remote end. |
| Path Alarms | |
| P-AIS | Path Alarm Indication Signal - indicates a propagation upstream of a downstream L-AIS alarm or another path failure. |
| P-LOP | Path Loss of Pointer - the pointer to the Sonet SPE is not correct; sometimes due to dirty fiber, or timing slips. |
| P-RDI | Path Remote Defect Indication- the result of a P-AIS alarm at the remote end. |

Table 13 10GE WAN alarms (continued)

| Name | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------------------|
| P-SLM | Path Signal Label Mismatch - path labels do not match, in particular the C2 label is mismatched. (The C2 label for 10GE WAN is 0x1A.) |
| P-UNEQ | Path unequipped - the Sonet path may not be fully provisioned to handle traffic cross-connects. |

Viewing 10GE LAN/WAN port statistics

Device Manager allows you to graph and display certain read-only statistics for the 10GE LAN/WAN.

The values for the 10GE Interface, 10GE Ethernet Errors, 10GE Bridging, 10GE Spanning Tree, and 10GE Routing tabs are displayed for absolute, cumulative, average, minimum, maximum, and last values.

[Table 14](#) describes these values.

Table 14 Types of statistics

| Field | Description |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AbsoluteValue | The total count since the last reset of counters. A system reboot resets all counters. |
| Cumulative | The total count since the statistics tab was first opened. The elapsed time for the cumulative counter is displayed at the bottom of the statistics window. |
| Average | The cumulative count divided by the cumulative elapsed time. |
| Minimum | The minimum average for the counter for a given polling interval over the cumulative elapsed time. |
| Maximum | The maximum average for the counter for a given polling interval over the cumulative elapsed time. |
| LastValue | The average for the counter over the last polling period. |

The values for the Section, Line, FE Line, Path, and FE Path tabs are updated based on the poll interval.

The 10GE LAN/WAN Modules provides the following read-only statistics tabs:

- “Viewing 10GE WAN section statistics,” next
- “Viewing 10GE WAN Line statistics” on page 50
- “Viewing 10GE WAN FE Line statistics” on page 52
- “Viewing 10GE WAN path statistics” on page 53
- “Viewing 10GE WAN FE path statistics” on page 55
- “Viewing 10GE LAN/WAN interface statistics” on page 56
- “Viewing 10GE LAN/WAN Ethernet errors statistics” on page 59
- “Viewing 10GE LAN/WAN bridging statistics” on page 63
- “Viewing 10GE LAN/WAN Spanning Tree statistics” on page 64
- “Viewing 10GE LAN/WAN routing statistics” on page 66

Viewing 10GE WAN section statistics



Note: The 10GE WAN module displays only the 10GE SONET statistics.

To display Section statistics:

- 1 On the device view, right-click the port.
- 2 Choose Graph 10GE SONET.

The GraphPort dialog box opens with the Section statistics tab displayed (Figure 10).

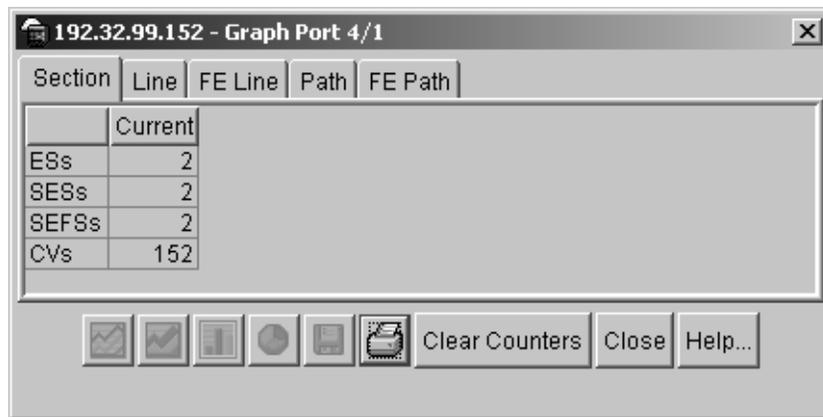
Figure 10 GraphPort dialog box—Section tab

Table 15 describes the fields in the Section tab.

Table 15 Section tab fields

| Field | Description |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESs | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SESs | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification ¹ . |
| SEFSs | Severely Errored Framing Second (SEFS) is a second containing one or more SEF events. |
| CVs | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |

¹ A BER of 10^{-6} corresponds to the default Section SES threshold of 8554.

Viewing 10GE WAN Line statistics

To display Line statistics:

- 1 On the device view, right-click the port.
- 2 Choose Graph Port.

The graphPort dialog box opens with the Section statistics tab displayed (Figure 10 on page 49).

- 3 Click the Line tab.

The Line tab opens (Figure 11).

Figure 11 GraphPort dialog box—Line tab

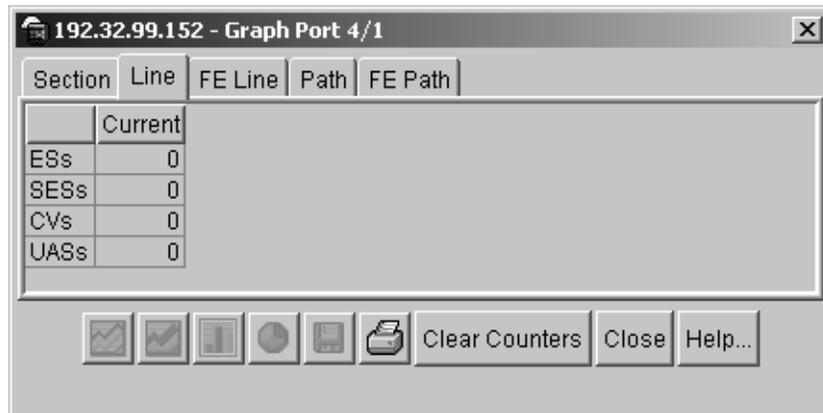


Table 16 describes the fields in the Line tab.

Table 16 Line tab fields

| Field | Description |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESs | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, or LOP. |
| SESs | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification ¹ . |
| CVs | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UASs | Number of seconds that the interface is unavailable. |

¹ A BER of 10^{-6} corresponds to the default Line SES threshold of 9835.

