Controller Commands

Note All commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router that is introduced from Cisco IOS XR Release 6.3.2. References to earlier releases in Command History tables apply to only the Cisco NCS 5500 Series Router.

Note

- Starting with Cisco IOS XR Release 6.6.25, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 560 Series Routers.
- Starting with Cisco IOS XR Release 6.3.2, all commands applicable for the Cisco NCS 5500 Series Router are also supported on the Cisco NCS 540 Series Router.
- References to releases before Cisco IOS XR Release 6.3.2 apply to only the Cisco NCS 5500 Series Router.
- Cisco IOS XR Software Release 7.0.1 specific updates are not applicable for the following variants of Cisco NCS 540 Series Routers:
  - N540-28Z4C-SYS-A
  - N540-28Z4C-SYS-D
  - N540X-16Z4G8Q2C-A
  - N540X-16Z4G8Q2C-D
  - N540X-16Z8Q2C-D
  - N540-12Z20G-SYS-A
  - N540-12Z20G-SYS-D
  - N540X-12Z16G-SYS-A
  - N540X-12Z16G-SYS-D

This module provides command line interface (CLI) commands for configuring controllers on the Cisco NCS 5500 Series Router.

For detailed information about optics and DSP controller concepts, configuration tasks, and examples, refer to the *Interface and Hardware Component Configuration Guide for Cisco NCS 5500 Series Routers.*

bert

To enable or disable a bit error rate tester (BERT) test pattern for a E1 channel, enable this command in controller configuration mode.

prbs mode source-sink pattern PN15 direction { **line** | **system** }

Syntax Description

line	Specifies the direction as line.
system	Specifies the direction as system.

Command Default

No **bert** test is performed.

Command Modes

Controller configuration.

Command History

Release	Modification
7.5.1	This command was introduced. Applicable only to N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, N540X-6Z18G-SYS-A/D and N540X-8Z16G-SYS-A/D variants.

Examples

```
controller E1 0/0/0/7
prbs mode source-sink pattern PN15 direction line
vlan 100 ecid 1
!


show command o/p
RP/0/RP0/CPU0:PE1# show controller e1 0/0/0/7
Tue Nov 16 10:16:24.548 UTC

Controller State : Down

Transport Admin State : In Service

Framing : Unframed

Linecoding : High Density Bipolar Order 3

Loopback : None

Clock : Adaptive Clock Recovery (ACR)

Clock State: Locked

vlan id : 100
ecid : 1

Alarm Status :
-------------
Detected Alarms : RAI
-------------
-------------
```

```
Root Alarm Status :
-------------
Detected Alarms :
-------------
-------------


CEM stats :
Ingress Pkts : 84811698
Ingress Drop Pkts : 0
Egress Pkts : 84811698
Egress Drop Pkts : 0
Input Error : 0
Output Error : 0
Pkt Missing : 0
Pkt Reordered : 0
Missorder Drops : 0
Jitter Buffer Underrun : 0
Pkts Malformed : 0
JitterBuffer Overrun : 0
PRBS Details :
PRBS Mode : Source-Sink

Test Pattern : PN15(2^15)

Sync Status : Not Sync

Direction : Line

Sync Detected : 0
Bit Recieved((since last sync) : 0
PRBS Duration : 14 (Seconds)
Timeunits since last-syn : 0 (Seconds)
```

clear controller pm

To clear performance monitoring counters, use the **clear controller pm** command.

clear controller {**optics** | **coherentDSP**}*r /s /i /p* **pm** [**30-sec** | **15-min** | **24-hour** **clear**]

Syntax Description

r /s /i /p	Rack/Slot/Instance/Port of the optics or coherent DSP controller.
30-sec | **15-min** | **24-hour**	Specifies the interval.
clear	Clears all PM data for all intervals or the specified interval.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Examples

This example shows how to clear all PM data in 15 minute current interval:

```
RP/0/RP0/CPU0:router# clear controller optics 0/5/0/1 pm 15-min
```

This example shows how to clear all PM data for all intervals:

```
RP/0/RP0/CPU0:router# clear controller optics 0/5/0/1 pm clear
```

clear counters controller

To clear performance monitoring counters, use the **clear counters controller** command.

clear counters controller coherentDSP *r /s /i /p* **pm** [**30-sec** | **15-min** | **24-hour** **clear**]

Syntax Description

r /s /i /p	Rack/Slot/Instance/Port of the optics or coherent DSP controller.
30-sec | **15-min** | **24-hour**	Specifies the interval.
clear	Clears all PM data for all intervals or the specified interval.

Command Default

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Examples

This example shows how to clear all counters in 15 minute current interval:

```
RP/0/RP0/CPU0:router# clear counters controller optics 0/5/0/1 pm 15-min
```

This example shows how to clear all counters for all intervals:

```
RP/0/RP0/CPU0:router# clear counters controller optics 0/5/0/1 pm clear
```

clock source

To configure the clock source of a DS1 link, enter the **clock source** command in interface configuration mode. To restore the default **line** setting, use the **no** form of this command.

clock source { **line** | **internal** | **recovered** }

no clock source

Syntax Description

line	Specifies that the E1 link uses the recovered clock from the line. This is the default.
internal	Specifies that the E1 link uses the internal clock from the interface.
recovered	Specifies the clock recovery mode.

Command Default

The default value is **line**.

Command Modes

Interface configuration.

Command History

Release	Modification
7.5.1	This command was introduced. Applicable only to N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, N540X-6Z18G-SYS-A/D and N540X-8Z16G-SYS-A/D variants.

Usage Guidelines

This command sets clocking for individual E1 links.

Examples

```
Router#show running-config controller e1 0/0/0/7
Tue Nov 16 10:20:56.913 UTC
controller E1 0/0/0/7
vlan 100 ecid 1
clock source recovered acr
!

RP/0/RP0/CPU0:PE1#show controller e1 0/0/0/7
Tue Nov 16 10:21:05.238 UTC

Controller State : Up

Transport Admin State : In Service

Framing : Unframed

Linecoding : High Density Bipolar Order 3

Loopback : None

Clock : Adaptive Clock Recovery (ACR)

Clock State: Locked

vlan id : 100
ecid : 1
```

```
Alarm Status :
-------------
Detected Alarms :
-------------None

-------------

Root Alarm Status :
-------------
Detected Alarms :
-------------None

-------------


CEM stats :
Ingress Pkts : 85092697
Ingress Drop Pkts : 0
Egress Pkts : 85092697
Egress Drop Pkts : 0
Input Error : 0
Output Error : 0
Pkt Missing : 0
Pkt Reordered : 0
Missorder Drops : 0
Jitter Buffer Underrun : 0
Pkts Malformed : 0
JitterBuffer Overrun : 0RP/0/RP0/CPU0:PE1#
```

clock source recovered

To associate the clock recovered ID, use the **clock source recovered** command in interface configuration mode.

clock source recovered { **acr** | **dcr** }

Syntax Description

acr	Specifies the adaptive clock recovery.
dcr	Specifies the differential clock recovery.

