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Nortel Networks

OPTera Metro 3500 Multiservice Platform

Performance Monitoring

Standard Release 12.0 Issue 1 November 2003

What's inside...

NORTEL NETWORKS

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Contents

About this document

This document describes

- procedures for facility performance monitoring (PM) counts
- procedures for facility PM thresholds

Supported software

This document supports the software release for Nortel Networks OPTera Metro 3500 Multiservice Platform Release 12.0.

Supported hardware

This document supports the OPTera Metro 3500 shelf and Universal OPTera Metro 3500 shelf.

Hardware naming conventions

The following naming conventions are used throughout this document to identify the OPTera Metro 3500 hardware:

- The extended shelf processor (SPx) is referred to as the shelf processor.
- The extended network processor (NPx) is referred to as the network processor.

Audience

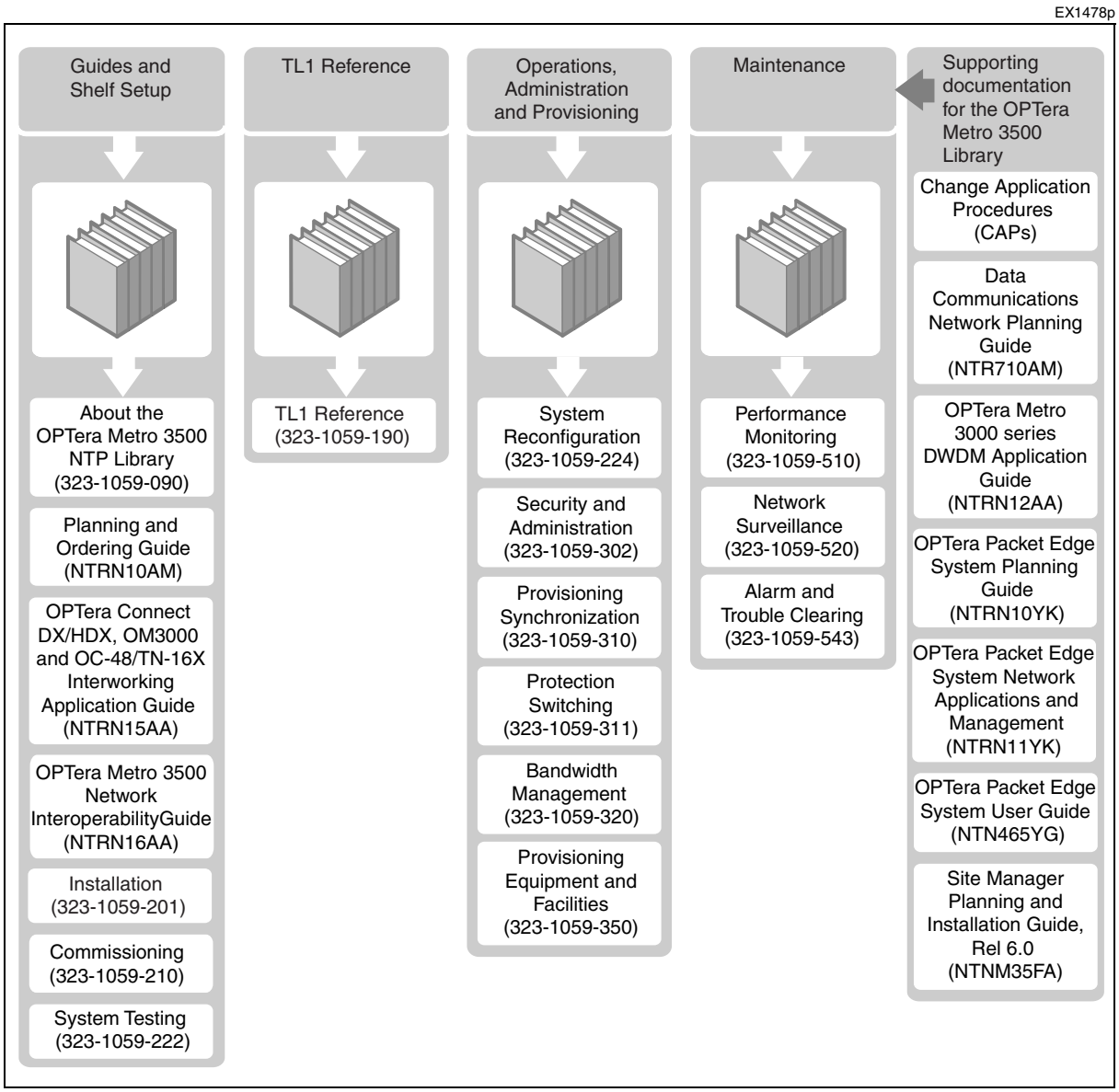
The following members of your company are the intended audience of this Nortel Networks technical publication (NTP):

- planners
- provisioners
- network administrators
- transmission standards engineers

Standards

The Telecommunications Industry Association (TIA) and the Electronics Industries Alliance (EIA) accepted RS-232 as a standard in 1997 and renumbered this standard as TIA/EIA-232. In this document, RS-232 is used to reflect current labels on the hardware and in the software for the OPTera Metro 3500 Multiservice Platform.

OPTera Metro 3500 NTP library



Technical support and information

For technical support and information from Nortel Networks, refer to the following table.

Technical Assistance Service	
For service-affecting problems: For 24-hour emergency recovery or software upgrade support, that is, for: • restoration of service for equipment that has been carrying traffic and is out of service • issues that prevent traffic protection switching • issues that prevent completion of software upgrades	**North America:** 1-800-4NORTEL (1-800-466-7835) **International:** 001-919-992-8300
For non-service-affecting problems: For 24-hour support on issues requiring immediate support or for 14-hour support (8 a.m. to 10 p.m. EST) on non-urgent issues.	**North America:** 1-800-4NORTEL (1-800-466-7835) ***Note:*** You require an express routing code (ERC). To determine the ERC, see our corporate Web site at www.nortelnetworks.com. Click on the Express Routing Codes link. **International:** Varies according to country. For a list of telephone numbers, see our corporate Web site at www.nortelnetworks.com. Click on the Contact Us link.
Global software upgrade support: For non-service affecting software upgrade issues	**North America:** 1-800-4NORTEL (1-800-466-7835) **International:** Varies according to country. For a list of telephone numbers, see our corporate Web site at www.nortelnetworks.com. Click on the Contact Us link.

Performance monitoring

Procedures for facility PM counts

Procedures for facility PM thresholds

Performance monitoring parameters

Procedure 1-1
Retrieving facility PM

Use this procedure to receive performance monitoring data from a network element.

> ***Note:*** If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select the facility you want to monitor.
6	Click Start Monitoring. The interface polls the network element every 15 seconds for the performance monitoring counts.

—end—

Procedure 1-2
Retrieving PM counts for DS1 facilities

Use this procedure to retrieve the performance monitoring counts for DS1 facilities that carry traffic on a network element.

Note: The SESP parameter does not count frame errors for DS-1 facilities on DS-1 circuit packs.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select DS1 from the Type drop-down list.
6	Select the DS1-slot#-port# or the DS1-slot#-port#-t1# from the Facility drop-down list. The slot number is 3 through 10 and the port number is 1 through 12. The t1# only applies to DS3VTx12 circuit packs and is 1 through 28.
7	Select Near end, Far end, or All from the Location drop-down list. ***Note:*** Only Near end is available for DS3VTx12 circuit packs.
8	Select Receive, Transmit, or All from the Direction drop-down list. ***Note:*** Only Receive is available for DS3VTx12 circuit packs.
9	Click Start Monitoring.

—end—

Procedure 1-3
Retrieving PM counts for DS1 service module facilities

Use this procedure to retrieve the performance monitoring counts for DS1, OC-3, and STS-1 facilities that carry traffic on a DS1 service module attached to a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select DS1, OC-3, or STS1 from the Type drop-down list.
6	Select the facility from the Facility drop-down list. • For DS1, — select DS1-1(HLINK info) from the Facility drop-down list. ***Note:*** HLINK info displays the OC-3 facility connected to the DSM. — Select the port from the ports drop-down list • For OC-3, select OC3-1..2-1(HLINK info) from the Facility drop-down list. ***Note:*** HLINK info displays the OC-3 facility connected to the DSM. • for STS-1, — select OC3-1..2-1(HLINK info) from the Facility drop-down list. ***Note:*** HLINK info displays the OC-3 facility connected to the DSM. — Select the STS number from the STS drop-down list.
7	Select Near end, Far end, or All from the Location drop-down list.
8	Select Receive, Transmit, or All from the Direction drop-down list for DS1. ***Note:*** Only Receive is available in the Direction drop-down list for OC-3 and STS-1.
9	Click Start Monitoring.

—end—

Procedure 1-4
Retrieving PM counts for DS3 facilities

Use this procedure to retrieve the performance monitoring counts for DS3 facilities that carry traffic on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select DS3 from the Type drop-down list.
6	Select the DS3-slot#-port# from the Facility drop-down list. ***Note 1:*** For DS3x3, the slot number is 3, 5, 7, or 9 and the port number is 1 through 3. ***Note 2:*** For DS3x12, DS3x12e, and DS3VTx12, the slot number is 3, 5, 7, or 9 and the port number is 1 through 12.
7	Select Near end from the Location drop-down list.
8	Select Transmit, Receive, or All from the Direction drop-down list. ***Note:*** Only Receive is available for DS3VTx12 circuit packs.
9	Click Start Monitoring. ***Note:*** When a DS3x12e circuit pack is protected by DS3x12 circuit pack or reversed, the PM counts for CV-P, ES-P, SES-P and UAS-P change on the receive side when the switching occurs. A working DS3x12e circuit pack shows all performance monitoring and a working DS3x12 circuit pack shows performance monitoring on the transmit side and 0 on the receive side.