Viewing 10GE WAN FE Line statistics

To display FE Line statistics:

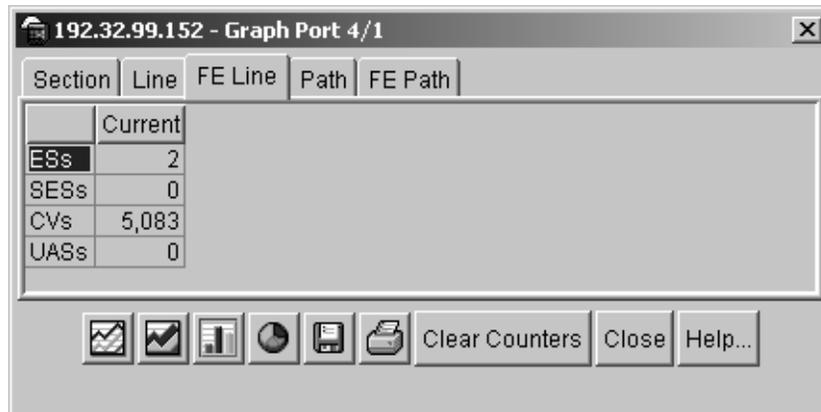
- 1 On the device view, right-click the port.
- 2 Choose Graph Port.

The graphPort dialog box opens with the Section statistics tab displayed (Figure 10 on page 49).

- 3 Click the FE Line tab.

The FE Line tab opens (Figure 12).

Figure 12 GraphPort dialog box—FE Line tab



[Table 17](#) describes the fields in the FE Line tab.

Table 17 FE Line tab fields

| Field | Description |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESs | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, or LOP. |
| SESs | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CVs | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UASs | Number of seconds that the interface is unavailable. |

Viewing 10GE WAN path statistics

To display path statistics:

- 1 On the device view, right-click the port.
- 2 Choose Graph Port.

The graphPort dialog box opens with the Section statistics tab displayed ([Figure 10 on page 49](#)).

- 3 Click the Path tab.

The Path tab opens ([Figure 13](#)).

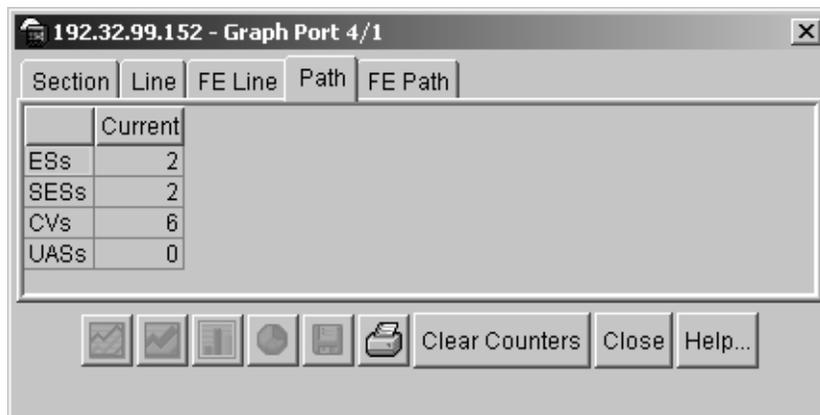
Figure 13 GraphPort dialog box — Path tab

Table 18 describes the fields in the Path tab.

Table 18 Path tab fields

| Field | Description |
|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESs | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, or LOP. |
| SESs | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification ¹ . |
| CVs | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UASs | Number of seconds that the interface is unavailable. |

¹ The default Path SES threshold of 2400 corresponds to a situation where 30% of all of the SPEs being received have parity errors detected via the Path BIP checks.

Viewing 10GE WAN FE path statistics

To display FE path statistics:

- 1 On the device view, right-click the port.
- 2 Choose Graph Port.

The GraphPort dialog box opens with the Section statistics tab displayed (Figure 10 on page 49).

- 3 Click the FE Path tab.

The FE Path tab opens (Figure 14).

Figure 14 GraphPort dialog box— FE Path tab

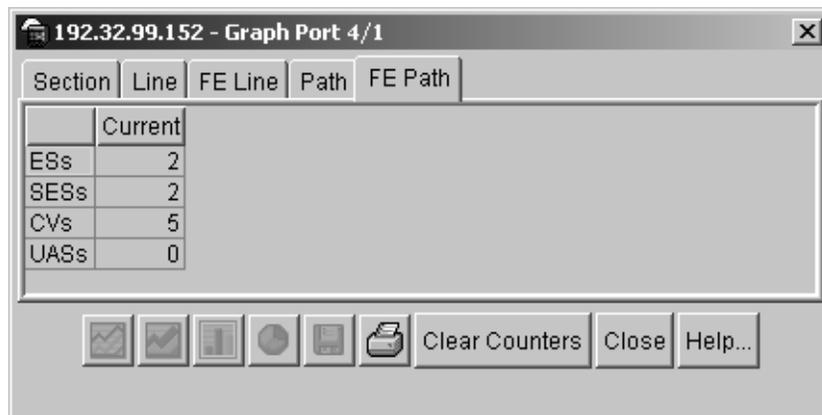


Table 19 describes the fields in the FE Path tab.

Table 19 FE Path tab fields

| Field | Description |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESs | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, or LOP. |
| SESSs | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CVs | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UASs | Number of seconds that the interface is unavailable. |

Viewing 10GE LAN/WAN interface statistics

To view interface statistics:

- 1 On the Device View, select a port ([Figure 5](#)).
- 2 From the Device Manager menu bar, select Graph > Port.

The GraphPort dialog box opens with the 10GE Interface tab displayed ([Figure 15](#)).

Figure 15 GraphPort dialog box—10GE Interface tab

| | AbsoluteValue | Cumulative | Average/sec | Minimum/sec | Maximum/sec | LastVal/sec |
|--------------------|---------------|------------|-------------|-------------|-------------|-------------|
| InOctets | 320 | | | | | |
| OutOctets | 320 | | | | | |
| InUcastPkts | 0 | | | | | |
| OutUcastPkts | 0 | | | | | |
| InMulticastPkts | 5 | | | | | |
| OutMulticastPkts | 5 | | | | | |
| InBroadcastPkts | 0 | | | | | |
| OutBroadcastPkts | 0 | | | | | |
| InDiscards | 0 | | | | | |
| InErrors | 0 | | | | | |
| InUnknownProtos | 0 | | | | | |
| InFlowCtrlPkts | 0 | | | | | |
| OutFlowCtrlPkts | 0 | | | | | |
| NumStateTransition | 0 | | | | | |

Table 20 describes the fields in the 10GE Interface tab.