Command Modes

Interface configuration.

Command History

Release	Modification
7.5.1	This command was introduced. Applicable only to N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, N540X-6Z18G-SYS-A/D and N540X-8Z16G-SYS-A/D variants.

Examples

```
RP/0/RP0/CPU0:PE1#show running-config controller e1 0/0/0/7
Tue Nov 16 10:20:56.913 UTC
controller E1 0/0/0/7
vlan 100 ecid 1
clock source recovered acr
!

RP/0/RP0/CPU0:PE1#show controller e1 0/0/0/7
Tue Nov 16 10:21:05.238 UTC

Controller State : Up

Transport Admin State : In Service

Framing : Unframed

Linecoding : High Density Bipolar Order 3

Loopback : None

Clock : Adaptive Clock Recovery (ACR)

Clock State: Locked

vlan id : 100
ecid : 1

Alarm Status :
-------------
Detected Alarms :
-------------None

-------------

Root Alarm Status :
-------------
```

```
Detected Alarms :
-------------None

-------------


CEM stats :
Ingress Pkts : 85092697
Ingress Drop Pkts : 0
Egress Pkts : 85092697
Egress Drop Pkts : 0
Input Error : 0
Output Error : 0
Pkt Missing : 0
Pkt Reordered : 0
Missorder Drops : 0
Jitter Buffer Underrun : 0
Pkts Malformed : 0
```

controller coherentDSP

To configure the coherent DSP controller, use the **controller coherentDSP** command in the Coherent DSP controller configuration mode.

controller coherentDSP *r /s /i /p* [**description** *description*] [**loopback internal**] [**perf-mon** {**enable** | **disable**}] [**pm** {**30-sec** | **15-min** | **24-hour**} {**fec** | **otn**} {**report** | **threshold**}*value*] [**secondary-admin-state** *maintenance*] [[**no**] **shutdown**]

Syntax Description

r/s/i/p	Rack/Slot/Instance/Port of the coherent DSP controller.
description *description*	Description of the optics controller.
loopback internal	Configures the internal loopback mode on the controller.
perf-mon {**enable**	**disable**}	Enables or disables performance monitoring.
pm {**30-sec**	**15-min**	**24-hour**}	Configures performance monitoring parameters for 30 second, 15 minute, or 24 hour intervals.
fec	Configures FEC PM data.
otn	Configures OTN PM data.
report	Configures TCA reporting status.
threshold	Configures threshold on coherent DSP parameters.
value	Value of the reporting or threshold parameters.
secondary-admin-state *maintenance*	Configures the administrative state of the controller indicating that the controller is under maintenance.
[**no**] **shutdown**	Disables or enables the coherent DSP controller.

Command Default

No default behavior or values

Command Modes

Coherent DSP controller

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines

The coherent DSP controller doesn't support Q factor, Q margin, and post FEC BER reporting. Therefore, no threshold crossing alert (TCA) is raised for these parameters.

Task ID

Task ID	Operation

Examples

This example shows how to place the DSP controllers in maintenance mode:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller coherentDSP 0/5/0/1 secondary-admin-state maintenance
```

controller coherentDSP (400G DCO)

To configure the coherent DSP controller, use the **controller coherentDSP** command in the Coherent DSP controller configuration mode.

controller coherentDSP *R/S/I/P* [**description** *description* | **perf-mon** { **enable** | **disable** } | **pm** { **30-sec |15-min |24-hour** } { **fec** } { **report | threshold** } *value* | **secondary-admin-state** { **maintenance | normal** } **loopback** { **internal** | **line** }]

Syntax Description

R/S/I/P	Rack/Slot/Instance/Port of the coherent DSP controller.
description *description*	Description of the coherent DSP controller.
perf-mon { **enable** | **disable** }	Enables or disables performance monitoring.
pm { **30-sec |15-min |24-hour** } { **fec** } { **report | threshold** } *value*	Configures performance monitoring parameters for 30-second,15-minute, or 24-hour intervals. The **fec** keyword configures FEC PM data in 30-second, 15-minute, or 24-hour intervals. The **report** keyword configures threshold crossing alerts (TCA) reporting status for the PM parameters. The **threshold** keyword configures threshold values for the PM parameters. The PM parameters that can be configured are: • Inst-Q-margin (Instantaneous Q margin) • Q threshold • Q-margin • ec-bits (error corrected bits) • post-FEC BER • pre-FEC BER • uc-words (uncorrected words)
secondary-admin-state	Configures the administrative state of the controller. The states are maintenance or normal.
loopback { **internal** | **line** }	Configures the internal or line loopback mode on the controller.

Command Default

None.

Command Modes

Coherent DSP controller configuration

Command History

Release	Modification
Release 7.3.2	This command was introduced.

Example

The following example shows how to enable line loopback configuration on coherent DSP controllers:

```
Router#config
Router(config)#controller coherentDSP 0/0/0/4
Router(config-CoDSP)#secondary-admin-state maintenance
Router(config-CoDSP)#loopback line
Router(config-CoDSP)#commit
```

controller (Fibre Channel)

To configure the Fibre Channel controller, use the **controller** command in the global configuration mode. To return to the default behavior, use the **no** form of this command.

controller *type r/s/i/p* [**tts**]
no controller *type r/s/i/p* [**tts**]

Syntax Description

type	Fibre Channel controller type. The options are OneGigFibreChanCtrlr, TwoGigFibreChanCtrlr, FourGigFibreChanCtrlr, EightGigFibreChanCtrlr, SixteenGigFibreChanCtrlr, and ThirtyTwoGigFibreChanCtrlr.
r/s/i/p	Rack/Slot/Instance/Port of the Fibre Channel controller.

Command Default

No default behavior or values

Command Modes

Global configuration

Command History

Release	Modification
Release 7.7.1	This command was introduced.

Usage Guidelines

- The TTS keyword is only available for the *ThirtyTwoGigFibreChanCtrlr* Fibre Channel controller type.
- You must configure this feature only on the PLE MPA1 even ports, that is, 0, 2, 4, 6, and so on.

Examples

This example shows how to enable the FC controller interface and configure the TTS function.