—end—

Procedure 1-5
Retrieving PM counts for STS-1

Use this procedure to retrieve the performance monitoring counts for STS-1 facilities that carry traffic on a network element.

Note 1: In BLSR, for RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR)(STS1-STS96 for an OC-192 BLSR) and the protection channel (STS25-STS48 for an OC-48 BLSR)(STS97-STS192 for an OC-192 BLSR).

Note 2: In BLSR, for non RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR or STS1-STS96 for an OC-192 BLSR), but for the protection channel (STS25-STS48 for an OC-48 BLSR or STS97-STS192 for an OC-192 BLSR) you can retrieve PM counts only under the following conditions:

- The equivalent working mate circuit pack is provisioned and the traffic is switched to the protection channel.

  Note: The PM counts are displayed only for switched nodes, not for pass-through nodes.

- The equivalent working mate circuit pack is provisioned and the traffic is on the working channel. The PM counts will show question marks.

Note 3: If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select STS1 from the Type drop-down list.

—continued—

Procedure 1-5 (continued)
Retrieving PM counts for STS-1

Step	Action
6	Select the facility from the Facility drop-down list: • for EC 1x3, select EC1-slot#-port# (the slot number is 3, 5, 7, or 9 and the port number is 1 through 3) • for EC 1x12, select EC1-slot#-port# (the slot number is 3, 5, 7, or 9 and the port number is 1 through 12) • for OC-3, select OC3-slot# (the slot number is 3 through 10) • for OC-3x4, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-12, select OC12-slot# (the slot number is 3 through 12) • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-48, select OC48-slot# (the slot number is 11 or 12) • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12) • for OC-192, select OC-192-slot# (the slot number is 11 or 12)
7	Select the STS number from the STS drop-down list. • for OC-3 and OC-3x4, the STS number is 1 through 3 • for OC-12 and OC-12x4 STS, the STS number is 1 through 12 • for OC-48 and OC-48 STS, the STS number is 1 through 48 • for OC-192, the STS number is 1 though 192
8	Click Near end, Far end, or All from the Location drop-down list.
9	Click Receive from the Direction drop-down list.
10	Click Start Monitoring.

—end—

Procedure 1-6
Retrieving PM counts for STS-3c

Use this procedure to retrieve the performance monitoring counts for STS-3c facilities that carry traffic on a network element.

Note 1: In BLSR, for RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR)(STS1-STS96 for an OC-192 BLSR) and the protection channel (STS25-STS48 for an OC-48 BLSR)(STS97-STS192 for an OC-192 BLSR).

Note 2: In BLSR, for non RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR or STS1-STS96 for an OC-192 BLSR), but for the protection channel (STS25-STS48 for an OC-48 BLSR or STS97-STS192 for an OC-192 BLSR) you can only retrieve PM counts under the following conditions:

- The equivalent working mate circuit pack is provisioned and the traffic is switched to the protection channel.

  Note: The PM counts are displayed only for switched nodes, not for pass-through nodes.

- The equivalent working mate circuit pack is provisioned and the traffic is on the working channel. The PM counts will show question marks.

Note 3: If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select STS3c from the Type drop-down list.

—continued—

Procedure 1-6 (continued)
Retrieving PM counts for STS-3c

Step	Action
6	Select the facility from the Facility drop-down list: • for OC-3, select OC3-slot# (the slot number is 3 through 10) • for OC-3x4, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-12, select OC12-slot# (the slot number is 3 through 12) • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-48, select OC48-slot# (the slot number is 11 or 12) • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12) • for OC-192, select OC-192-slot# (the slot number is 11 or 12)
7	Select the STS number from the STS drop-down list. • for OC-3 and OC-3x4, the STS number is 1 • for OC-12 and OC-12x4 STS, the STS number is 1, 4, 7, or 10 • for OC-48 and OC-48 STS, the STS number is 1, 4, 7,10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, or 46 • for OC-192, the STS number is 1, 4, 7,10, 13, 16, 19 ... 172, 175, 178, 181, 184, 187, 190
8	Click Near end, Far end, or All from the Location drop-down list.
9	Click Receive from the Direction drop-down list.
10	Click Start Monitoring.

—end—

Procedure 1-7
Retrieving PM counts for STS-12c

Use this procedure to retrieve the performance monitoring counts for STS-12c facilities that carry traffic on a network element.

Note 1: In BLSR, for RPR traffic, you can retrieve PM counts for the working channel (STS1-STS96 for an OC-192 BLSR) and the protection channel (STS97-STS192 for an OC-192 BLSR).

Note 2: In BLSR, for non RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR or STS1-STS96 for an OC-192 BLSR), but for the protection channel (STS97-STS192 for an OC-192 BLSR) you can retrieve PM counts only under the following conditions:

- The equivalent working mate circuit pack is provisioned and the traffic is switched to the protection channel.

  Note: The PM counts are displayed only for switched nodes, not for pass-through nodes.

- The equivalent working mate circuit pack is provisioned and the traffic is on the working channel. The PM counts will show question marks.

Note 3: If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Note 4: The following four OC-12 circuit packs do not support the STS-12c signal rate: OC-12 IR (NTN404BA), IC (NTN404DA), LR (NTN404AA), and ER (NTN404CA).

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

—continued—

Procedure 1-7 (continued)
Retrieving PM counts for STS-12c

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the Navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select STS12c from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-12, select OC12-slot# (the slot number is 3 through 12). • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-48, select OC48-slot# (the slot number is 11 and 12). • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12)
7	Select the STS number from the STS drop-down list: • for OC-12 and OC-12x4 STS, the STS number is 1 • for OC-48 and OC48 STS, the STS number is 1, 13, 25, or 37 • for OC-192, the STS number is 1, 13,..., 169, 181.
8	Click Near end, Far end, or All from the Location drop-down list.
9	Click Receive from the Direction drop-down list.
10	Click Start Monitoring.

—end—

Procedure 1-8
Retrieving PM counts for STS-24c

Use this procedure to retrieve the performance monitoring counts for STS-24c facilities that carry traffic on a network element.

Note 1: In BLSR, for RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR)(STS1-STS96 for an OC-192 BLSR) and the protection channel (STS25-STS48 for an OC-48 BLSR)(STS97-STS192 for an OC-192 BLSR).

Note 2: In BLSR, for non RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR or STS1-STS96 for an OC-192 BLSR), but for the protection channel (STS25-STS48 for an OC-48 BLSR or STS97-STS192 for an OC-192 BLSR) you can retrieve PM counts only under the following conditions:

- The equivalent working mate circuit pack is provisioned and the traffic is switched to the protection channel.

  Note: The PM counts are displayed only for switched nodes, not for pass-through nodes.

- The equivalent working mate circuit pack is provisioned and the traffic is on the working channel. The PM counts will show question marks.

Note 3: If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility or OC-192 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

—continued—

Procedure 1-8 (continued)
Retrieving PM counts for STS-24c

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the Navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select STS-24c from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12)
7	Select the STS number from the STS drop-down list: • for OC48 STS, the STS number is 1, 25 • for OC-192, the STS number is 1, 25, 49, 73, 97,121,145.
8	Click Near end, Far end, or All from the Location drop-down list.
9	Click Receive from the Direction drop-down list.
10	Click Start Monitoring.

—end—

Procedure 1-9
Retrieving PM counts for STS-48c

Use this procedure to retrieve the performance monitoring counts for STS-48c facilities that carry traffic on a network element.

Note 1: In BLSR, for RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR)(STS1-STS96 for an OC-192 BLSR) and the protection channel (STS25-STS48 for an OC-48 BLSR)(STS97-STS192 for an OC-192 BLSR).

Note 2: In BLSR, for non RPR traffic, you can retrieve PM counts for the working channel (STS1-STS24 for an OC-48 BLSR or STS1-STS96 for an OC-192 BLSR), but for the protection channel (STS25-STS48 for an OC-48 BLSR or STS97-STS192 for an OC-192 BLSR) you can retrieve PM counts only under the following conditions:

- The equivalent working mate circuit pack is provisioned and the traffic is switched to the protection channel.

  Note: The PM counts are displayed only for switched nodes, not for pass-through nodes.

- The equivalent working mate circuit pack is provisioned and the traffic is on the working channel. The PM counts will show question marks.

Note 3: If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility OC-192 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

—continued—

Procedure 1-9 (continued)
Retrieving PM counts for STS-48c

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the Navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select STS-48c from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12).
7	Select the STS number from the STS drop-down list: • for OC48 STS, the STS number is 1. • for OC-192, the STS number is 1, 49, 97, 145.
8	Click Near end, Far end, or All from the Location drop-down list.
9	Click Receive from the Direction drop-down list.
10	Click Start Monitoring.

—end—

Procedure 1-10
Retrieving PM counts for OC-3, OC-12, OC-48 and OC-192 facilities

Use this procedure to retrieve the performance monitoring counts for OC-3, OC-12, OC-48 and OC-192 facilities that carry traffic on a network element. You can also use this procedure to retrieve the performance monitoring counts for OC-48 facilities on a Packet Edge circuit pack.

> ***Note:*** If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility at the far-end network element. This alarm is not raised for 2WAY cross-connects.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select OC3, OC12, OC48 or OC192 from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-3, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is always 1) • for OC-3x4, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-12, select OC12-slot# (the slot number is 3 through 12). • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-48, select OC48-slot# (the slot number is 11 and 12). • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12).
7	Select Near end, Far end, or All from the Location drop-down list.
8	Click Receive from the Direction drop-down list.
9	Click Start Monitoring.

—end—

Procedure 1-11
Retrieving PM counts for EC-1 facilities

Use this procedure to retrieve the performance monitoring counts for EC-1 facilities that carry traffic on a network element.