Table 20 10GE Interface tab fields

| Field | Description |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| InOctets | The total number of octets received on the interface, including framing characters. |
| OutOctets | The total number of octets transmitted out of the interface, including framing characters. |
| InUcastPkts | The number of packets delivered by this sublayer to a higher sublayer that were not addressed to a multicast or broadcast address at this sublayer. |
| OutUcastPkts | The number of packets that higher-level protocols requested be transmitted that were not addressed to a multicast address at this sublayer. This total number includes those packets discarded or not sent. |
| InMulticastPkts | The number of packets delivered by this sublayer to a higher sublayer that were addressed to a multicast address at this sublayer. For a MAC layer protocol, this number includes both Group and Functional addresses. |

Table 20 10GE Interface tab fields (continued)

| Field | Description |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OutMulticastPkts | The total number of packets that higher-level protocols requested be transmitted, and that were addressed to a multicast address at this sublayer, including those that were discarded or not sent. For a MAC layer protocol, this number includes both Group and Functional addresses. |
| InBroadcastPkts | The number of packets delivered by this sublayer to a higher sublayer that were addressed to a broadcast address at this sublayer. |
| OutBroadcastPkts | The total number of packets that higher-level protocols requested be transmitted, and that were addressed to a broadcast address at this sublayer, including those that were discarded or not sent. |
| InDiscards | The number of inbound packets that were discarded because of frames with errors or invalid frames or, in some cases, to fill up buffer space. |
| InErrors | Number of inbound packets that contained errors preventing them from being deliverable to a higher-layer protocol. |
| InUnknownProtos | Number of packets received via the interface which were discarded because of an unknown or unsupported protocol. |
| InFlowCtrlPkts | The total number of flow control packets received by this interface. |
| OutFlowCtrlPkts | The total number of flow control packets transmitted by this interface. |
| NumStateTransition | The number of times the port went in and out of service; the number of state transitions from up to down. |

Viewing 10GE LAN/WAN Ethernet errors statistics

To view Ethernet errors statistics:

- 1 On the Device View, select a port (Figure 5).
- 2 From the Device Manager menu bar, select Graph > Port.

The GraphPort dialog box opens with the 10GE Interface tab displayed (Figure 15).

- 3 Click the 10GE Ethernet Errors tab.

The 10GE Ethernet Errors tab opens (Figure 16).

Figure 16 GraphPort dialog box—10GE Ethernet Errors tab

| | AbsoluteValue | Cumulative | Average/sec | Minimum/sec | Maximum/sec | LastVal/sec |
|---------------------------|---------------|------------|-------------|-------------|-------------|-------------|
| AlignmentErrors | 0 | | | | | |
| FCSErrors | 0 | | | | | |
| InternalMacTransmitErrors | 0 | | | | | |
| InternalMacReceiveErrors | 0 | | | | | |
| CarrierSenseErrors | 0 | | | | | |
| FrameTooLongs | 0 | | | | | |
| SQETestErrors | 0 | | | | | |
| DeferredTransmissions | 0 | | | | | |
| SingleCollisionFrames | 0 | | | | | |
| MultipleCollisionFrames | 0 | | | | | |
| LateCollisions | 0 | | | | | |
| ExcessiveCollisions | 0 | | | | | |
| FrameTooShorts | 0 | | | | | |
| LinkFailures | 4 | | | | | |
| PacketErrors | 0 | | | | | |
| CarrierErrors | 0 | | | | | |
| LinkInactiveErrors | 0 | | | | | |

Table 21 describes the 10GE Ethernet Errors tab fields.

Table 21 10GE Ethernet Errors tab fields

| Field | Description |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AlignmentErrors | A count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check. The count represented by an instance of this object is incremented when the alignmentError status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions obtain are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC. |
| FCSErrors | A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check. The count represented by an instance of this object is incremented when the frameCheckError status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions obtained are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC. |
| InternalMacTransmitErrors | A count of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of either the dot3StatsLateCollisions object, the dot3StatsExcessiveCollisions object, or the dot3StatsCarrierSenseErrors object. The precise meaning of the count represented by an instance of this object is implementation specific. In particular, an instance of this object may represent a count of transmission errors on a particular interface that are not otherwise counted. |
| InternalMacReceiveErrors | A count of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of either the dot3StatsFrameTooLongs object, the dot3StatsAlignmentErrors object, or the dot3StatsFCSErrors object. The precise meaning of the count represented by an instance of this object is implementation specific. In particular, an instance of this object may represent a count of receive errors on a particular interface that are not otherwise counted. |

Table 21 10GE Ethernet Errors tab fields (continued)

| Field | Description |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CarrierSenseErrors | The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface. The count represented by an instance of this object is incremented at most once per transmission attempt, even if the carrier sense condition fluctuates during a transmission attempt. |
| FrameTooLongs | A count of frames received on a particular interface that exceed the maximum permitted frame size. The count represented by an instance of this object is incremented when the frameTooLong status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions obtained are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC. |
| SQETestErrors | A count of times that the SQE TEST ERROR message is generated by the PLS sublayer for a particular interface. The SQE TEST ERROR message is defined in section 7.2.2.2.4 of ANSI/IEEE 802.3-1985 and its generation described in section 7.2.4.6 of the same document. |
| DeferredTransmissions | A count of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy. The count represented by an instance of this object does not include frames involved in collisions. |
| SingleCollisionFrames | A count of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the ifOutUcastPkts, ifOutMulticastPkts, or ifOutBroadcastPkts, objects and is not counted by the corresponding instance of the dot3StatsMultipleCollisionFrames object. |
| MultipleCollisionFrames | A count of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the ifOutUcastPkts, ifOutMulticastPkts, or ifOutBroadcastPkts, objects and is not counted by the corresponding instance of the dot3StatsSingleCollisionFrames object. |

Table 21 10GE Ethernet Errors tab fields (continued)

| Field | Description |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LateCollisions | The number of times that a collision is detected on a particular interface later than 512 bit-times into the transmission of a packet; 512 corresponds to 51.2 microseconds on a 10 Mb/s system. A (late) collision included in a count represented by an instance of this object is also considered as a (generic) collision for purposes of other collision-related statistics. |
| ExcessiveCollisions | A count of frames for which transmission on a particular interface fails due to excessive collisions. |
| FrameTooShorts | The total number of frames that are too short that were encountered on this interface. |
| LinkFailures | The total number of link failures encountered on this interface. |
| PacketErrors | The total number of packet errors encountered on this interface. |
| CarrierErrors | The total number of carrier errors encountered on this interface. |
| LinkInactiveErrors | The total number of link inactive errors encountered on this interface. |

Viewing 10GE LAN/WAN bridging statistics

To view bridging statistics:

- 1 On the Device View, select a port (Figure 5).
- 2 From the Device Manager menu bar, select Graph > Port.

The GraphPort dialog box opens with the 10GE Interface tab displayed (Figure 15).