```
Router(config)# controller Optics0/0/1/6
Router(config-Optics)# port-mode FC framing cem-packetize rate FC32
Router(config-Optics)# exit
Router(config)# controller ThirtyTwoGigFibreChanCtrlr 0/1/1/0
Router(config-ThirtyTwoGigFibreChanCtrlr)# tts
Router(config-ThirtyTwoGigFibreChanCtrlr)# commit
```

controller optics

To configure the optics controller, use the **controller optics** command in the optics controller configuration mode. To return to the default behavior, use the **no** form of this command.

controller optics *r / s / i / p* [**dgd-high-threshold** *dgd-value* | **lbc-high-threshold** *lbc_value* | **osnr-low-threshold** *osnr_value* | **description** *description* | **ext-description** *description* | **rx-high-threshold** *rx-high* | **rx-low-threshold** *rx-low* | **tx-high-threshold** *tx-high* | **tx-low-threshold** *tx-low* | [**no**] **shutdown** | **transmit-power** *transmit-power* | **perf-mon** { **enable** | **disable** } | **host** { **auto-squelch** } { **disable** } | **pm** { **30-sec** | **15-min** | **24-hour** } **optics** { **report** | **threshold** } *value* | { **mode etm** | **no mode etm** } { **speed** *value* }
no controller optics *r/s/i/p*

Syntax Description

r/s/i/p	Rack/Slot/Instance/Port of the optics controller.
dgd-high-threshold *dgd-value*	Configures the maximum acceptable Differential Group Delay (DGD) value. The HIGH_DGD alarm is raised if DGD exceeds this value. The range is 0 to 18000 (in the units of 0.01 ps).
lbc-high-threshold *lbc_value*	Configures the high laser bias current threshold. The range is 0 to 100%
osnr-low-threshold *osnr_value*	Configures the minimum acceptable Optical Signal to Noise ratio (OSNR) value. The LOW_OSNR alarm is raised if OSNR goes below this value. The range is 0 to 4000 (in the units of 0.01 db).
description *description*	Description of the optics controller.
ext-description *description*	Ext-description of the optics controller.
rx-high-threshold *rx-high*	Configures high receive power threshold. The range is -400 to 300 (in the units of 0.1 dBm).
rx-low-threshold *rx-low*	Configures low receive power threshold. The range is -400 to 300 (in the units of 0.1 dBm).
tx-high-threshold *tx-high*	Configures high transmit power threshold. The range is -400 to 300 dBm (in the units of 0.1 dBm).
tx-low-threshold*tx-low*	Configures low transmit power threshold. The range is -400 to 300 dBm (in the units of 0.1 dBm).
[**no**] **shutdown**	Disables or enables the optics controller.
transmit-power *transmit-power*	Configures the transmit power. The range is -190 to 15 dBm (in the units of 0.1 dBm).
perf-mon {**enable** | **disable**}	Enables or disables performance monitoring.
pm {**30-sec** | **15-min** | **24-hour** }	Configures performance monitoring parameters for 30 second, 15 minute, or 24 hour intervals.

host { **auto-squelch** } { **disable** }	Disable squelch for host.
optics	Configures the optics PM data.
report	Configures TCA reporting status.
threshold	Configures threshold on optics parameters.
value	Value of the reporting or threshold parameters.
{ **mode etm** | **no mode etm** }	Enables or disables the egress traffic management mode.
speed *value*	Configures the network interface speed.

Command Default

No default behavior or values

Command Modes

Optics controller

Command History

Release	Modification
Release 6.2.2	This command was introduced.
Release 7.4.1	The **etm mode** option for egress traffic management was introduced.
Release 7.11.1	The following keyword was introduced: • **host auto-squelch disable**

Usage Guidelines

You must shut down the optics controller before you perform any of the following tasks:

- Configure the controller
- Restore a saved configuration
- Upgrade the DSP processor or CFP2 optics module Field Programmable Device (FPD)

Note When you bring up the local optics controller, you might briefly see transient loss of signal (LOS) alarms on the console. This behavior might be observed during the initial tuning of the channel.

```
PKT_INFRA-FM-2-FAULT_CRITICAL : ALARM_CRITICAL :LOS-P :DECLARE :CoherentDSP0/3/0/1:
PKT_INFRA-FM-2-FAULT_CRITICAL : ALARM_CRITICAL :LOS-P :CLEAR :CoherentDSP0/3/0/1:
```

During the laser-on process, you might briefly see transient loss of line (LOL) alarms on the console. This alarm is cleared when the laser-on process is complete.

```
PKT_INFRA-FM-3-FAULT_MAJOR : ALARM_MAJOR :CTP2 RX LOL :DECLARE ::
PKT_INFRA-FM-3-FAULT_MAJOR : ALARM_MAJOR :CTP2 RX LOL :CLEAR ::
```

The laser-on process can take up to 120 seconds to complete.

Examples

This example shows how to configure the optics controller and set the high power threshold at the transmit and receive side.

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(router)# controller optics 0/5/0/1
RP/0/RP0/CPU0:router(config-optics)# rx-high-threshold 200
RP/0/RP0/CPU0:router(config-optics)# tx-high-threshold 300
```

Examples

This example shows how to configure the network interface speed on the router.