> ***Note:*** If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select EC1 from the Type drop-down list.
6	Select the facility EC1-slot#-port# from the Facility drop-down list. ***Note 1:*** For EC 1x3, the slot number is 3 through 10 and the port number is 1 through 3. ***Note 2:*** For EC 1x12, the slot number is 3 through 10 and the port number is 1 through 12.
7	Select Near end, Far end, or All from the Location drop-down list.
8	Click Receive from the Direction drop-down list.
9	Click Start Monitoring.

—end—

Procedure 1-12
Retrieving PM counts for ETH or FC and WAN facilities on a 2xGigE/FC-P2P circuit pack

Use this procedure to retrieve performance monitoring counts for ETH or FC and WAN facilities on a 2xGigE/FC-P2P circuit pack.

Note 1: PM counts are not available for ETH or WAN facilities on the 2x100BT-P2P circuit pack.

Note 2: LAN PMs ES, SES, and UAS on the 2xGigE/FC-P2P do not count properly if defects are also present on the WAN port.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select ETH, FC, or WAN from the Type drop-down list.
6	Select the facility from the Facility drop-down list. • for an Ethernet facility, select ETH-slot#-port# • for a Fibre Channel facility, select FC-slot#-port# • for a WAN facility, select WAN-slot#-port# The slot number is 3 through 10 and the port number is 1 or 2.
7	Select Near end from the Location drop-down list.
8	Click Receive from the Direction drop-down list.
9	Click Start Monitoring.

—end—

Procedure 1-13
Retrieving operational measurements

Use this procedure to retrieve one of the following:

- Ethernet operational measurements for an Ethernet facility on a 2x100BT-P2P or 2xGigE/FC-P2P circuit pack
- Interface operational measurements for an Ethernet or WAN facility on a 2x100BT-P2P or 2xGigE/FC-P2P circuit pack
- Interface operational measurements for a Fiber Channel facility on a 2xGigE/FC-P2P circuit pack

Note 1: WAN operational measurements can continue to increase even when traffic is not running. For example, when running full-rate Fibre Channel traffic, the idle packet counts and 8B10B are included in the counters.

Note 2: Packets with CRC (cyclic redundancy check) errors that have a packet size of less than 64 bytes, are counted as fragments and therefore not counted in the FCS Errors.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Counts from the Performance drop-down menu.
5	Select the facility for which the PM is monitored.
6	Select Operational Measurements from the Performance drop-down menu.
7	Specify whether to retrieve Ethernet or interface operational measurements by selecting the appropriate option from the Type drop-down menu.

—continued—

Procedure 1-13 (continued)
Retrieving operational measurements

Step	Action
8	For Ethernet operational measurements, select the Ethernet facility from the Facility drop-down menu. For interface operational measurements, select the Ethernet, Fibre Channel, or WAN facility from the Facility drop-down menu. • for an Ethernet facility, select ETH-slot#-port# • for a WAN facility, select WAN-slot#-port# • for a Fibre Channel facility (supported on 2xGigE/FC-P2P only), select FC-slot#-port# The slot number is 3 through 10 and the port number is 1 or 2. The Ethernet or interface measurements for the selected facility are displayed. For a description of these measurements, see Ethernet operational measurements on page 1-63 or Interface operational measurements on page 1-65. ***Note:*** To clear operational measurements, click the Clear Counts button to open the Clear OM Counts dialog box. Select the facility measurements to clear from the Facility drop-down menu, then click OK. **—end—**

Procedure 1-14
Polling operational measurements

Use this procedure to poll one of the following:

- Ethernet operational measurements for an Ethernet facility on a 2x100BT-P2P or 2xGigE/FC-P2P circuit pack
- Interface operational measurements for an Ethernet or WAN facility on a 2x100BT-P2P or 2xGigE/FC-P2P circuit pack
- Interface operational measurements for a Fibre Channel facility on a 2xGigE/FC-P2P circuit pack

Note 1: WAN operational measurements can continue to increase even when traffic is not running. For example, when running full-rate fibre channel traffic, the idle packet counts and 8B10B are included in the counters.

Note 2: Packets with CRC (cyclic redundancy check) errors that have a packet size of less than 64 bytes, are counted as fragments and therefore not counted in the FCS Errors.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Operational Measurements from the Performance drop-down menu.
5	Specify whether to poll Ethernet or interface operational measurements by selecting the appropriate option from the Type drop-down menu.

—continued—

Procedure 1-14 (continued)
Polling operational measurements

Step	Action
6	For Ethernet operational measurements, select the Ethernet facility from the Facility drop-down menu. For interface operational measurements, select the Ethernet, Fibre Channel, or WAN facility from the Facility drop-down menu. • for an Ethernet facility, select ETH-slot#-port# • for a WAN facility, select WAN-slot#-port# • for a Fibre Channel facility (supported on 2xGigE/FC-P2P only), select FC-slot#-port# The slot number is 3 through 10 and the port number is 1 or 2. ***Note:*** The primary state of the port you want to poll must be in-service (IS).
7	Click Start Monitoring to begin polling. The operational measurements for the selected port are automatically updated every 15 seconds. For a description of these measurements, see Ethernet operational measurements on page 1-63 or Interface operational measurements on page 1-65. After you click Start Monitoring, the button changes to Stop Monitoring. Click the Stop Monitoring button to stop polling. **—end—**

Procedure 1-15
Stopping the facility PM retrieve

Use this procedure to stop receiving performance monitoring data from a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Ensure the table retrieves the current performance monitoring data and the Stop Monitoring button is visible.
4	Click Stop Monitoring. ***Note:*** The interface stops polling the network element for the performance monitoring counts and saves the current performance monitoring settings.

—end—

Procedure 1-16
Clearing facility PM counts

Use this procedure to clear performance monitoring counts for DS1, DS3, EC-1, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, OC-3, OC-12, OC-48, OC-192, Ethernet, Fibre Channel, and WAN facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select Facility PM Counts from the Performance drop-down menu. ***Note:*** If the application is not actively retrieving counts, click the Start Monitoring button. Ensure the interface retrieves the current performance monitoring counts for the facility you want to edit.
4	If the interface is receiving performance monitoring data from the network element, click Stop Monitoring.
5	Select the required parameter(s).
6	Click Clear Counts to open the Clear PM Counts dialog box.
7	Select one of the following from the Restart options: • select the Current counts radio button to clear the current performance monitoring counts • select the History counts radio button to clear the previous performance monitoring counts • select the Both radio button to clear the current and previous counts
8	Select the period.
9	Select a facility to clear counts from the Facility drop-down list.
10	Click OK.
11	Click OK in the confirmation dialog box.
12	Click Start Monitoring.

—end—

Procedure 1-17
Clearing the untimed interval for monitoring the performance of facilities

Use this procedure to restart the untimed interval counter to monitor the performance of DS1, DS3, EC-1, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, OC-3, OC-12, OC-48, OC-192, Ethernet, Fibre Channel, and WAN facilities on a network element facilities that carry traffic on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Ensure the interface retrieves the current performance monitoring counts for the facility you want to edit.
4	If the interface is receiving performance monitoring data from the network element, click Stop Monitoring.
5	Click Restart Untimed to open the Restart Untimed Counter dialog box.
6	Select a facility from the Facility drop-down list.
7	Click OK.
8	Click OK in the confirmation dialog box. ***Note 1:*** All associated active threshold-crossing alarms or alerts clear. ***Note 2:*** Untimed interval counts for the facility clear.
9	Click Start Monitoring.

—end—

Procedure 1-18
Retrieving the PM history counts

Use this procedure to retrieve performance monitoring history counts for DS1, DS3, EC-1, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, OC-3, OC-12, OC-48, OC-192, Ethernet, Fibre Channel, and WAN facilities on a network element facilities on a network element.

> ***Note:*** If you provisioned 1WAY STS-1 cross-connects on a two-node system using DS3x12 circuit packs, the STS Rx RFI alarm is raised and UAS-PFE counts increase on the OC-48 facility at the far-end network element. This alarm is not raised when 2WAY cross-connects are provisioned.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Ensure the interface retrieves the current performance monitoring counts for the facility you want to view.
4	If the interface is receiving performance monitoring data from the network element, click Stop Monitoring.
5	Select the parameter from the Monitor Type column.
6	Click History to open the Performance History dialog box.
7	Click Close to close the Performance History dialog box.

—end—

Procedure 1-19
Printing or saving the PM history counts

Use this procedure to print or save the performance monitoring history counts for DS1, DS3, EC-1, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, OC-3, OC-12, OC-48, OC-192, Ethernet, Fibre Channel, and WAN facilities on a network element facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Retrieve the performance history according to Retrieving the PM history counts on page 1-27.
4	Select the text that you want to print from the Performance History table.
5	Press Ctrl+c to copy the text.
6	Paste the text into a text editor.
7	Print or save the text from the text editor.

—end—

Procedure 1-20
Retrieving PM thresholds for DS1 facilities

Use this procedure to retrieve the performance monitoring thresholds for DS1 facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select DS1 from the Type drop-down list.
6	Select the DS1-slot#-port# or the DS1-slot#-port#-t1# from the Facility drop-down list. The slot number is 3 through 10 and the port number is 1 through 12. The t1# only applies to DS3VTx12 circuit packs and is 1 through 28.
7	Select Near end, Far end, or All from the Location drop-down list. ***Note:*** Only Near end is available for DS3VTx12 circuit packs.
8	Select Receive, Transmit, or All from the Direction drop-down list. ***Note:*** Only Receive is available for DS3VTx12 circuit packs.
9	Click Retrieve.