- 3 Click the 10GE Bridging tab.

The 10GE Bridging tab opens (Figure 17).

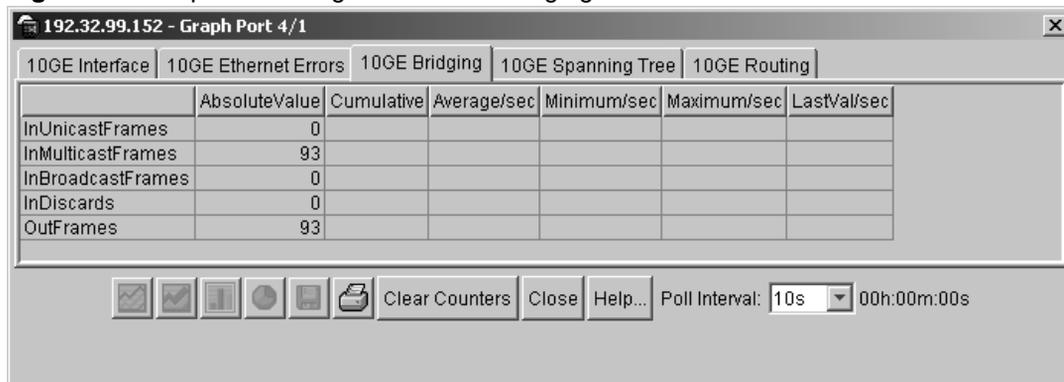
Figure 17 GraphPort dialog box—10GE Bridging tab

Table 22 describes the fields in the 10GE Bridging tab.

Table 22 10GE Bridging tab fields

| Field | Description |
|-------------------|--------------------------------------------------------------|
| InUnicastFrames | The total number of incoming unicast frames bridged. |
| InMulticastFrames | The total number of incoming multicast frames bridged. |
| InBroadcastFrames | The total number of incoming broadcast frames bridged. |
| InDiscards | The total number of frames discarded by the bridging entity. |
| OutFrames | The total number of outgoing frames bridged. |

Viewing 10GE LAN/WAN Spanning Tree statistics

To view Spanning Tree statistics:

- 1 On the Device View, select a port (Figure 5).
- 2 From the Device Manager menu bar, select Graph > Port.

The GraphPort dialog box opens with the 10GE Interface tab displayed (Figure 15).

3 Click the 10GE Spanning Tree tab.

The 10GE Spanning Tree tab opens (Figure 18).

Figure 18 GraphPort dialog box—10GE Spanning Tree tab

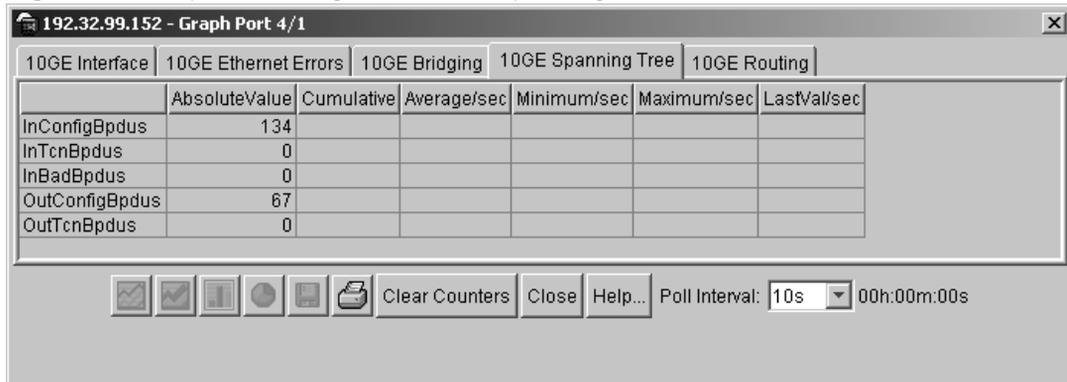


Table 23 describes the 10GE Spanning Tree tab fields.

Table 23 10GE Spanning Tree tab fields

| Field | Description |
|----------------|---------------------------------------------------------------|
| InConfigBpdus | The number of Config BPDUs received. |
| InTcnBpdus | The number of Topology Change Notification BPDUs received. |
| InBadBpdus | The number of unknown or malformed BPDUs received. |
| OutConfigBpdus | The number of Config BPDUs transmitted. |
| OutTcnBpdus | The number of Topology Change Notification BPDUs transmitted. |

Viewing 10GE LAN/WAN routing statistics

To view routing statistics:

- 1 On the Device View, select a port (Figure 5).
- 2 From the Device Manager menu bar, select Graph > Port.

The GraphPort dialog box opens with the 10GE Interface tab displayed (Figure 15).

- 3 Click the 10GE Routing tab.

The 10GE Routing tab opens (Figure 19).

Figure 19 GraphPort dialog box—10GE Routing tab

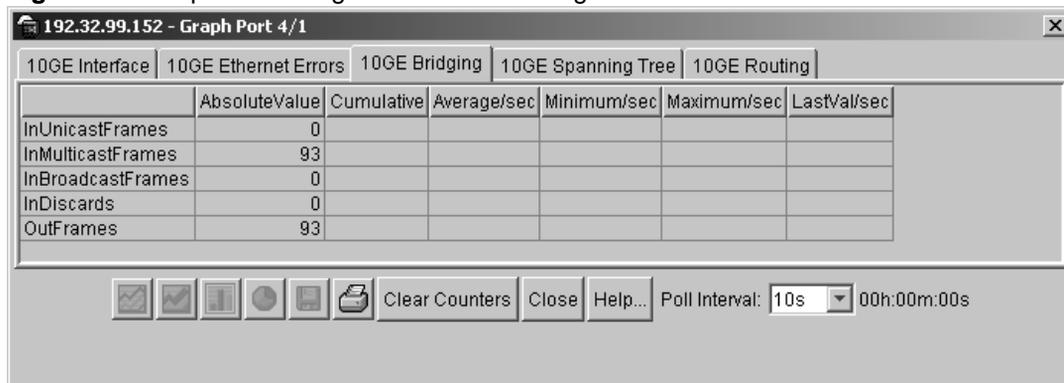


Table 24 describes the fields in the 10GE Routing tab.