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(router)# interface GigabitEthernet 0/0/0/1
RP/0/RP0/CPU0:router(config-if)# speed 100
```

controller optics (400G DCO)

To configure the optics controller, use the **controller optics** command in the optics controller configuration mode.

controller optics *R/S/I/P* [**DAC-Rate** *rate* | **[no] breakout** *muxponder-mode* | **cd-max** *cd-max* | **cd-min** *cd-min* | **cd-low-threshold** *cd-low* | **cd-high-threshold** *cd-high* | **dgd-high-threshold** *dgd-value* | **dwdm-carrier** *channel-grid* | **lbc-high-threshold** *lbc-value* | **modulation** *modulation-type* | **osnr-low-threshold** *osnr-value* **description** *description* | **fec** *fec-mode* | **sec-admin-state {maintenance | normal}** | **shutdown** | **transmit-power** *transmit-power* | **[no] transceiver disable** | **perf-mon** { **enable** | **disable** } | **pm** { **30-sec |15-min | 24-hour** } { **optics** } { **report | threshold** } *pm-parameter value* | **host fec-threshold** { **excess-degrade** { **raise** | **clear** } *threshold-value* | **detected-degrade** { **raise** | **clear** } *threshold-value* } | **media fec-threshold** { **excess-degrade** { **raise** | **clear** } *threshold-value* | **detected-degrade** { **raise** | **clear** } *threshold-value* } | **media link-down prefec-degrade**]

Syntax Description

R/S/I/P	Rack/Slot/Instance/Port of the optics controller.
DAC-Rate *rate*	Sets the DAC (digital to analog conversion) sampling rate for this controller. The sampling rate options available are: • 1x1 • 1x1.25
breakout *muxponder mode*	Configures the muxponder mode for this controller. Muxponder mode options available are: • 4x100 • 3x100 • 2x100 • 1x100 The **no** form of this command switches the optics controller from the muxponder mode to the transponder mode. QDD-400G-ZR-S supports only 4x100.
cd-max *cd-max*	(Only for trunk optics controllers) Maximum chromatic dispersion. For QDD-400G-ZR-S optical module, the range is 0 to +2400. For QDD-400G-ZRP-S optical module, the range is 0 to +160000 ps/nm.
cd-min *cd-min*	(Only for trunk optics controllers) Minimum chromatic dispersion. For QDD-400G-ZR-S optical module, the range is -2400 to 0. For QDD-400G-ZRP-S optical module, the range is -160000 to 0 ps/nm.

cd-low-threshold *cd-low*	(Only for trunk optics controllers) Minimum acceptable chromatic dispersion value. The CD alarm is raised if the chromatic dispersion goes below this value. This is an alarm threshold parameter. For QDD-400G-ZR-S optical module, the range is -2400 to 0. For QDD-400G-ZRP-S optical module, the range is -160000 to 0 ps/nm.
cd-high-threshold *cd-high*	(Only for trunk optics controllers) Maximum acceptable chromatic dispersion value. The CD alarm is raised if the chromatic dispersion exceeds this value. This is an alarm threshold parameter. For QDD-400G-ZR-S optical module, the range is 0 to +2400. For QDD-400G-ZRP-S optical module, the range is 0 to +160000 ps/nm.
dgd-high-threshold *dgd-value*	(Only for trunk optics controllers) Configures the maximum acceptable Differential Group Delay (DGD) value. The DGD alarm is raised if DGD exceeds this value. This is an alarm threshold parameter. The range is 0 to 18000 (in the units of 0.01 ps).
dwdm-carrier *channel-grid*	Configures the DWDM carrier channel. Options are: • 100MHz-grid • 50GHz-grid
lbc-high-threshold *lbc-value*	Configures the high laser bias current threshold. This is an alarm threshold parameter. The range is 0 to 100%
modulation *modulation-type*	Configures the modulation type. Options are: • 16Qam • 8Qam • Qpsk
osnr-low-threshold *osnr-value*	(Only for trunk optics controllers) Configures the minimum acceptable Optical Signal-to-Noise ratio (OSNR) value. The OSNR alarm is raised if OSNR goes below this value. This is an alarm threshold parameter. The range is 0 to 4000 (in units of 0.01db).
description *description*	Description of the optics controller.
[no] transceiver disable	Enables or disables the transceiver module. The transceiver is enabled by default.
fec *fec-mode*	Configures Forward Error Correction (FEC) modes.
sec-admin-state	Configures the administrative state of the controller. The values are maintenance or normal.
shutdown	Disables the configuration of the controller.

pm { **30-sec** | **15-min** | **24-hour** } { **optics** } { **report** | **threshold** } *pm-parameter value*	Configures performance monitoring parameters for 30-second, 15-minute, and 24-hour intervals. The **report** keyword configures threshold crossing alerts (TCA) reporting status for the PM parameters. The **threshold** keyword configures threshold values for the PM parameters. The PM parameters that can be configured are: • cd (chromatic dispersion) • dgd (differential group delay) • low-freq-off (low signal frequency offset) • opr (optical power RX) • osnr (optical signal-to-noise ratio) • pcr (polarization change rate) • pdl (polarization dependent loss) • rx-sig (receiving signal power) • snr (signal-to-noise ratio) • sopmd (second order polarization mode dispersion)
transmit-power *transmit-power*	(Only for trunk optics controllers) Configures the transmit power. The range is -190 to 50 dBm (in the units of 0.1 dBm).
perf-mon { **enable** | **disable** }	Enables or disables performance monitoring.
host fec-threshold excess-degrade raise *threshold-value*	Configures the raise threshold value for FEC excessive degrade (FED) alarm on the host-side of the optical module. Range is 1 to 2046000000000000000.
media fec-threshold excess-degrade raise *threshold-value*	Configures the raise threshold value for FED alarm on the media-side of the optical module. Range is 1 to 2046000000000000000.
host fec-threshold excess-degrade clear *threshold-value*	Configures the clear threshold value for FED alarm on the host-side of the optical module. Range is 1 to 2046000000000000000.
media fec-threshold excess-degrade clear *threshold-value*	Configures the clear threshold value for FED alarm on the media-side of the optical module. Range is 1 to 2046000000000000000.

host fec-threshold detected-degrade raise *threshold-value*	Configures the raise threshold value for FEC detected-degrade (FDD) alarm on the host-side of the optical module. Range is 1 to 2046000000000000000.
media fec-threshold detected-degrade raise *threshold-value*	Configures the raise threshold value for FDD alarm on the media-side of the optical module. Range is 1 to 2046000000000000000.
host fec-threshold detected-degrade clear *threshold-value*	Configures the clear threshold value for FDD alarm on the host-side of the optical module. Range is 1 to 2046000000000000000.
media fec-threshold detected-degrade clear *threshold-value*	Configures the clear threshold value for FDD alarm on the media-side of the optical module. Range is 1 to 2046000000000000000.
media link-down prefec-degrade	Enables link-down and prefec degrade mode when the BER counter crosses the threshold value.

Command Default

Table 1: QDD-400G-ZR-S and QDD-400G-ZRP-S Default Traffic Configuration Values

	QDD-400G-ZR-S	QDD-400G-ZRP-S
Client Speed	400G (400GAUI-8)	400G (400GAUI-8)
Trunk Speed	400G	400G
Frequency	193.10THz	193.10THz
FEC	cFEC	oFEC
Modulation	16QAM	16QAM
DAC-Rate	1x1	1x1.25
Chromatic Dispersion (CD)	+/-2400	+/-26000
Transmitted (Tx) Power	-10.00 dBm	-10.00 dBm

For FDD and FED alarms, the default **raise** and **clear threshold value** for both media and host side of the optics controller is as follows:

Table 2: Default Raise and Clear Threshold Value for FDD and FED Alarms

Threshold	FDD	FED
Raise	**9,00E-05**	**2,40E-04**
Clear	**9,00E-06**	**2,40E-05**

Command History

Release	Modification
Release 7.3.2	This command was introduced.
Release 24.3.1	The following keywords were introduced: • **host fec-threshold excess-degrade raise** • **media fec-threshold excess-degrade raise** • **host fec-threshold excess-degrade clear** • **media fec-threshold excess-degrade clear** • **host fec-threshold detected-degrade raise** • **media fec-threshold detected-degrade raise** • **host fec-threshold detected-degrade clear** • **media fec-threshold detected-degrade clear**
Release 24.3.1	The **media link-down prefec-degrade** keyword was introduced.

Command Modes

Optics controller configuration

Usage Guidelines

The configurations for chromatic dispersion , cd-low-threshold, and cd-high-threshold must be performed only after the **hw-module** configuration. These configurations must be removed before the **no hw-module** configuration. Default values are set to optimize the power consumption by the QDD-400G-ZR-S and QDD-400G-ZRP-S modules.

For FDD and FED alarms, the **raise threshold value** must always be greater than the **clear threshold value**. Also, the **raise** or **clear threshold value** of FED alarm must always be greater than the **raise or clear threshold value** of the FDD alarm. While the router configuration permits a range of 1 to 18446744073709551615, the router only supports a range of 1 to 2046000000000000000.

Table 3: Supported Ports and Command for Configuring Muxponder Mode

Fixed-Port Routers	**Ports**	**Command**
N540-24Q8L2DD-SYS	400G ports (port 0 and 1)	**breakout**
NCS-57B1-6D24H-S	400G ports (ports 24-29)	**breakout** *muxponder mode*
NCS-57B1-5D24H-SE	400G ports (ports 24-28)	**breakout** *muxponder mode*
Line Cards	**Ports**	**Command**
NC57-24DD	400G even-numbered ports (port 0, port 2, port 4, and so on)	**breakout** *muxponder mode*
NC57-18DD-SE	400G ports (port 18 through port 23)	**breakout** *muxponder mode*
	remaining 400G even-numbered ports (port 0, port 2, and so on)	**hw-module port-range**

NC57-36H6D-S	400G even-numbered (ports 24-35) ports	**hw-module port-range**

Example

The following example shows how to configure the optics controller and set the ranges for chromatic dispersion:

```
Router#configure
Router(config)#controller optics 0/0/1/1
Router(config-optics)#cd-max 2000
Router(config-optics)#cd-min -2000
Router(config)#commit
```

The following is a sample in which the performance monitoring parameters of optics controller are configured in 24-hour intervals:

```
Router#configure
Router(config)#controller optics 0/0/1/1
Router(config-optics)#perf-mon enable
Router(config-optics)#pm 24-hour optics threshold osnr max 345
Router(config)#commit
```

This example shows how to configure FDD clear and raise alarm threshold on the host side of the optics controller:

```
Router#config
Router(config)#controller optics 0/0/0/10
Router(config-Optics)#host fec-threshold detected-degrade clear 12000
Router(config-Optics)#host fec-threshold detected-degrade raise 22000
Router(config-Optics)#commit
Router(config-Optics)#end
```

This example shows how to enable Media Link-down PreFEC Degrade support on the media side of the optics controller:

```
Router#config
Router(config)#controller optics 0/0/0/10
Router(config-Optics)#media link-down prefec-degrade
Router(config-Optics)#commit
Router(config-Optics)#end
```

hw-module port-range

To configure the muxponder mode, use the **hw-module port-range** command in the global configuration mode.

hw-module port-range *start-port end-port* **[instance** *mpa-instance* **] location** *node-id* **mode** *mode-type*

Syntax Description

start-port end-port	Specify the port range - start and end port. Start port must be an even port and the end port must be an odd port. The port range must be provided in the format as shown in these examples: **port-range 0 1** **port-range 2 3**
instance *mpa-instance*	Specify the MPA-instance.
location *node-id*	Specify the node location.
mode *mode-type*	Configures the mode-type for this controller. Mode-type options available are: • 4x100 • 3x100 • 2x100-PAM4 • 1x100 • 50 To configure 2x100 muxponder mode, use only the 2x100-PAM4 option.

Command Default

None.

Command Modes

Global Configuration

Command History

Release	Modification
Release 7.3.2	This command was introduced.

Usage Guidelines

Table 4: Supported Ports and Command for Configuring Mode Type

Fixed-Port Routers	**Ports**	**Command**
NCS-57B1-6D24H-S	400G ports (ports 24-29)	**breakout**
NCS-57B1-5D24H-SE	400G ports (ports 24-28)	**breakout**
Line Cards	**Ports**	**Command**

NC57-24DD	400G even-numbered ports (port 0, port 2, port 4, and so on)	**breakout**
NC57-18DD-SE	400G ports (port 18 through port 23)	**breakout**
	remaining 400G even-numbered ports (port 0, port 2, and so on)	**hw-module port-range**
NC57-36H6D-S	400G even-numbered (ports 24-35) ports	**hw-module port-range**
Modular Port Adapter	**Ports**	**Command**
NCS57-MPA-12L-S	50G even-numbered ports (port 4, 6, 8, and 10)	**hw-module port-range**

Example

This example shows how to configure the 4x100 mode using the **hw-module port-range** command:

```
Router#configure
Router(config)#hw-module port-range 2 3 location 0/0/CPU0 mode 4x100
Router(config)#commit
```

hw-module quad

To configure the quad port in the specified mode, use the **hw-module quad** command in the XR Config mode. Use the **no** form of the command to revert to the default 25Gbps quad mode.

hw-module quad *quad-number* **location** *node-id* **mode** *port-speed*

Syntax Description

quad-number	Specifies the number of quads (0,1,2,…n). Each quad has a default speed of 25Gbps. You can modify the default 25Gbps mode to one of the following modes: • 1Gbps mode • 10Gbps mode • 50Gbps mode 50Gbps mode is supported only on the following NC57 line cards: • NC-57-48Q2D-S • NC-57-48Q2D-SE-S
location	Specifies the node location.
node-id	Specifies the location of the node. Example: *0/0/CPU0*.
mode	Specifies the mode speed.
port-speed	Specifies the speed of the quad mode. Valid options are: • 1Gbps • 10Gbps • 25Gbps (default) • 50Gbps 50Gbps mode is supported only on the following line cards: • NC-57-48Q2D-S • NC-57-48Q2D-SE-S

Command Default

25Gbps is the default mode configured on the quad.

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.3.2	This command was introduced.

Release	Modification
Release 24.2.1	A new variable, *50g*, was added to the **mode** keyword of the command for NC-57-48Q2D-S and NC-57-48Q2D-SE-S line cards.

Usage Guidelines

Guidelines for 1Gbps or 10Gbps Port Speed

Note These guidelines do not apply to the NC-57-48Q2D-S and NC-57-48Q2D-SE-S line cards.

- Port speeds of 1Gbps and 10Gbps are incompatible with a 25Gbps port speed within the same quad. They cannot be configured to operate simultaneously.
- 10Gbps mode supports both 1Gbps and 10Gbps port speed.

Guidelines for 50Gbps Port Speed

Note These guidelines apply only to the NC-57-48Q2D-S and NC-57-48Q2D-SE-S line cards.

- Starting with Cisco IOS XR Software Release 24.2.1, port speed of 50Gbps is also supported. This port speed is supported only on the NC-57-48Q2D-S and NC-57-48Q2D-SE-S line cards.
- Port speeds of 1Gbps, 10Gbps, and 25Gbps are incompatible with a 50Gbps port speed within the same quad. They cannot be configured to operate simultaneously.
- 25Gbps mode supports 1Gbps, 10Gbps, and 25Gbps port speed.

Example

This example shows how to configure 10Gbps quad ports.