—end—

Procedure 1-21
Retrieving PM thresholds for DS1 service module facilities

Use this procedure to retrieve the performance monitoring thresholds for DS1 facilities on a DS1 service module attached to a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select DS1, OC-3, or STS-1 from the Type drop-down list.
6	Select the facility from the Facility drop-down list. • For DS1, — select DS1-1(HLINK info) from the Facility drop-down list ***Note:*** HLINK info displays the OC3 facility connected to the DSM — Select the port from the ports drop-down list. • for OC-3, select OC3-1..2-1(HLINK info) from the Facility drop-down list. ***Note:*** HLINK info displays the OC3 facility connected to the DSM. • for STS-1, — select OC3-1..2-1(HLINK info) from the Facility drop-down list. ***Note:*** HLINK info displays the OC3 facility connected to the DSM. — Select the STS number from the STS drop-down list.
7	Select Near end, Far end, or All from the Location drop-down list.
8	Select Receive, Transmit, or All from the Direction drop-down list for DS1. ***Note:*** Only Receive is available in the Direction drop-down list for OC-3 and STS-1.
9	Click Retrieve.

—end—

Procedure 1-22
Retrieving PM thresholds for DS3 facilities

Use this procedure to retrieve the performance monitoring thresholds for DS3 facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select DS3 from the Type drop-down list.
6	Select the facility DS3-slot#-port# from the Facility drop-down list. ***Note 1:*** For DS3x3, the slot number is 3 through 10 and the port number is 1 through 3. ***Note 2:*** For DS3x12, DS3x12e, and DS3VTx12, the slot number is 3 through 10 and the port number is 1 through 12.
7	Select Near end from the Location drop-down list.
8	Select Transmit, Receive, or All from the Direction drop-down list. ***Note:*** Only Receive is available for DS3VTx12 circuit packs.
9	Click Retrieve.

—end—

Procedure 1-23
Retrieving PM thresholds for STS-1

Use this procedure to retrieve the performance monitoring thresholds for STS-1 facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select STS-1 from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-3, select OC3-slot# (the slot number is 3 through 10). • for OC-3x4, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4). • for OC-12, select OC12-slot# (the slot number is 3 through 12). • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-48, select OC48-slot# (the slot number is 11 and 12). • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12).
7	Select the STS number from the STS drop-down list. • for OC-3 and OC-3x4, the STS number is 1 through 3. • for OC-12 and OC-12x4 STS, the STS number is 1 through 12. • for OC-48 or OC-48 STS, the STS number is 1 through 48. • for OC-192, the STS number is 1 through 192.
8	Select Near end, Far end, or All from the Location drop-down list.
9	Select Receive from the Direction drop-down list.
10	Click Retrieve.

—end—

Procedure 1-24
Retrieving PM thresholds for STS-3c

Use this procedure to retrieve the performance monitoring thresholds for STS-3c facilities on a network element. This procedure is also used to retrieve the performance monitoring thresholds for STS-3c facilities on a Packet Edge circuit pack.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select STS-3c from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-3, select OC3-slot# (the slot number is 3 through 10). • for OC-3x4, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4). • for OC-12, select OC12-slot# (the slot number is 3 through 12). • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4) • for OC-48, select OC48-slot# (the slot number is 11 and 12). • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot#(the slot number is 11 and 12).
7	Select the STS number from the STS drop-down list. • for OC-3 and OC-3x4, the STS number is 1. • for OC-12 and OC-12x4 STS, the STS number is 1, 4, 7, or 10. • for OC-48 or OC-48 STS, the STS number is 1, 4, 7,10, ..., 43, or 46. • for OC-192, the STS number is 1, 4, 7, 10, ..., 187, or 190.
8	Select Near end, Far end, or All from the Location drop-down list.
9	Select Receive from the Direction drop-down list.
10	Click Retrieve.

—end—

Procedure 1-25
Retrieving PM thresholds for STS-12c

Use this procedure to retrieve the performance monitoring thresholds for STS-12c facilities on a network element.

> ***Note:*** The following four OC-12 circuit packs do not support the STS-12c signal rate: OC-12 IR (NTN404BA), IC (NTN404DA), LR (NTN404AA), and ER (NTN404CA).

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select STS-12c from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-12, select OC12-slot# (the slot number is 3 through 12). • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4). • for OC-48, select OC48-slot# (the slot number is 11 and 12). • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot # (the slot number is 11 or 12).
7	Select the STS number from the STS drop-down list: • for OC-12 and OC-12x4 STS, the STS number is 1. • for OC-48 or OC-48 STS, the STS number is 1, 13, 25, or 37. • for OC-192, the STS number is 1, 13, ..., 169, 181.
8	Select Near end, Far end, or All from the Location drop-down list.
9	Select Receive from the Direction drop-down list.
10	Click Retrieve.

—end—

Procedure 1-26
Retrieving PM thresholds for STS-24c

Use this procedure to retrieve the performance monitoring thresholds for STS-24c facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select STS-24c from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12). ***Note:*** Slots 3 through 10 are valid for OC-12x4 circuit packs.
7	Select the STS number from the STS drop-down list: • for OC-48 STS, the STS number is 1or 25. • for OC-192, the STS number is 1, 25, 49, 73, 97, 121, or 145.
8	Select Near end, Far end, or All from the Location drop-down list.
9	Select Receive from the Direction drop-down list.
10	Click Retrieve.

—end—

Procedure 1-27
Retrieving PM thresholds for STS-48c

Use this procedure to retrieve the performance monitoring thresholds for STS-48c facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select STS-48c from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12).
7	Select the STS number from the STS drop-down list: • for OC-48 STS, the STS number is 1. • for OC-192, the STS number is 1, 49, 97 or 145.
8	Select Near end, Far end, or All from the Location drop-down list.
9	Select Receive from the Direction drop-down list.
10	Click Retrieve.

—end—

Procedure 1-28
Retrieving PM thresholds for OC-3, OC-12, OC-48 and OC-192 facilities

Use this procedure to retrieve the performance monitoring thresholds for OC-3, OC-12, OC-48 and OC-192 facilities on a network element. This procedure is also used to retrieve the performance monitoring thresholds for OC-48 facilities on an Packet Edge circuit pack.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select OC-3, OC-12, OC-48 or OC-192 from the Type drop-down list.
6	Select the facility from the Facility drop-down list: • for OC-3, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is always 1). • for OC-3x4, select OC3-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4). • for OC-12, select OC12-slot# (the slot number is 3 through 12 and the port number is 1). • for OC-12x4 STS, select OC12-slot#-port# (the slot number is 3 through 10 and the port number is 1 through 4). • for OC-48, select OC48-slot# (the slot number is 11 and 12). • for OC-48 STS, select OC48-slot# (the slot number is 3 through 12). • for OC-192, select OC192-slot# (the slot number is 11 and 12).
7	Select Near end, Far end, or All from the Location drop-down list.
8	Select Receive from the Direction drop-down list.
9	Click Retrieve.

—end—

Procedure 1-29
Retrieving PM thresholds for EC-1 facilities

Use this procedure to retrieve the performance monitoring thresholds for EC-1 facilities that carry traffic on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select EC1 from the Type drop-down list.
6	Select the facility EC1-slot#-port# from the Facility drop-down list. ***Note 1:*** For EC-1x3, the slot number is 3 through 10 and the port number is 1 through 3. ***Note 2:*** For EC-1x12, the slot number is 3 through 10 and the port number is 1 through 12.
7	Select Near end, Far end, or All from the Location drop-down list.
8	Click Receive from the Direction drop-down list.
9	Click Retrieve.

—end—

Procedure 1-30
Retrieving PM thresholds for ETH or FC and WAN facilities on a 2xGigE/FC-P2P circuit pack

Use this procedure to retrieve performance monitoring thresholds for ETH or FC and WAN facilities on a 2xGigE/FC-P2P circuit pack.

Note: PM counts and PM thresholds are not available for ETH and WAN facilities on the 2x100BT-P2P circuit pack.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Select Facility PM Thresholds from the Performance drop-down menu.
5	Select ETH, FC, or WAN from the Type drop-down list.
6	Select the facility from the Facility drop-down list. • for an Ethernet facility, select ETH-slot#-port#. • for a Fibre Channel facility, select FC-slot#-port#. • for a WAN facility, select WAN-slot#-port#. The slot number is 3 through 10 and the port number is 1 or 2.
7	Select Near end from the Location drop-down list.
8	Click Receive from the Direction drop-down list.
9	Click Retrieve.

—end—

Procedure 1-31
Editing PM thresholds for facilities

Use this procedure to edit performance monitoring thresholds for DS1, DS3, EC-1, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, OC-3, OC-12, OC-48, OC-192, Ethernet, Fibre Channel, and WAN facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Ensure the interface retrieves the performance monitoring thresholds for the facility you want to edit. See Procedures for facility PM thresholds on page 1-2.
4	Select the threshold from the Facility PM Thresholds table.
5	Click Edit to open the Edit Threshold Values dialog box. ***Note:*** You can also right-click on the threshold to open the Edit Threshold Values dialog box.
6	Select the monitor type from the Monitor Type drop-down list.
7	Select a facility from the Apply to drop-down list.
8	Select the location from the Location drop-down list.
9	Select the direction from the Direction drop-down list.
10	Select 15-Min, 1-Day, Untimed, or All from the Period drop-down list.
11	Select one of the following: • the Default radio button to set the threshold value to the system default and go to step 13. • the Value radio button to enter another threshold default value and go to step 12.
12	Enter a threshold in the Value field.