Table 24 10GE Routing tab fields

| Field | Description |
|--------------------|-------------------------------------------------------------|
| InUnicastFrames | The total number of incoming unicast frames routed. |
| InMulticastFrames | The total number of incoming multicast frames routed. |
| InDiscards | The total number of frames discarded by the routing entity. |
| OutUnicastFrames | The total number of outgoing unicast frames routed. |
| OutMulticastFrames | The total number of outgoing multicast frames routed. |

Chapter 4

Configuring and monitoring the 10GE LAN/WAN modules using the CLI

Two management tools enable you to configure your 10GE LAN/WAN modules: Device Manager and the command line interface (CLI). This chapter describes only those CLI commands specific to the 10GE LAN/WAN module. For information on other configuration options, refer to your release notes for a list of related publications for your software release.

This chapter describes how to configure the 10GE LAN/WAN module using the CLI, and includes the following topics:

| Topic | Page |
|------------------------------------------------------------------|------|
| Roadmap of 10GE commands | 68 |
| Configuring the 10GE LAN/WAN module with the CLI | 69 |
| Viewing 10GE WAN port statistics with the CLI | 72 |

Roadmap of 10GE commands

The following roadmap lists some of the 10GE commands. Use this list as a quick reference or click on any command entry for more information.

Command

```
config ethernet <port>
clock-source [<internal|line>]

config ethernet <slot/port>
[<enable | disable>]

config ethernet <port> framing
[<sonet|sdh>]

config ethernet <port/slot>
tx-flow-control [enable|disable]

config ethernet <port/slot>
fc-pause0 [enable|disable]

config ethernet <port/slot>
fc-pause-time <1...65535>

test loopback <ports> [<int |
ext>]

show ports stats wis activealarms
[<ports>]

show ports stats wis
sectioncurrent [<ports>]

show ports stats wis
sectioninterval <intervalid>
[<ports>]

show ports stats wis linecurrent
[<ports>]

show ports stats wis lineinterval
<intervalid> [<ports>]

show ports stats wis felinecurrent
[<ports>]

show ports stats wis
felineinterval <intervalid>
[<ports>]
```

Command

```
show ports stats wis pathcurrent  
[<ports>]  
  
show ports stats wis pathinterval  
<intervalid> [<ports>]  
  
show ports stats wis fepathcurrent  
[<ports>]  
  
show ports stats wis  
fepathinterval <intervalid>  
[<ports>]  
  
show ports stats wis sonetmedium  
[<port>]
```

Configuring the 10GE LAN/WAN module with the CLI

This section describes the specific commands used to configure the 10GE LAN/WAN modules using the command line interface, and includes the following topics:

- [“Configuring the clock source,”](#) next
- [“Configuring the port’s administrative status”](#) on page 70
- [“Configuring the WAN framing type”](#) on page 70
- [“Configuring flow control”](#) on page 70
- [“Performing a 10GE LAN/WAN loopback test”](#) on page 72
- [“Displaying active alarms”](#) on page 72

Configuring the clock source

To configure the clock source of your 10GE WAN module, use the CLI command:

```
config ethernet <port> clock-source [<internal|line>]
```

where:

- *internal* mode uses the onboard oscillator to generate the Tx clock
- *line* mode uses the recovered Rx clock to generate the Tx clock

The default value is *internal*.

Configuring the port's administrative status

To enable or disable port settings on the 10GE LAN/WAN module, use the CLI command:

```
config ethernet <slot/port> [<enable | disable>]
```

Configuring the WAN framing type

To configure the WAN framing type, use the CLI command:

```
config ethernet <port> framing [<sonet|sdh>]
```

where:

- *sonet* is Synchronous Optical Network; standard format in North America
- *sdh* is Synchronous Digital Hierarchy; standard format in Europe

The default value is *sonet*.

Configuring flow control

This section describes how to enable or disable flow control, how to enable or disable flow-control pause0, and how to set flow-control pause0 time.

Enabling or disabling flow control

When `tx-flow-control` is enabled, the TX port will transmit MAC control pause frames to indicate congestion on the receive side of the port interface. The link partner will cease transmission based on the MAC control frame pause-timer value.

To enable or disable flow control for the 10GE LAN/WAN module, use the CLI command:

```
config ethernet <port/slot> tx-flow-control [enable|disable]
```

The default value is `disable`.

Enabling or disabling flow-control-pause0

When `tx-flow-control` is enabled and `fc-pause0` is enabled, the TX port will transmit MAC control pause frames with a timer value of 0 to indicate to its link partner to resume transmission.

To enable or disable flow control pause0 for the 10GE LAN/WAN module, use the CLI command:

```
config ethernet <port/slot> fc-pause0 [enable|disable]
```

The default value is `enable`.

Setting the flow control pause timer

Setting the flow-control-pause time sets the timer value in the MAC control pause frame to indicate to the link partner how long to pause transmission. The pause time is in 512 bit-times.



Note: Do not set the `fc-pause-time` to a low value, such as 1 or 2. These lower values will not have a useful effect on network congestion.

To set the flow-control-pause0 time, use the CLI command:

```
config ethernet <port/slot> fc-pause-time <1...65535>
```

The default value is 65535.

Performing a 10GE LAN/WAN loopback test

This section describes the loopback test CLI command available for the 10GIGE LAN/WAN module.

You can perform two types of loopback test, internal and external. The internal loopback test is the default.



Note: All ports must be in test mode to conduct any testing.

To test for loopback, use the CLI command:

```
test loopback <ports> [<int | ext>]
```

Viewing 10GE WAN port statistics with the CLI

This section describes the CLI commands available to view 10GE WAN active alarms and port statistics:

Displaying active alarms

To display information about active alarms on specified ports, use the CLI command:

```
show ports stats wis activealarms [<ports>]
```

[Figure 20](#) shows sample output for this command.

Figure 20 show ports stats wis activealarms command output

```
Passport-8610:5# show ports stats wis activealarms
```

```
=====
                                Active Alarms
=====
PORT
NUM      ACTIVE ALARM
-----
4/1      No Defect
7/1      LOS

Passport-8610:5#
```

[Table 25](#) describes the show ports stats wis activealarms [<ports>] parameters.