```
Router#configure
Router(config)#hw-module quad 1 location 0/0/CPU0 mode 10g
Router(config)#commit
```

This example shows how to revert to the default 25Gbps quad ports from 10Gbps mode.

```
Router#configure
Router(config)#no hw-module quad 1 location 0/0/CPU0 mode 10g
Router(config)#commit
```

This example shows how to configure 50Gbps quad ports for the NC-57-48Q2D-S and NC-57-48Q2D-SE-S line cards.

```
Router#configure
Router(config)#hw-module quad 1 location 0/0/CPU0 mode 50g
Router(config)#commit
```

This example shows how to revert to the default 25Gbps quad ports from 50Gbps mode configured on the NC-57-48Q2D-S and NC-57-48Q2D-SE-S line cards.

```
Router#configure
Router(config)#no hw-module quad 1 location 0/0/CPU0 mode 50g
Router(config)#commit
```

dwdm-carrier

To configure the wavelength, use the **dwdm-carrier** command in optics controller configuration mode.

dwdm-carrier 100MHz-grid frequency *frequency*
dwdm-carrier 50Ghz-grid [**frequency** *frequency* | *channel-number*]

Syntax Description

100MHz-grid frequency	Configures the wavelength in 100MHz (0.1GHz) grid spacing in accordance with ITU definition.
50Ghz-grid	Configures the wavelength in 50GHz grid spacing in accordance with ITU definition.
frequency *frequency*	Specifies the frequency for the optics controller. In 50GHz grid spacing, enter the 5-digit frequency value in the range of 19115 to 19610. For example, enter 19580 to specify 195.8 THz. In 100MHz grid spacing, enter the 7-digit frequency value in the range of 1911500 to 1961000. For example, enter 1913501 to specify 191.3501 THz.
channel-number	ITU channel number. The range is 1 to 100 for conventional band (C-band).

Command Default

No wavelength is configured.

Command Modes

Optics controller

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines

You must shut down the controller before you configure the controller or restore a saved configuration.

Use the show **controllers optics** *r /s /i /p* **dwdm-carrrier-map** command to display the wavelength and channel mapping for trunk optics controllers.

Examples

The following example shows how to configure the frequency in 50GHz grid spacing.

```
RP/0/RP0/CPU0:router# config
RP/0/RP0/CPU0:router(router)# controller optics 0/5/0/1
RP/0/RP0/CPU0:router(config-optics)# dwdm-carrier 50GHz-grid frequency 1960625
```

framing

To specify the type of framing used by E1 channels, use the **framing unframed** command in controller configuration mode.

framing unframed

Syntax Description

unframed	Specifies the unframed packets.

Command Default

The default value is **unframed**.

Command Modes

Controller configuration.

Command History

Release	Modification
7.5.1	This command was introduced. Applicable only to N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, N540X-6Z18G-SYS-A/D and N540X-8Z16G-SYS-A/D variants.

Examples

```
Router#show running-config controlle e1 0/0/0/11
Tue Nov 16 12:15:31.824 UTC
controller E1 0/0/0/11
vlan 100 ecid 1
clock source recovered acr
!

RP/0/RP0/CPU0:PE2#show controller e1 0/0/0/11
Tue Nov 16 12:15:45.369 UTC

Controller State : Up

Transport Admin State : In Service

Framing : Unframed

Linecoding : High Density Bipolar Order 3

Loopback : None

Clock : Adaptive Clock Recovery (ACR)

Clock State: Locked

vlan id : 100
ecid : 1

Alarm Status :
-------------
Detected Alarms :
-------------None

-------------

Root Alarm Status :
-------------
```

```
Detected Alarms :
-------------None

-------------


CEM stats :
Ingress Pkts : 104952484
Ingress Drop Pkts : 0
Egress Pkts : 104952484
Egress Drop Pkts : 0
Input Error : 0
Output Error : 0
Pkt Missing : 0
Pkt Reordered : 0
Missorder Drops : 0
Jitter Buffer Underrun : 0
Pkts Malformed : 0
JitterBuffer Overrun : 0RP/0/RP0/CPU0:PE2#
```

linecode

To specify the type of line coding used by E1 channels, use the **linecode** command in controller configuration mode.

linecode { **hdb3** | **ami** }

Syntax Description

hdb3	Specifies the hdb3 linecode type.
ami	Specifies the ami linecode type.

Command Modes

Controller configuration.

Command History

Release	Modification
7.5.1	This command was introduced. Applicable only to N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, N540X-6Z18G-SYS-A/D and N540X-8Z16G-SYS-A/D variants.

Examples

```
Router#linecoding ami
```

loopback

To configure loopback E1 controller, use the **loopback** command in controller configuration mode.

loopback { **local** | **network** [**line**] }

Syntax Description

local	Places the interface into local loopback mode and creates a loopback wherein information received from the locally-attached customer premises equipment (CPE) is transmitted back to the locally-attached CPE.
network	Creates a loopback wherein data received over the network from the remote CPE is transmitted back to the remote CPE. • line: Creates a full physical layer loopback of all bits, including data and framing bits.

Command Default

No **loopback** is configured.

Command Modes

Controller configuration.

Command History

Release	Modification
7.5.1	This command was introduced. Applicable only to N540-28Z4C-SYS-A/D, N540X-16Z4G8Q2C-A/D, N540-12Z20G-SYS-A/D, N540X-12Z16G-SYS-A/D, N540X-6Z18G-SYS-A/D and N540X-8Z16G-SYS-A/D variants.

Examples

```
Router#show running-config controller e1 0/0/0/11
Tue Nov 16 18:37:58.238 UTC
controller E1 0/0/0/11
vlan 100 ecid 1
loopback network line
sec-admin-state maintenance