—continued—

Procedure 1-31 (continued)
Editing PM thresholds for facilities

Step	Action
13	If you are editing the threshold value for the optical power receive (OPR) physical PM, you have the option to reset the baseline power level by selecting this radio button. ***Note:*** If the baseline power level is reset, the baseline takes the value of the current OPR untimed value.
14	Click OK. ***Note:*** Check the number of alerts at which performance monitoring reports are capped (a default value of 100 for each reporting interval). **—end—**

Procedure 1-32
Editing default PM thresholds for facilities

Use this procedure to edit default performance monitoring thresholds for DS1, DS3, EC-1, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, OC-3, OC-12, OC-48, OC-192, Ethernet, Fibre Channel, and WAN facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Ensure the interface retrieves the performance monitoring thresholds for the facility you want to edit. See Procedures for facility PM thresholds on page 1-2.
4	Select the threshold from the Facility PM Thresholds table. See Facility PM thresholds table on page 1-45.
5	Click Edit Default to open the Edit Default Threshold Values dialog box. ***Note:*** You can also right-click on the threshold to open the Edit Default Threshold Values dialog box.
6	Select 15-Min, 1-Day, Untimed, or All from the Period drop-down list.
7	Enter a threshold in the Value field.
8	Click OK. ***Note:*** Check the number of alerts at which performance monitoring reports are capped (a default value of 100 for each reporting interval).

—end—

Procedure 1-33
Editing the threshold status for facilities

Use this procedure to edit the performance monitoring status for DS1, DS3, EC-1, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, OC-3, OC-12, OC-48, OC-192, Ethernet, Fibre Channel, and WAN facilities on a network element.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Ensure the interface retrieves the performance monitoring thresholds for the facility you want to edit. See Procedures for facility PM thresholds on page 1-2.
4	Select the threshold from the Facility PM Thresholds table. See Facility PM thresholds table on page 1-45.
5	Click Edit Status to open the Edit Threshold Status dialog box.
6	Select the All on or All off radio button.
7	Click OK.
8	Click OK in the Information dialog box to accept the changes, or Cancel to close the dialog box and ignore the changes.

—end—

Procedure 1-34
Editing the Threshold Crossing Report Type for facilities

Use this procedure to edit the Threshold Crossing Report Type of a PM parameter for an OC-3, OC-12, OC-48, OC-192, STS-1, STS-3c, STS-12c, STS-24c, STS-48c, EC-1, Ethernet, Fibre Channel, or WAN facility on a network element.

> ***Note:*** You cannot provision the Threshold Crossing Report Type for protection switching PMs and physical PMs.

Requirement

To perform this procedure, ensure you have all the documentation referenced in this procedure.

Step	Action
1	Log in to the network processor. For instructions, see 323-1059-302, Procedures for logging in to a network processor on page 2-1.
2	Log in to the network element. For instructions, see 323-1059-302, Procedures for logging in to a network element on page 2-1.
3	Select the network element from the navigation tree.
4	Retrieve the performance monitoring thresholds for the facility for which you want to edit the report type. See Procedures for facility PM thresholds on page 1-2.
5	Click Edit Report to open the Edit Threshold Crossing Report Type dialog box.
6	Select the facility from the Apply to drop-down list.
7	Select the location from the Location drop-down list.
8	Select the direction from the Direction drop-down list.
9	Select the period from the Period drop-down list.
10	Select the required report type: Threshold Crossing Alert or Alarm. You can enable or disable both report types.
11	Click OK. *The Report column in the Facility PM Thresholds window is updated to display the selected report type(s).*

—end—

Facility PM counts table

Monitor Type	Displays the monitored parameter type for the facility. For definitions of the parameters, see Montype parameter definitions on page 1-51.
Location	Displays the location of the given monitor type and value.
Direction	Displays the direction of the given monitor type and value.
Curr 15min	Displays the current 15-minute counts.See Note .
Prev 15min	Displays the previous 15-minute counts.See Note .
Curr day	Displays the current 1-day counts.
Prev day	Displays the previous 1-day counts.
Untimed	Displays the current untimed interval counts.
Note 1: Invalid data flag (?) indicates a count that is not complete, not supported, or not accurate. If the count is supported and a ? is displayed, possible causes are out-of-service facilities, shelf restarts, time changes, cleared performance monitoring counts, failed circuit packs, failed communications, or failed protection switches. ***Note:*** The 15-minute bin count represents a snapshot of the value at the beginning of each bin interval. It is calculated every 15 minutes at the beginning of the bin.	

Facility PM thresholds table

Monitor Type	Displays the monitored parameter type for the facility. For definitions of the parameters, see Montype parameter definitions on page 1-51.
Location	Displays the location of the given monitor type and value.
Direction	Displays the direction of the given monitor type and value.
Status Report	Displays the monitor type status (on or off). Report displays the threshold crossing report type.
Value	Displays the threshold setting.
Default	Displays the factory set threshold of each monitor type.
Period	Displays the time interval for the given monitor type. The time interval is 15-min, 1-day, or Untimed.

PM default values and maximum threshold values

Parameter	15-minute		1-day		Untimed	
	Default	**Maximum**	**Default**	**Maximum**	**Default**	**Maximum**
OC3 and OC12 monitored parameters						
CV-S	1772	38700	4430	215913600	0	4294967295
ES-S	346	899	864	65535	0	65535
SES-S	2	899	4	65535	0	65535
SEFS-S	2	899	4	65535	0	65535
CV-L	1772	16383	4430	215913600	0	4294967295
ES-L	346	899	864	65535	0	65535
SES-L	2	899	4	65535	0	65535
UAS-L	10	899	10	65535	0	65535
FC-L	Thresholds not supported for this parameter.					
PSC-W	Thresholds not supported for this parameter.					
PSC-P	Thresholds not supported for this parameter.					
PSD	Thresholds not supported for this parameter.					
OC48 monitored parameters						
CV-S	1772	38700	4430	215913600	0	4294967295
ES-S	346	899	864	65535	0	65535
SES-S	2	899	4	65535	0	65535
SEFS-S	2	899	4	65535	0	65535
CV-L	1772	16383	4430	215913600	0	4294967295
ES-L	346	899	864	65535	0	65535
SES-L	2	899	4	65535	0	65535
UAS-L	10	899	10	65535	0	65535
OPR See Note	-	-	-	-	3	50
FC-L	Thresholds not supported for this parameter.					
PSC-W	Thresholds not supported for this parameter.					
PSC-P	Thresholds not supported for this parameter.					
PSD	Thresholds not supported for this parameter.					

Parameter	15-minute		1-day		Untimed	
	Default	**Maximum**	**Default**	**Maximum**	**Default**	**Maximum**
Note: OPR and OPRN physical parameters are monitored only on the OC-48 ER DWDM, OC-48 ELR, OC-48 STS, and OC-192 circuit packs. OPR parameter is collected in Untimed bins only. OPRN parameter is collected in 15-min and 1-day bins only.						
OC-192 monitored parameters						
CV-S	1772	38700	4430	215913600	0	4294967295
ES-S	346	899	864	65535	0	65535
SES-S	2	899	4	65535	0	65535
SEFS-S	2	899	4	65535	0	65535
CV-L CV-LFE	1772	16383	4430	215913600	0	4294967295
ES-L ES-LFE	346	899	864	65535	0	65535
SES-L SES-LFE	2	899	4	65535	0	65535
UAS-L UAS-LFE	10	899	10	65535	0	65535
OPR See Note	-	-	-	-	3	50
FC-L	Thresholds not supported for this parameter.					
PSC-W	Thresholds not supported for this parameter.					
PSC-P	Thresholds not supported for this parameter.					
PSD	Thresholds not supported for this parameter.					
Note: OPR and OPRN physical parameters are monitored only on the OC-48 ER DWDM, OC-48 ELR, OC-48 STS, and OC-192 circuit packs. OPR parameter is collected in Untimed bins only. OPRN parameter is collected in 15-min and 1-day bins only.						
EC1 monitored parameters						
CV-S	591	38700	1477	215913600	0	4294967295
ES-S	115	899	288	65535	0	65535
SES-S	1	899	2	65535	0	65535

Parameter	15-minute		1-day		Untimed	
	Default	**Maximum**	**Default**	**Maximum**	**Default**	**Maximum**
SEFS-S	1	899	2	65535	0	65535
CV-L	591	16383	1477	215913600	0	4294967295
ES-L	115	899	288	65535	0	65535
SES-L	1	899	2	65535	0	65535
UAS-L	10	899	10	65535	0	65535
FC-L	Thresholds not supported for this parameter.					
STS-1 monitored parameters						
CV-P	15	16383	125	215913600	0	4294967295
ES-P	12	899	100	65535	0	65535
SES-P	3	899	7	65535	0	65535
ALS-P	2	899	8	65535	0	65535
UAS-P	10	899	10	65535	0	65535
STS-3C monitored parameters						
CV-P	25	16383	250	215913600	0	4294967295
ES-P	20	899	200	65535	0	65535
SES-P	3	899	7	65535	0	65535
ALS-P	2	899	8	65535	0	65535
UAS-P	10	899	10	65535	0	65535
FC-P	Thresholds not supported for this parameter.					