Table 25 show ports stats wis active alarms field parameters

| Field | Description |
|-----------------------|----------------------------------------------------------------------------------------------------------------------|
| Section alarms | |
| NO DEFECT | No SONET/SDH defects are present. |
| LOS | Loss of signal - not enough Rx power or fiber disconnected. |
| LOF | Loss of frame - unable to frame the signal correctly, possibly due to improper timing setup. |
| Line Alarms | |
| L-AIS | Alarm Indication Signal - sent out when a port is disabled or indicates another line failure. |
| L-RDI | Remote Defect Indication - the result of a L-AIS or LOS/LOF at the remote end. |
| Path Alarms | |
| P-AIS | Path Alarm Indication Signal - indicates a propagation upstream of a downstream L-AIS alarm or another path failure. |
| P-LOP | Path Loss of Pointer - the pointer to the Sonet SPE is not correct; sometimes due to dirty fiber, or timing slips. |
| P-RDI | Path Remote Indicator - the result of a P-AIS alarm at the remote end. |

Table 25 show ports stats wis active alarms field parameters (continued)

| Field | Description |
|--------|---------------------------------------------------------------------------------------------------------------------------------------|
| P-SLM | Path Signal Label Mismatch - path labels do not match, in particular the C2 label is mismatched. (The C2 label for 10GE WAN is 0x1A.) |
| P-UNEQ | Path unequipped - the Sonet path may not be fully provisioned to handle traffic cross-connects. |

Viewing 10GE WAN section statistics

To display current section statistics on specified ports, use the CLI command:

```
show ports stats wis sectioncurrent [<ports>]
```

[Figure 21](#) shows sample output for this command.

Figure 21 show ports stats wis sectioncurrent command output

```

=====
                                WIS Section Current Stats
=====
PORT  ERRORED SECONDS SEVERELY ERRORED CODE VIOLATION SEVERELY ERRORED
NUM  COUNT (ES)      COUNT (SES)      COUNT (CV-S)    FRAMES (SEF)    STATUS
-----
2/1  32                32                1027288         32              LOF

```

[Table 26](#) describes the show ports stats wis sectioncurrent [<ports>] parameters.

Table 26 show ports stats wis sectioncurrent [<ports>] parameters

| Field | Description |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given BIT Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification ¹ . |
| CODE VIOLATION COUNT (CV-S) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| SEVERELY ERRORED FRAMES (SEF) | Severely Errored Framing Second (SEFs) is a second containing one or more SEF events |
| STATUS | Status of defects. |

¹ A BER of 10^{-6} corresponds to the default Section SES threshold of 8554.

Viewing current section statistics at a specified interval

To display current section statistics on specified ports at a specified interval, use the CLI command:

```
show ports stats wis sectioninterval <intervalid> [<ports>]
```

where:

- *intervalid* is the interval identifier (the interval range is 1 to 96 seconds)
- *ports* is an optional parameter that allows you to specify stats for a specific port.

Figure 22 shows sample output for this command.

Figure 22 show ports stats wis sectioninterval <intervalid> command output

```
=====
                                WIS Section Interval Stats
=====
PORT      ERRORED SECONDS  SEVERELY ERRORED  CODE VIOLATION  SEVERELY ERRORED
NUM      COUNT (ES)      COUNT (SES)       COUNT (CV-S)    FRAMES (SEF)
-----
2/1      900              900               28883030        900
INTERVAL ID = 1
```

[Table 27](#) describes the `show ports stats wis sectioninterval <intervalid> [<ports>]` parameters.

Table 27 `show ports stats wis sectioninterval <intervalid> [<ports>]` parameters

| Field | Description |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of IEEE 802.3ae ¹ . |
| CODE VIOLATION COUNT (CV) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| INTERVAL ID | Each interval (1..96) represents a 15-minute time period (sometimes called a bin). 96 bins represents 24 hours. |

¹ A BER of 10^{-6} corresponds to the default Line SES threshold of 9835.

Viewing 10GE WAN current line statistics

To display current line statistics on specified ports, use the CLI command:

```
show ports stats wis linecurrent [<ports>]
```

[Figure 23](#) shows sample output for this command.

Figure 23 show ports stats wis linecurrent command output

```

=====
                                WIS Line Current Stats
=====
PORT  ERRORED SECONDS  SEVERELY ERRORED  CODE VIOLATION  UNAVAILABLE
NUM   COUNT (ES)      COUNT (SES)       COUNT (CV-L)    SECONDS (UAS)  STATUS
-----
2/1   0                0                 0               115            NoDefect
=====

```

[Table 28](#) describes the show ports stats wis linecurrent [<ports>] parameters.

Table 28 show ports stats wis linecurrent [<ports>] parameters

| Field | Description |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CODE VIOLATION COUNT (CV-L) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| STATUS | Status of defects. |

Viewing 10GE WAN line statistics at a specified interval

To display current line statistics on specified ports at a specified interval, use the CLI command:

```
show ports stats wis lineinterval <intervalid> [<ports>]
```

where:

- *intervalid* is the interval identifier (the interval range is 1 to 96 seconds)
- *ports* is an optional parameter that allows you to specify stats for a specific port.

Figure 24 shows sample output for this command.

Figure 24 show ports stats wis lineinterval <intervalid> command output

```
=====
                                WIS Line Interval Stats
=====
PORT      ERRORED SECONDS   SEVERELY ERRORED   CODE VIOLATION   UNAVAILABLE
NUM      COUNT (ES)       COUNT (SES)        COUNT (CV-L)     SECONDS
                                      (UAS)
-----
2/1      0                 0                   0                 900
INTERVAL ID = 1
```

[Table 29](#) describes the `show ports stats wis lineinterval <intervalid> [<ports>]` parameters.

Table 29 `show ports stats wis lineinterval <intervalid> [<ports>]` parameters

| Field | Description |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CODE VIOLATION COUNT (CV-L) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| INTERVAL ID | Each interval (1..96) represents a 15-minute time period (sometimes called a bin). 96 bins represents 24 hours. |

Viewing 10GE WAN FE line statistics

To display current FE line statistics on specified ports, use the CLI command:

```
show ports stats wis felinecurrent [<ports>]
```

[Figure 25](#) shows sample output for this command.

Figure 25 show ports stats wis felinecurrent command output

```

=====
                                WIS Line Current Stats
=====
PORT  ERRORED SECONDS  SEVERELY ERRORED  CODE VIOLATION  UNAVAILABLE
NUM   COUNT (ES)      COUNT (SES)      COUNT (CV-L)    SECONDS (UAS)  STATUS
-----
2/1   0                0                0                115            NoDefect
=====

```

Table 30 describes the show ports stats wis felinecurrent [<ports>] parameters.

Table 30 show ports stats wis felinecurrent [<ports>] parameters

| Field | Description |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CODE VIOLATION COUNT (CV-L) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| STATUS | Status of defects. |

Viewing 10GE WAN FE line statistics at a specified interval

To display current FE line statistics on specified ports at a specified interval, use the CLI command:

```
show ports stats wis felineinterval <intervalid> [<ports>]
```

where:

- *intervalid* is the interval identifier (the interval range is 1 to 96 seconds)
- *ports* is an optional parameter that allows you to specify stats for a specific port.

Figure 26 shows sample output for this command.