RP/0/RP0/CPU0:PE2#show controllers e1 0/0/0/11
Tue Nov 16 18:40:40.801 UTC

Controller State : Up

Transport Admin State : Maintenance

Framing : Unframed

Linecoding : High Density Bipolar Order 3

Loopback : Line side loopback

Clock : Internal

vlan id : 100
ecid : 1

Alarm Status :
-------------
```

```
Detected Alarms :
-------------None

-------------

Root Alarm Status :
-------------
Detected Alarms :
-------------None

-------------


CEM stats :
Ingress Pkts : 128048371
Ingress Drop Pkts : 0
Egress Pkts : 128048370
Egress Drop Pkts : 0
Input Error : 0
Output Error : 0
Pkt Missing : 0
Pkt Reordered : 0
Missorder Drops : 0
Jitter Buffer Underrun : 0
Pkts Malformed : 0
```

PRBS

To enable PRBS (Pseudo Random Binary Sequence) mode for PLE client controllers, enable this command in PLE client controller configuration mode.

prbs mode *mode-type* **pattern** *pattern-type* [**direction** *direction-type* | **error-inject** *type* | **framing** *framing-type*]

Syntax Description

mode *mode-type*	Configures the specified PRBS (Pseudo Random Binary Sequence) mode. The available options are: • source • source-sink
pattern *pattern-type*	Configures the pattern for PRBS mode. The available options are: • pn7 • pn9 • pn15 • pn23 • pn31 • user-defined
direction *direction-type*	Configures the PRBS direction. The supported directions are: • line - Configures the PRBS in line side. • System - Configures the PRBS in system side.
error-inject *type*	Configures error injection in the PRBS pattern. Supported error injection type is: • continuous

framing *framing-type*	Configure PRBS framing type. Supported framing types are: • framed - Enables framed PRBS • unframed - Enables unframed PRBS **Note** The default framing configurations: • otu2 and otu2e - Unframed • odu2 and odu2e - framed

Command Modes

Controller configuration.

Command History

Release	Modification
7.7.1	This command was introduced.

Usage Guidelines

This command is supported only on NC55-OIP-02 MPA.

Note
- Error inject is disabled by default.
- Default PRBS direction is line side.
- PRBS with framing type as framed is supported with odu2, odu2e, SONET and SDH controllers. The supported patterns are PN23, PN31 and user-defined.

Table 5: PRBS Pattern Support Matrix

Pattern	Direction	Supported controllers
PN7	• Line	• SONET controllers • SDH controllers • FC controllers • OTN controllers • Ethernet controllers
PN9		
PN15		
PN23	• Line • System	
PN31		
User-defined		

Table 6: PRBS framing support matrix

Controller Type	Supported PRBS Framing
SONET controllers	• Framed PRBS • Unframed PRBS
SDH controllers	• Framed PRBS • Unframed PRBS
FC controllers	• Unframed PRBS
OTN controllers	• Framed PRBS • Unframed PRBS
Ethernet controllers	• Unframed PRBS

Before configuring PRBS, the secondary admin state should be set to maintenance mode.

```
RP/0/RP0/CPU0:router(config-otu2)#?
secondary-admin-state  Configure the secondary admin state of the controller

RP/0/RP0/CPU0:router(config-otu2)#secondary-admin-state ?

maintenance  Maintenance, Admin-state under maintenance
normal       Normal, Admin-state in normal
RP/0/RP0/CPU0:router(config-otu2)#secondary-admin-state maintenance
RP/0/RP0/CPU0:router(config-otu2)#commit
```

Examples

This example shows PRBS configuration and show command output for otu2 controller on NC55-OIP-02 MPA.

```
RP/0/RP0/CPU0:router#prbs mode source-sink pattern pn15 direction line error-inject continuous
RP/0/RP0/CPU0:router#commit

show command o/p
RP/0/RP0/CPU0:router#show controller otu2 0/0/2/4 prbs-details
Mon Jul 18 08:11:44.281 UTC

----------------------PRBS details------------------
PRBS Test  : Enable
PRBS Mode  : Source-Sink
PRBS Pattern  : PN31
PRBS Direction  : Line
PRBS Error-Inject : None
PRBS Status  : Unlocked

--------------------------------------------------
```

loopback (PLE)

To configure loopback for PLE controller, use the **loopback** command in PLE client controller configuration mode.

loopback { **internal** | **line** }

Syntax Description

internal	Configures internal loopback mode.
line	Creates a full physical layer loopback of all bits, including data and framing bits.

Command Default

No **loopback** is configured.

Command Modes

Controller configuration.

Command History

Release	Modification
7.7.1	This command was introduced.

Usage Guidelines

This command is supported only on NC55-OIP-02 MPA.

Before configuring loopback, the secondary admin state should be set to maintenance mode.

```
RP/0/RP0/CPU0:router(config-EightGigFibreChanCtrlr)#?
secondary-admin-state  Configure the secondary admin state of the controller

RP/0/RP0/CPU0:router(config-EightGigFibreChanCtrlr)#secondary-admin-state ?

maintenance  Maintenance, Admin-state under maintenance
normal       Normal, Admin-state in normal
RP/0/RP0/CPU0:router(config-EightGigFibreChanCtrlr)#secondary-admin-state maintenance
RP/0/RP0/CPU0:router(config-EightGigFibreChanCtrlr)#commit
```

This example shows loopback configuration and show command output for 8G Fibre channel controller on NC55-OIP-02 MPA.

Examples

```
RP/0/RP0/CPU0:router(config)#controller eightGigFibreChanCtrlr 0/0/2/1
RP/0/RP0/CPU0:ios(config-EightGigFibreChanCtrlr)#loopback line
RP/0/RP0/CPU0:ios(config-EightGigFibreChanCtrlr)#commit



RP/0/RP0/CPU0:router#show controller EightGigFibreChanCtrlr0/0/2/1
Fri Jul 22 05:35:14.069 UTC

Operational data for Fibre Channel controller EightGigFibreChanCtrlr0/0/2/1

State:
        Admin State           : Up
        Operational state     : Down
        LED state             : Red On
        Secondary admin state : Normal
        Laser Squelch         : Disabled
```

```
Performance Monitoring is enabled

Operational values:
        Speed                     : 8 Gbps
        Loopback                  : Line
        BER monitoring:
                Signal Degrade    : 1e-0
                Signal Fail       : 1e-0
        Hold-off Time             : 0 ms
        Forward Error Correction  : Not Configured
```

extended-loopback (PLE)

To configure extended loopback for PLE controller, use the **extended-loopback** command in PLE client controller configuration mode.

extended-loopback level *type* { **internal** | **line** }

Syntax Description

level *type*	Configures the extended loopback level. The supported level types are 1 and 2.
internal	Configures internal loopback mode.
line	Creates a full physical layer loopback of all bits, including data and framing bits.

Command Default

No **extended-loopback** is configured.

Command Modes

Controller configuration.

Command History

Release	Modification
7.7.1	This command was introduced.

Usage Guidelines

This command is supported only on NC55-OIP-02 MPA with Ethernet, SONET and SDH client controllers.

Before configuring extended loopback, the secondary admin state should be set to maintenance mode.