Parameter	15-minute		1-day		Untimed	
	Default	**Maximum**	**Default**	**Maximum**	**Default**	**Maximum**
STS-12C monitored parameters						
CV-P	75	16383	750	215913600	0	4294967295
ES-P	60	899	600	65535	0	65535
SES-P	3	899	7	65535	0	65535
ALS-P	2	899	8	65535	0	65535
UAS-P	10	899	10	65535	0	65535
FC-P	Thresholds not supported for this parameter.					
STS-24C monitored parameters						
CV-P	110	16383	1125	215913600	0	4294967295
ES-P	90	899	900	65535	0	65535
SES-P	3	899	7	65535	0	65535
ALS-P	2	899	8	65535	0	65535
UAS-P	10	899	10	65535	0	65535
FC-P	Thresholds not supported for this parameter.					
STS-48C monitored parameters						
CV-P	225	16383	2250	215913600	0	4294967295
ES-P	180	899	1800	65535	0	65535
SES-P	3	899	7	65535	0	65535
ALS-P	2	899	8	65535	0	65535
UAS-P	10	899	10	65535	0	65535
FC-P	Thresholds not supported for this parameter.					
DS1 monitored parameters						
CV-L	13340	16383	133400	133315200	0	4294967295
ES-L	65	899	648	65535	0	65535
SES-L	10	899	100	65535	0	65535
CV-P	72	16383	691	27561600	0	4294967295
ES-P	65	899	648	65535	0	65535
SES-P	10	899	100	65535	0	65535

Parameter	15-minute		1-day		Untimed	
	Default	**Maximum**	**Default**	**Maximum**	**Default**	**Maximum**
SEFS-P	2	899	17	65535	0	65565
SAS-P	2	899	17	65535	0	65535
CSS-P	1	899	4	65535	0	65535
UAS-P	10	899	10	65535	0	65535
FC-P	Thresholds not supported for this parameter.					
DS3 monitored parameters						
CV-L	387	16383	3865	3715200	0	4294967295
ES-L	25	899	250	65535	0	65535
SES-L	4	899	40	65535	0	65535
CV-P	382	16383	3820	3715200	0	4294967295
ES-P	25	899	250	65535	0	65535
SES-P	4	899	40	65535	0	65535
SAS-P	2	899	8	65535	0	65535
UAS-P	10	899	10	65535	0	65535
FC-P	Thresholds not supported for this parameter.					
Ethernet, Fibre Channel, and WAN monitored parameters						
ES	65	899	648	65535	0	65535
SES	10	899	100	65535	0	65535
UAS	10	899	10	65535	0	65535
INFRAMES	Thresholds not supported for this parameter.					
INFRAMESERR	Thresholds not supported for this parameter.					
INFRAMES DISC	Thresholds not supported for this parameter.					
Note: INFRAMES, INFRAMESERR, and INFRAMESDISC do not apply to Fibre Channel facilities. INFRAMESDISC does not apply to WAN facilities.						

Montype parameter definitions

Variable	Description
Section	
CV-S	Coding violations, section Valid for: EC1, OC-3, OC-12, OC-48 and OC-192
ES-S	Errored seconds, section Valid for: EC1, OC-3, OC-12, OC-48 and OC-192
SEFS-S	Severely errored frame seconds, section Valid for: EC1, OC-3, OC-12, OC-48 and OC-192
SES-S	Severely errored seconds, section Valid for: EC1, OC-3, OC-12, OC-48 and OC-192
Line	
CV-L	Coding violations, line Valid for: EC1, OC-3, OC-12, OC-48, OC-192, DS1, and DS3
ES-L	Errored seconds, line Valid for: EC1, OC-3, OC-12, OC-48, OC-192, DS1, and DS3
FC-L	Failure count, line Valid for: EC1, OC-3, OC-12, OC-48 and OC-192
SES-L	Severely errored seconds, line Valid for: EC1, OC-3, OC-12, OC-48, DS1, and DS3
UAS-L	Unavailable seconds, line Valid for: EC1, OC-3, OC-12, OC-48 and OC-192
Path	
ALS-P	AIS/LOP seconds path Valid for: STS-1, STS-3C, and STS-12C, STS-24C and STS-48C
CSS-P	Controlled slip seconds, path Valid for: DS1
CV-P	Coding violations, path Valid for: STS-1, STS-3C, STS-12C, STS-24C, STS-48C, DS1, and DS3
ES-P	Errored seconds, path Valid for: STS-1, STS-3C, STS-12C, STS-24C, STS-48C, DS1, DS3

Variable	Description
FC-P	Failure count, path Valid for: STS-1, STS-3C, STS-12C, STS-24C, STS-48C, DS1, and DS3
SAS-P	SEF/AIS seconds, path Valid for: DS1 and DS3
SEFS-P	Severely errored frame seconds, path Valid for: DS1
SES-P	Severely errored seconds, path Valid for: STS-1, STS-3C, STS-12C, STS-24C, STS-48C, DS1, DS3
UAS-P	Unavailable seconds, path Valid for: STS-1, STS-3C, STS-12C, STS-24C, STS-48C, DS1, DS3
Ethernet, Fibre Channel, and WAN PMs (see Note 1)	
ES	Errored seconds Valid for: Ethernet, Fibre Channel, and WAN
SES	Severely errored seconds Valid for: Ethernet, Fibre Channel, and WAN
UAS	Unavailable seconds Valid for: Ethernet, Fibre Channel, and WAN
INFRAMES	In frames, path Valid for: Ethernet and WAN
INFRAMESERR	In errored frames, path Valid for: Ethernet and WAN
INFRAMESDISC	In discarded frames, path Valid for: Ethernet
Physical PMs	
OPR	Optical power receive (at near-end) Valid for: OC-48 ER, OC-48 ELR, OC-48 STS, and OC-192
OPRN	Optical power receive-normalized (at near-end) Valid for: OC-48 ER, OC-48 ELR, OC-48 STS, and OC-192
Protection switching PMs (see Note 2)	
PSC-W	Protection switch count, working line Valid for: OC-3, OC-12, OC-48 and OC-192 See Note 3.

Variable	Description
PSC-P	Protection switch count, protection line Valid for: OC-3, OC-12, OC-48 and OC-192 See Note 3.
PSD	Protection switch duration Valid for: OC-48 and OC-192 (BLSR configuration only) See Note 4.
Note 1: INFRAMES, INFRAMESERR, and INFRAMESDISC do not apply to Fibre Channel facilities. INFRAMESDISC does not apply to WAN facilities. ***Note 2:*** When the facilities are not protected, the protection switching PM parameters are fixed at 0. ***Note 3:*** On the OC-3, EC-1x3, and EC-1x12 circuit packs, this parameter is not monitored. ***Note 4:*** The linear 1+1 configuration is non-revertive. Therefore, the PSD parameter for facilities in a linear 1+1 configuration is fixed at 0.	

Montype variable by facility

Montype	DS1	DS3	EC1, OC3, OC12, OC48, OC192	STS1	STS3C, STS12C, STS24C, STS48C	ETH	FC	WAN
CV-S			X					
ES-S			X					
SEFS-S			X					
SES-S			X					
CV-L	X See Note 3	X See Note 2	X					
ES-L	X See Note 3	X See Note 2	X					
FC-L			X					
SES-L	X See Note 3	X See Note 2	X					
UAS-L			X					
ALS-P				X	X			
CSS-P	X See Note 3							
CV-P	X See Note 2	X See Note 1		X	X			
ES-P	X See Note 2	X See Note 1		X	X			
FC-P	X	X See Note 2		X	X			
SAS-P	X See Note 2	X See Note 2						
SEFS-P	X See Note 3							
SES-P	X See Note 9	X See Note 1		X	X			
UAS-P	X See Note 2	X See Note 1		X	X			

Montype	DS1	DS3	EC1, OC3, OC12, OC48, OC192	STS1	STS3C, STS12C, STS24C, STS48C	ETH	FC	WAN
ES						X See Note 4	X See Note 4	X See Note 4
SES						X See Note 4	X See Note 4	X See Note 4
UAS						X See Note 4	X See Note 4	X See Note 4
INFRAMES						X See Note 4		X See Note 4
INFRAMES ERR						X See Note 4		X See Note 4
INFRAMES DISC						X See Note 4		
OPR			X See Note 5					
OPRN			X See Note 6					
PSC-W			X See Note 7					
PSC-P			X See Note 7					
PSD			X See Note 7 and Note 8					

Note 1: On DS3VTx12 circuit packs, this parameter is monitored for near-end receive only. On DS3x12 circuit packs, this parameter is monitored for transmit only.

Note 2: On DS3VTx12 circuit packs, this parameter is monitored for near-end receive only.

Note 3: On DS3VTx12 circuit packs, this parameter is not monitored.

Note 4: On the 2x100BT-P2P circuit pack, this parameter is not monitored.

Note 5: Monitored on the OC-48 ER, OC-48 ELR, OC-48 STS, and OC-192 circuit packs, receive direction only.

Note 6: Calculated for the OC-48 ER, OC-48 ELR, OC-48 STS, and OC-192 circuit packs only.

Note 7: On the OC-3, EC-1x3, and EC-1x12 circuit packs, this parameter is not monitored.

Note 8: This parameter is applicable to OC-48 and OC-192 facilities in a BLSR configuration only. For OC-3 and OC-12 facilities, PSD is fixed at 0.

Note 9: The SESP parameter does not count frame errors for DS-1 facilities on DS-1 circuit packs.

Parameter definitions

Parameters		Definitions
Section		
CV-S	Coding violations, section	SONET: Count of BIP-8 errors (B1) byte
ES-S	Errored seconds, section	SONET: Count of one second intervals with BIP-8 errors (B1) >= 1 or LOF >= 1 or LOS >=1
SES-S	Severely errored seconds, section	SONET: Count of one second intervals with BIP-8 errors (B1) >= K (where K is 155 for OC-3, 616 for OC-12, 2392 for OC-48 and 8854 for OC-192) or SEF >= 1 or LOS >= 1
SEFS-S	Severely errored frame seconds, section	SONET: Count of one second intervals with any LOF >= 1
Line		
CV-L	Coding violations, line	SONET: Count of BIP-8 errors (B2 byte) DS3 / DS1: Count of BPV +EXZ BPVs which are part of the B3ZS code are not counted, receive only
CV-LFE	Coding violations, line, far-end	SONET: Count of FEBE-L (Bits 2-8 of Z2 byte of STS-1 No.3)
ES-L	Errored seconds, line	SONET: Count of one second intervals with BIP-8 errors (B2) >= 1 or AIS-L >=1 DS3 / DS1: Count of one second intervals with (BPV + EXZ) >= 1 or LOS >= 1, receive only
ES-LFE	Errored seconds, line, far-end	SONET: Count of one second intervals with FEBE-L >= 1 or RDI-L >= 1 DS1-ESF: Count of one second PRM intervals with LV= 1 in the PRM, receive and transmit
SES-L	Severely errored seconds, line	SONET: Count of one second intervals with BIP-8 errors (B2) >= K (where K is 154 for OC-3, 615 for OC-12, 2459 for OC-48 and 9835 for OC-192) or AIS-L >= 1 DS3: Count of second intervals with (BPV + EXZ) >= 44 or LOS >=1, receive only DS1: Count of one second intervals with (BPV + EXZ) >= 1544 or LOS >= 1, receive only
SES-LFE	Severely errored seconds, line	SONET: Count of one second intervals with FEBE-L >=K (where K is 154 for OC-3, 615 for OC-12, 2459 for OC-48 and 9835 for OC-192) or RDI-L >=1