Figure 26 show ports stats wis felineinterval <intervalid> command output

| ===== | | | | |
|---------------------------------|-----------------|------------------|----------------|---------------|
| WIS Far End Line Interval Stats | | | | |
| ===== | | | | |
| PORT | ERRORED SECONDS | SEVERELY ERRORED | CODE VIOLATION | UNAVAILABLE |
| NUM | COUNT (ES) | COUNT (SES) | COUNT (CV-L) | SECONDS (UAS) |
| ----- | | | | |
| 2/1 | 0 | 0 | 0 | 900 |
| INTERVAL ID = 1 | | | | |

Table 31 describes the `show ports stats wis felineinterval <intervalid> [<ports>]` parameters.

Table 31 `show ports stats wis felineinterval <intervalid> [<ports>]` parameters

| Field | Description |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CODE VIOLATION COUNT (CV-L) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| INTERVAL ID | Each interval (1..96) represents a 15-minute time period (sometimes called a bin). 96 bins represents 24 hours. |

Viewing 10GE WAN path statistics

To display current path statistics on specified ports, use the CLI command:

```
show ports stats wis pathcurrent [<ports>]
```

Figure 27 shows sample output for this command.

Figure 27 show ports stats wis pathcurrent command output

```

=====
                                WIS Path Current Stats
=====
PORT  ERRED SECS  SEVERELY ERRED CODE VIOLATION UNAVAILABLE
NUM   COUNT (ES)  COUNT (SES)      COUNT (CV-P)  SECONDS (UAS)  STATUS  WIDTH
-----
2/1   0           0                0             546            PLOP   6

```

[Table 32](#) describes the show ports stats wis pathcurrent [<ports>] parameters.

Table 32 show ports stats wis pathcurrent [<ports>] parameters

| Field | Description |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. ¹ |
| CODE VIOLATION COUNT (CV-P) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| STATUS | Status of defects. |
| WIDTH | Number of defects. |

¹ The default Path SES threshold of 2400 corresponds to a situation where 30% of all of the SPes being received have parity errors detected via the Path BIP checks.

Viewing 10GE WAN path statistics at a specified interval

To display current path statistics on specified ports at a specified interval, use the CLI command:

```
show ports stats wis pathinterval <intervalid> [<ports>]
```

where:

- *intervalid* is the interval identifier (the interval range is 1 to 96 seconds)
- *ports* is an optional parameter that allows you to specify stats for a specific port.

Figure 28 shows sample output for this command.

Figure 28 show ports stats wis pathinterval <intervalid> command output

```
=====
                                WIS Path Interval Stats
=====
PORT      ERRORED SECONDS   SEVERELY ERRORED   CODE VIOLATION     UNAVAILABLE
NUM      COUNT (ES)       COUNT (SES)        COUNT (CV-P)       SECONDS
                                      (UAS)
-----
2/1      0                 0                  0                  900
INTERVAL ID = 1
```

Table 33 describes the `show ports stats wis pathinterval <intervalid> [<ports>]` parameters.

Table 33 `show ports stats wis pathinterval <intervalid> [<ports>]` parameters

| Field | Description |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CODE VIOLATION COUNT (CV-P) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| INTERVAL ID | Each interval (1..96) represents a 15-minute time period (sometimes called a bin). 96 bins represents 24 hours. |

Viewing 10GE WAN FE path statistics

To display current FE path statistics on specified ports, use the CLI command:

```
show ports stats wis fepathcurrent [<ports>]
```

Figure 29 shows sample output for this command.

Figure 29 show ports stats wis fepathcurrent command output

```

=====
                                WIS Far End Path Current Stats
=====
PORT      ERRORED SECONDS SEVERELY ERRORED CODE VIOLATION      UNAVAILABLE
NUM       COUNT (ES)      COUNT (SES)      COUNT (CV-P)      SECONDS (UAS)
-----
2/1      0                0                0                116
=====

```

[Table 34](#) describes the show ports stats wis fepathcurrent [<ports>] parameters.

Table 34 show ports stats wis fepathcurrent [<ports>] parameters

| Field | Description |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CODE VIOLATION COUNT (CV-P) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |

Viewing 10GE WAN FE path statistics at a specified interval

To display current FE path statistics on specified ports at a specified interval, use the CLI command:

```
show ports stats wis fepathinterval <intervalid> [<ports>]
```

where:

- *intervalid* is the interval identifier (the interval range is 1 to 96 seconds)
- *ports* is an optional parameter that allows you to specify stats for a specific port.

Figure 30 shows sample output for this command.

Figure 30 show ports stats wis fepathinterval <intervalid> command output

```

=====
                        WIS FE Path Interval Stats
=====
PORT      ERRORED SECONDS   SEVERELY ERRORED   CODE VIOLATION   UNAVAILABLE
NUM      COUNT (ES)       COUNT (SES)        COUNT (CV-P)     SECONDS
                                      (UAS)
-----
2/1      0                 0                   0                 900
INTERVAL ID = 1

```

Table 35 describes the `show ports stats wis fepathinterval <intervalid> [<ports>]` parameters.

Table 35 `show ports stats wis fepathinterval <intervalid> [<ports>]` parameters

| Field | Description |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| ERRORED SECONDS COUNT (ES) | Errored Second (ES) is a second with one or more Coding Violations or one or more incoming defects, for example, SEF, LOS, AIS, LOP. |
| SEVERELY ERRORED COUNT (SES) | Severely Errored Second (SES) is a second with x or more Coding Violations (CV), or a second with at least one or more incoming defects. The value of x is defined for a given Bit Error Rate (BER) as outlined in Annex 50A of the IEEE 802.3ae specification. |
| CODE VIOLATION COUNT (CV-P) | Coding Violations (CV) are Bit Interleaved Parity (BIP) errors that are detected in the incoming signal. CV counters are incremented for each BIP error detected. |
| UNAVAILABLE SECONDS (UAS) | Number of seconds that the interface is unavailable. |
| INTERVAL ID | Each interval (1..96) represents a 15-minute time period (sometimes called a bin). 96 bins represents 24 hours. |

Viewing 10GE LAN/WAN SONET medium statistics

To display current SONET medium statistics on a specified port, use the CLI command:

```
show ports stats wis sonetmedium [<port>]
```

Figure 31 shows sample output for this command.

Figure 31 show ports stats wis sonetmedium command output

```

Passport-8610:5# show port stats wis sonetmedium

=====
                                WIS SONET Medium Table
=====
PORT      MEDIUM   TIME     VALID   LINE    LINE    CIRCUIT
NUM       TYPE     ELAPSED  INTERVALS CODING   TYPE     ID
-----
4/1       sonet    175      1       NRZ     LongSingle
7/1       sonet    69       1       NRZ     LongSingle

Passport-8610:5#

```

[Table 36](#) describes the show ports stats wis sonetmedium [<port>] parameters.