Parameters		**Definitions**
UAS-L UAS-LFE	Unavailable seconds, line Unavailable seconds, line, far-end	SONET: Count of the seconds during which the Line was considered unavailable. >10 SES-L (for UAS-LFE) >10 SES-LFE (for UAS-LFE)
FC-L	Failure count, line	SONET: Count of near-end line failure (AIS-L) events
FC-LFE	Failure count, line, far-end	SONET: Count of far-end line failure (RFI-L) events
Path		
CV-P	Coding violations, path	SONET: Count of BIP-8 errors (B3 byte) DS3: Count of P-bit parity errors, C-bit application not supported, receive and transmit for DS3, DS3x3, and DS3x12e, transmit only for DS3x12, receive only for DS3VTx12 DS1-SF: Count of Frame synchronization bit Errors (FE), receive and transmit for DS1 mappers, receive only for DS3VTx12 DS1-ESF: Count of CRC-errors, receive and transmit for DS1 mappers, receive only for DS3VTx12
CSS-P	Controlled slip seconds, path	DS1: Count of one second PRM intervals with LV= 1 in the PRM, receive and transmit
CV-PFE	Coding violations, path, far-end	SONET: Count of FEBE-P (bits 1-4 in G1 byte) DS1:ESF:0, 1, 5, 10, 100, 319, or 333 based on G1-G6 bit value in the PRM, receive and transmit
ES-P	Errored seconds, path	SONET: Count of one second intervals with BIP-8 errors (B3) >= 1 or LOP-P >= 1 or AIS-P >=1 DS3: Count of one second intervals with P-bit parity errors >= 1 or SEF >= 1 or AIS >= 1, receive and transmit for DS3, DS3x3, and DS3x12e, transmit only for DS3x12, receive only for DS3VTx12 DS1-SF: Count of one second intervals with SEF >=1, AIS >=1 or FE >= 1, receive and transmit for DS1 mappers, receive only for DS3VTx12 DS1-ESF: Count of one second intervals with CRC >= 1, SEF >=1 or AIS >= 1, receive and transmit for DS1 mappers, receive only for DS3VTx12
ES-PFE	Errored seconds, path, far-end	SONET: Count of one second intervals with FEBE-P >= 1 or RDI-P >= 1 DS1- ESF: Count of one second PRM intervals with (G1-G6 =1 or SE=1 or SL=1) in the PRM or RAI signal, receive and transmit

Parameters		Definitions
SES-P	Severely errored seconds, path	SONET: Count of one second intervals with BIP-8 errors (B3) >=2400 or AIS-P= or LOP-P >=1 DS3x3 / DS3x12e: Count of one second intervals with P-bit parity errors >44 or SEF 1 or AIS, receive and transmit DS3x12: Count of one second intervals with P-bit parity errors >44 or SEF 1 or AIS, transmit only DS1-SF: Count of one second intervals with FE >=8 or SEF>=1 or AIS >=1, receive and transmit DS1=ESF: Count of one second intervals with CRC >=320 or SEF >=1 or AIS >=1, receive and transmit STS-3c: Count of one second intervals with BIP-8 errors (B3) >=2400 STS-12c: Count of one second intervals with BIP-8 errors (B3) >=2400 STS-24c: Count of one second intervals with BIP-8 errors (B3) >=2400 STS-48c: Count of one second intervals with BIP-8 errors (B3) >=2400 ***Note:*** The SESP parameter does not count frame errors for DS-1 facilities on DS-1 circuit packs.
SES-PFE	Severely errored seconds, path, far-end	SONET: Count of one second intervals with FEBE-P >= 2400 or RDI-P >= 1 DS1-ESF: Count of one second PRM intervals with (G6=1 or SE=1) in the PRM or RAI signal, receive and transmit
SEFS-PFE	Severely errored frame, path, far-end	SONET: Count of one second intervals with FEBE-P >= 2400 or RDI-P >= 1 DS1-ESF: Count of one second PRM intervals with (G6=1 or SE=1) in the PRM or RAI signal
SAS-P	Severely errored frame/alarm indication signal (AIS) seconds, path	DS3: Count of one second intervals with any SEF >= 1 or AIS >= 1, receive and transmit for DS3, DS3x3, DS3x12, and DS3x12e, receive only for DS3VTx12 DS1: Count of one second intervals with SEF >= 1 or AIS >= 1, receive and transmit for DS1 mappers, receive only for DS3VTx12
SEFS-P	Severely errored frame, path	DS1-ESF: Count of one second PRM intervals with SE bit=1 in the PRM, receive and transmit
ALS-P	AIS/LOP seconds, path	SONET: Count of one second intervals with AIS-P >=1 or LOP-P >= 1
ALS-PFE	AIS/LOP seconds, path, far-end	SONET: Count of one second intervals with RDI-P >= 1

Parameters		**Definitions**
UAS-P	Unavailable seconds, path	SONET: Count of the seconds during which the STS Path was considered unavailable DS3x3 / DS3x12e: Count of the seconds during which the STS Path was considered unavailable, receive and transmit DS3x12: Count of the seconds during which the STS Path was considered unavailable, transmit only DS1: Count of the seconds during which the STS Path was considered unavailable, receive and transmit >10 SES-L
UAS-PFE	Unavailable seconds, path, far-end	SONET, DS1-ESF: Count of the seconds during which the STS Path was considered unavailable, receive and transmit >10 SES-LFE
FC-P	Failure count, path	SONET: Count of near-end STS path failure (LOP-P or AIS-P) events DS1: Count of near-end path failure (LOF or AIS) events, receive and transmit for DS1 mappers, receive only for DS3VTx12
FC-PFE	Failure count, path, far-end	SONET: Count of far-end STS path failure (RFI-P) events DS1: Count of far-end path failure (RAI) events, receive and transmit
Ethernet and Fibre Channel and WAN		
ES	Errored seconds	Ethernet, WAN: Count of one second intervals with INFRAMESERR >= 1 FC (Fibre Channel): Count of one second intervals with INOCTETSERR >=1
SES	Severely errored seconds	Ethernet, WAN: Count of one second intervals with INFRAMESERR/INFRAMES > 0.01 FC (Fibre Channel): Count of one second intervals with INOCTETSERR > 500
UAS	Unavailable seconds	Ethernet, FC (Fibre Channel), WAN: Count of one second intervals of unavailability

Parameters		**Definitions**
INFRAMES	In frames	Ethernet facilities: The number of frames received at the port, including errored frames (see Note 1). The count includes control frames and pause frames. WAN POS facilities: The number of frames received at the port. WAN GFP-F facilities: The number of client data frames received at the port. The count includes FCS and type header error control (tHEC) errors but does not include client management frames. WAN GFP-T facilities: The number superblocks received at the port.
INFRAMES ERR	In errored frames	Ethernet facilities: The number of frames received at the port with a FCS error. The count includes fragments (short frames with an invalid FCS) and jabbers (long frames with an invalid FCS) but excludes undersized frames (short frames with a valid FCS) and oversized frames (long frames with a valid FCS). WAN POS facilities: The number of frames received at the port with a FCS error. WAN GFP-F facilities: The number of client data frames received at the port with a payload FCS error. The count includes received type header error control (tHEC) errors that could not be corrected. WAN GFP-T facilities: The number of superblocks received at the port with CRC-16 errors that could not be corrected. ***Note:*** When the WAN link is down, the INFRAMES ERR counter and the INOCTETS ERR counter may not increment consistently with each other.
INFRAMES DISCDS	In discarded frames	Ethernet facilities: The number of frames received at the port with a valid FCS and valid frame size but discarded because of an ingress first-in, first-out (FIFO) overflow. Ingress overflows can result at a ETH port when the operating state of the corresponding WAN port is down or when ingress traffic exceeds the bandwidth capability of the corresponding WAN port.
Physical PMs		
OPR	Optical power received	Gauge type measurement of the received optical signal. OPR values are collected and recorded every second and are un-normalized. OPR is used to calculate OPRN.

Parameters		Definitions
OPRN	Optical power received normalized	OPRN is the deviation from the receivers midpoint operational range. This value is expressed as a percentage and is derived from the following formula: $$OPRN = 2\left(\frac{(OPR - OPRnominal)}{(OPRmax - OPRmin)}\right)100$$ Where: OPRnominal is the midpoint operational range of the receiver OPRmax is the maximum received optical power. OPRmin is the minimum received optical power. OPRN is 0% when the received power is equal to the nominal value (mid- range value), 100% when the received power is at the maximum level of the operational range, and -100% when the received power is at the minimum level of the operational range. ***Note:*** The 15-minute bin count represents a snapshot of the value at the beginning of each bin interval. It is calculated every 15 minutes at the beginning of the bin.

Parameters		Definitions
Protection switching PMs		
PSC-W	Protection switch count, working line	For a working line, PSC-W is the number of times that service switched from the working line to the protection line, plus the number of times that service switched back to the working line. See Note 2 and Note 3.
PSC-P	Protection switch count, protection line	For a protection line, PSC-P is the number of times that service switched from the working line to the protection line, plus the number of times service switched back to the working line. See Note 2 and Note 3.
PSD	Protection switch duration	For a working line, PSD is the number of seconds that service was carried on the protection line. For a protection line, PSD is the number of seconds that the line was used to carry service. See Note 3 and Note 4.

Note 1: For the 2x100BT-P2P circuit pack, this count includes only frames without errors and with a valid frame size.

Note 2: In a linear 1+1 configuration, the working and the protection facilities are on separate lines. Therefore, the PSC-W parameter on the working line and the PSC-P parameter on the protection line are fixed at 0.
In a BLSR configuration, each line includes both working and protection facilities. As a result, the PSC-P and PSC-W parameters increment independently on each line.

Note 3: In a BLSR configuration, protection PM parameters increment on switching nodes only and not on pass-through nodes.

Note 4: The PSD parameter is applicable to OC-48 and OC-192 facilities in a BLSR configuration only. This parameter is applicable only if the protection scheme is revertive. When revertive operation is disabled (by setting the wait-to-restore period to infinite) or when a manual or forced switch is activated, the PSD parameter is not applicable and is fixed at 0.The linear 1+1 configuration is non-revertive. Therefore, the PSD parameter for facilities in a linear 1+1 configuration is fixed at 0.

Ethernet operational measurements

Note: For a list of supported Ethernet operational measurements by circuit pack, see Ethernet operational measurements by circuit pack on page 1-64.

Measurement	Description
Align errors	The number of frames received at the port that were not an integer number of octets in length or failed the frame check sequence.
Excess collisions	The number of times that frames failed to transmit because of excessive collisions (more than 15 collisions of the frame).
FCS errors	The number of frames received at the port that were an integer number of octets in length but failed the frame check sequence. ***Note 1:*** The FCS errors count includes the Frames too long count. To determine only the number of FCS errors received at the port, subtract the Frames too long count from the FCS errors count. ***Note 2:*** Packets which contain CRC errors and are less than 64 bytes are measured as fragments and are not included in the FCS errors count.
Frames too long	The number of frames received at the port that exceeded the maximum frame size (MTU).
Frames too short	The number of frames received at the port that are smaller than the allowed 64-byte frame size.
In pause frames	The number of pause frames received at the port. The count includes the number of MAC control frames received with an opcode indicating a pause frame (whether or not it is acted upon). The count is incremented whether the Ethernet control frames attribute is set to enable or disable.
Internal MAC rx errors	The number of frames that could not be received because of an internal MAC sub-layer receive error.
Internal MAC tx errors	The number of frames that failed to transmit because of an internal MAC sub-layer transmit error.
Multi collision frames	The number of times that frames were transmitted after multiple collisions (2 to 15 collisions of the frame).
Out pause frames	The number of pause frames transmitted by the port. The count does not include pause frames received on the WAN side that are transparently passed through.
Single collision frames	The number of times that frames were transmitted after one collision.
Symbol errors	The number of received frames with a valid length but at least one invalid data symbol.

Ethernet operational measurements by circuit pack

Measurement	**2x100BT-P2P circuit pack**	**2xGigE/FC-P2P circuit pack**
Align errors	X	
Excess collisions	X	
FCS errors	X	X
Frames too long	X	X
Frames too short	X	X
In pause frames	X	X
Internal MAC rx errors		X
Multi collision frames	X	
Out pause frames	X	X
Single collision frames	X	
Symbol errors		X
Note: Carrier sense errors, Delayed transmissions, Late collisions, SQE test errors, and Internal MAC tx errors are not applicable for the 2x100BT-P2P or 2xGigE/FC-P2P circuit pack.		

Interface operational measurements

Note: For a list of supported interface operational measurements by facility on 2x100BT-P2P and 2xGigE/FC-P2P circuit packs, see Interface operational measurements by facility on page 1-68.

Measurement	Description
In Frames	Ethernet facilities: The number of frames received at the port, including errored frames (see Note 1). The count includes control frames and pause frames. Fibre Channel facilities: The number of Class 2, 3, and F FC frames received at the port. WAN POS facilities: The number of frames received at the port. WAN GFP-F facilities: The number of client data frames received at the port. The count includes FCS and type header error control (tHEC) errors but does not include client management frames. WAN GFP-T facilities: The number superblocks received at the port. Valid for: • Ethernet, Fibre Channel facilities • WAN facilities: Packet over SONET (POS), Generic Framing Protocol-Framed (GFP-F), Generic Framing Protocol-Transparent (GFP-T)
In Errored Frames	Ethernet facilities: The number of frames received at the port with an FCS error. The count includes fragments (short frames with an invalid FCS) and jabbers (long frames with an invalid FCS) but excludes undersized frames (short frames with a valid FCS) and oversized frames (long frames with a valid FCS). WAN POS facilities: The number of frames received at the port with an FCS error. WAN GFP-F facilities: The number of client data frames received at the port with a payload FCS error. The count includes received type header error control (tHEC) errors that could not be corrected. WAN GFP-T facilities: The number of superblocks received at the port with CRC-16 errors that could not be corrected. Valid for: • Ethernet or Fibre Channel • WAN facilities: POS, GFP-F, GFP-T ***Note:*** When the WAN link is down, the INFRAMES ERR counter and the INOCTETS ERR counter may not increment consistently with each other.

Measurement	Description
In Discarded Frames	Ethernet facilities: The number of frames received at the port with a valid FCS and valid frame size but discarded because of an ingress first-in, first-out (FIFO) overflow. Ingress overflows can result at a Ethernet or Fibre Channel port when the operating state of the corresponding WAN port is down or when ingress traffic exceeds the bandwidth capability of the corresponding WAN port. Fibre Channel facilities: The number of Fibre Channel frames received at the port that were discarded because of an ingress FIFO overflow. WAN POS facilities: The number of frames received at the port that were discarded because they exceeded the maximum transmit unit (MTU) size. The count also includes frames that were discarded because they had an invalid POS field. Valid for: • Ethernet, Fibre Channel facilities • WAN facilities: POS
In Octets	The number of octets received at the port (see Note 1). For Ethernet facilities, the count includes the DA, SA, T/L, and FCS headers. For Fibre Channel facilities, this count can be estimated using the following formula: Rx data bytes - (Rx control bytes x 3) + Rx symbol errors For WAN POS facilities, the count includes the point-to-point protocol (PPP) headers. Undersized and oversized packets are not counted. For WAN GFP-F facilities, the count includes the GFP/HEC headers and payload FCS. The count does not include octets from client management frames. Valid for: • Ethernet, Fibre Channel facilities • WAN facilities: POS, GFP-F
In Errored Octets	The number of octets received at the port in errored frames (as counted by In Errored Frames). For Fibre Channel facilities, this count can be estimated using the following formula: Rx disparity errors + Rx symbol errors. Valid for: • Ethernet, Fibre Channel facilities • WAN facilities: POS, GFP-F ***Note:*** When the WAN link is down, the INFRAMES ERR counter and the INOCTETS ERR counter may not increment consistently with each other.

Measurement	Description
Out Frames	Ethernet facilities: The number of frames transmitted by the port. Fibre Channel facilities: The number of Class 2, 3, and F FC frames transmitted by the port. WAN POS facilities: The number of frames transmitted by the port. The count includes heartbeat control frames when link connectivity monitoring is enabled. WAN GFP-F: The number of client data frames transmitted by the port. The count does not include client management frames. WAN GFP-T facilities: The number of superblocks transmitted by the port. Valid for: • Ethernet, Fibre Channel facilities • WAN facilities: POS, GFP-F, GFP-T
Out Errored Frames	The number of frames that could not be transmitted by the port because of errors. For Ethernet facilities, the count includes frames that were transmitted with errors. The count also includes frames that could not be transmitted because of excessive or late collisions (in half duplex mode) or because of an FIFO underrun (due to internal memory errors). The count also includes the number of frames transmitted with FCS errors (when received from the corresponding WAN port). Valid for: • Ethernet facilities • WAN facilities: POS, GFP-F
Out Discarded Frames	The number of frames discarded because of an egress FIFO overflow. For Ethernet facilities, egress overflows can result at a ETH port when the operating state of the ETH port is down or when egress traffic exceeds the ETH port capacity (for example, the ETH port is only operating at 10 Mbit/s when the corresponding WAN port is mapped to an STS-3c rate). For Fibre Channel facilities, egress overflows can result at an FC port when the maximum link distance is exceeded. Valid for: • Ethernet, Fibre Channel facilities • WAN facilities: Not applicable
Out Octets	The number of octets transmitted by the port. For Ethernet facilities, the count includes the DA, SA, T/L, and FCS headers. For Fibre Channel facilities, this count can be estimated using the following formula: Tx data bytes - (Tx control bytes x 3) + Tx 8B/10B code errors. For WAN POS facilities, the count includes the PPP headers. For WAN GFP-F facilities, the count includes GFP/HEC headers and payload FCS. Valid for: • Ethernet, Fibre Channel facilities • WAN facilities: POS, GFP-F

Measurement	Description
Out Errored Octets	Ethernet facilities: The number of octets transmitted by the port in errored frames (as counted by Out Errored Frames). Fibre Channel facilities: The number of 8B/10B code errors transmitted by the port. Valid for: • Ethernet, Fibre Channel facilities (see Note 2) • WAN facilities: Not applicable
Note 1: For the 2x100BT-P2P circuit pack, this count includes only frames without errors and with a valid frame size. ***Note 2:*** This measurement is not supported on the 2x100BT-P2P circuit pack.	

Interface operational measurements by facility

Measurement	2x100BT-P2P circuit pack		2xGigE/FC-P2P circuit pack			
	LAN Ethernet	WAN POS	Ethernet	Fibre Channel	WAN GFP-F	WAN GFP-T
In Frames	X	X	X	X	X	X
In Errored Frames	X	X	X		X	X
In Discarded Frames	X	X	X	X		
In Octets	X	X	X	X	X	
In Errored Octets	X	X		X		
Out Frames	X	X	X	X	X	X
Out Errored Frames	X	X	X			
Out Discarded Frames	X		X	X		
Out Octets	X	X	X	X	X	
Out Errored Octets				X		

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