Table 36 show ports stats wis sonetmedium [<port>] parameters

| Field | Description |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PORT NUM | Slot and port number |
| MEDIUM TYPE | The current framing (SONET or SDH) operating on this interface. |
| TIME ELAPSED | Number of seconds, including partial seconds, that have elapsed since the beginning of the current measurement period. If, for some reason, such as an adjustment in the system's time-of-day clock, the current interval exceeds the maximum value, the agent will return the maximum value. |
| VALID INTERVALS | Number of previous 15-minute intervals for which performance monitoring data was collected. |
| LINE CODING | Line coding for this interface. This is always Non-Return to Zero (NRZ) for 10GE WAN. |
| LINE TYPE | Line type for this interface. Currently, this will be only LongSingle, indicating long-range, single-mode fiber. |
| CIRCUIT ID | Transmission vendor's circuit identifier, for the purpose of facilitating troubleshooting. Note that the circuit identifier, if available, is also represented by ifPhysAddress. |

Appendix A

Technical Specifications

This appendix lists the technical specifications for the 10GE LAN/WAN modules.

8681XLR (10GE LAN) Module

Physical specifications

| | |
|---------|--------------------|
| Height: | 1.5 in. (3.8 cm) |
| Width: | 15.4 in. (39.1 cm) |
| Depth: | 18.5 in. (47.0 cm) |
| Weight: | 8.0 lb (3.6 kg) |

Electrical specifications

| | |
|-----------------|--------------------|
| Input power: | 150 W maximum |
| Thermal rating: | 512 BTU/hr maximum |

MTBF rating 140,000 hr

Data Rate and encoding 64B/66B(IEEE 802.3ae specified)

Compatible with OC-192/STM-64 No

Module Performance (64 byte packets)

| | |
|-------------------------------------|-----------------|
| Aggregate throughput | 8x1,488,100 pps |
| Routing and Switch Forwarding Rates | 8x1,488,100 pps |

Connector type SC Duplex

Port type 10GBASE-LR 1310nm serial PMD

Cable specifications

Type: 9/125 μm single mode fiber optic cable
Distance: 6.2 miles (10 km)

Optical specifications

Wavelength: 1310 nm
Optical budget: 7.4 dB
Transmitter characteristics: Minimum optical power: -5 dBm
Maximum optical power: -1 dBm
Receiver characteristics: Minimum receiver sensitivity: -12.4 dBm
Maximum input power: 1 dBm

LED operation

Rx Amber during link-down
Tx/Rx Green during link-up state and activity

8681XLW (10GE WAN) Module

Physical specifications

| | |
|---------|--------------------|
| Height: | 1.5 in. (3.8 cm) |
| Width: | 15.4 in. (39.1 cm) |
| Depth: | 18.5 in. (47.0 cm) |
| Weight: | 8.0 lb (3.6 kg) |

Electrical specifications

| | |
|-----------------|--------------------|
| Input power: | 150 W maximum |
| Thermal rating: | 512 BTU/hr maximum |

MTBF rating

140,000 hr

Data Rate and encoding

64b/66b (IEEE 802.3ae specified)

Compatible with OC-192/STM-64

Yes

Module Performance (64 byte packets)

| | |
|-------------------------------------|-----------------|
| Aggregate throughput | 8x1,488,100 pps |
| Routing and Switch Forwarding Rates | 8x1,488,100 pps |

Connector type

SC Duplex

Port type

10GBASE-LW 1310nm serial PMD

Cable specifications

| | |
|-----------|---------------------------------------------|
| Type: | 9/125 μ m single mode fiber optic cable |
| Distance: | 6.2 miles (10 km) |

Optical specifications

| | |
|------------------------------|--------------------------------------------------------------------|
| Wavelength: | 1310 nm* |
| Optical budget: | 7.4 dB |
| Transmitter characteristics: | Minimum output power: -5 dBm Maximum output power: -1 dBm |
| Receiver characteristics: | Minimum input sensitivity: -12.4 dBm Maximum input power: 1 dBm |

LED operation

| | |
|-------|-------------------------------------------------|
| Rx | Amber during link-down or Sonet alarm condition |
| Tx/Rx | Green during link-up state and activity |

* Refer to the *Network Design Guidelines* (Passport 8000 Switch Series Release 3.3 Implementation Notes) 313197-B for information on interworking with SONET/SDH 1550nm WAN equipment.

Appendix B

Error messages

This section describes the error messages may be generated with the 10GE LAN/WAN modules.

| Error message | Generated node or leaf | Cause |
|------------------------------------------------------------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cannot set framing on this port | framing | You have attempted to set framing for a non-10Gigabit Ethernet module. (This attribute is valid for 10GE WAN modules only) |
| Cannot modify framing when in LAN mode | framing | You have attempted to set framing on a 10GE module running in LAN mode. |
| Cannot delete internal Mlt Id | delete | You have attempted to delete a 10GE internal MLT using the CLI command <code>config/mlt #/</code> . |
| Feature is not supported | create | You have attempted to create an IPX route for a 10GE module port using the CLI command <code>/config/ethernet <port>/ipx/create</code> . 10GE modules do not support IPX routing. |
| VLAN has a 10GE port member which doesn't support IPX | create | You have attempted to create an IPX route for a VLAN which has a 10GE module port member using the CLI command <code>//config/vlan <id>/ipx/create</code> . 10GE modules do not support IPX routing. |
| clock-source is only available on 10GE WAN port | clock-source | You have attempted to configure the clock-source for a non-10GE WAN module port using the CLI command <code>//config/ethernet <port>/clock-source</code> . |
| Port <port/slot> is not a 10GE port. Flow Control is only available on 10GE ports. | tx-flow-control | You have attempted to configure tx-flow-control for a non-10GE port using the CLI command <code>//config/ethernet <port>/tx-flow-control</code> . |

| Error message | Generated node or leaf | Cause |
|-----------------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Port <port/slot> is not a 10GE port. Flow Control Pause Zero is only available on 10GE ports. | fc-pause0 | You have attempted to configure fc-pause0 for a non-10GE port using the CLI command //config/ethernet <port>/fc-pause0. |
| Port <port/slot> is not a 10GE port. Flow Control is only available on 10GE ports. | fc-pause-time | You have attempted to configure fc-pause-time for a non-10GE port using the CLI command //config/ethernet <port>/fc-pause-time. |

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