```
RP/0/RP0/CPU0:router(config-eth-ctrlr)#?
secondary-admin-state  Configure the secondary admin state of the controller

RP/0/RP0/CPU0:router(config-eth-ctrlr)#secondary-admin-state ?

maintenance  Maintenance, Admin-state under maintenance
normal       Normal, Admin-state in normal
RP/0/RP0/CPU0:router(config-eth-ctrlr)#secondary-admin-state maintenance
RP/0/RP0/CPU0:router(config-eth-ctrlr)#commit
```

This example shows extended loopback configuration and show command output for 10GbE Ethernet controller on NC55-OIP-02 MPA.

Examples

```
RP/0/RP0/CPU0:router(config)#controller TenGigECtrlr 0/0/2/2
RP/0/RP0/CPU0:router(config-eth-ctrlr)#extended-loopback level ?
  <1-3>
RP/0/RP0/CPU0:router(config-eth-ctrlr)#extended-loopback level 1 ?
  internal  Enable internal loopback
  line      Enable line loopback
RP/0/RP0/CPU0:router(config-eth-ctrlr)#extended-loopback level 1 line ?
  <cr>
RP/0/RP0/CPU0:router(config-eth-ctrlr)#extended-loopback level 1 line

RP/0/RP0/CPU0:router#show controller tenGigEctrlr 0/0/2/2
Mon Jul 25 11:09:44.533 UTC
Operational data for interface TenGigECtrlr0/0/2/2:
```

```
State:
    Administrative state: enabled
    Operational state: Up
    LED state: Red Flashing
    PRBS:
      Status: Not Running
      Mode: None
      Pattern: None
      Direction: Not configured
      Error-inject: None
      Framing: Not Configured
      User-pattern: 0x0

Phy:
    Media type: Not known
    Alarms:
        Current:
            Loss of Signal
            PCS Loss of Block Lock
            Loss of Frequency Sync Data
        Previous:
            Loss of Signal
            PCS Loss of Block Lock
            Loss of Frequency Sync Data

Autonegotiation disabled.

Operational values:
    Speed: 10Gbps
    Duplex: Full Duplex
    Flowcontrol: None
    Loopback: None (or external)
    Extended Loopback: Level 1: Line
    Inter-packet gap: standard (12)
    BER monitoring:
        Not supported
```

pm

To configure the performance monitoring parameters of the optics and coherent DSP controllers, use the **pm** command in the optics controller or Coherent DSP controller or PLE controller configuration mode.

pm *time-period* { **optics** | **prbs** | **fec** | **otn** } { **report** | **threshold** } *value*

Syntax Description

pm *time-period*	Configures performance monitoring parameters. The available options are: • 30-sec • 15-min • 24-hour
optics	Configures performance monitoring parameters for the optics controller.
prbs	Configures performance monitoring parameters for the PRBS controller.
fec	Configures performance monitoring parameters for the FEC controller.
otn	Configures performance monitoring parameters for the OTN controller.
report	Configures TCA reporting status.
threshold	Configures threshold on optics or coherent DSP parameters.
value	Value of the reporting or threshold parameters.

Command Default

No default behavior or values

Command Modes

Optics controller

Coherent DSP controller

Command History

Release	Modification
Release 6.2.2	This command was introduced.
Release 7.7.1	The **prbs** keyword was added.

Usage Guidelines

You must shut down the controller before you configure the controller or restore a saved configuration.

Note The **prbs** keyword is supported only with NC55-OIP-02 MPA.

The following table describes the optics PM parameters:

Parameter	Description
cd	Chromatic dispersion TCA reporting status or threshold
dgd	Differential group delay TCA reporting status or threshold
lbc	lbc TCA reporting status or threshold
lbc-pc	lbc percentage TCA reporting status or threshold
opr	opr TCA reporting status or threshold
opt	opt TCA reporting status or threshold
osnr	Optical Signal to Noise Ratio TCA reporting status or threshold
pcr	Polarization Change Rate TCA reporting status or threshold
pdl	Polarization Dependent Loss TCA reporting status or threshold
pn	Phase Noise TCA reporting status or threshold
sopmd	Second Order Polarization Mode Dispersion TCA reporting status or threshold

The following table describes the OTN PM parameters.

Parameter	Description
ES-NE	Error seconds in the near end
ESR-NE	Error seconds ratio in the near end
SES-NE	Severely error seconds in the near end
SESR-NE	Severely error seconds ratio in the near end
UAS-NE	Unavailable seconds in the near end
BBE-NE	Background block errors in the near end
BBER-NE	Background block errors ratio in the near end
FC-NE	Failure counts in the near end
ES-FE	Error seconds in the far end
ESR-FE	Error seconds ratio in the far end
SES-FE	Severely error seconds in the far end

Parameter	Description
SESR-FE	Severely error seconds ratio in the far end
UAS-FE	Unavailable seconds in the far end
BBE-FE	Background block errors in the far end
BBER-FE	Background block errors ratio in the far end
FC-FE	Failure counts in the far end

The following table describes the FEC PM parameters.

Parameter	Description
ec-bits	Number of bit errors that are corrected by the system
uc-words	Number of words that are not corrected by the system

Examples

This example shows how to set the maximum TCA reporting status for the chromatic dispersion.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller optics 0/5/0/1 pm 15-min optics report cd max-tca
 enable
```

This example shows how to set the maximum threshold for the chromatic dispersion.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller optics 0/5/0/1 pm 15-min optics threshold cd max
```

This example shows how to set the maximum error seconds in the far end.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller coherentDSP 0/5/0/1 pm 15-min otn threshold es-fe
 500
```

This example shows PRBS performance monitoring information for otu2 controller on NC55-OIP-02 MPA.

```
RP/0/RP0/CPU0:router#show controller otu2 0/0/2/4 pm current 15-min prbs

RP/0/RP0/CPU0:router#show controller otu2 0/0/2/4 pm current 15-min prbs
Mon Jul 18 09:30:06.603 UTC

 PRBS in the current interval [09:30:00 - 09:30:06 Mon Jul 18 2022]

 PRBS current bucket type : Valid

 EBC          : 0           Threshold : 0         TCA(enable)   : NO
 FOUND-COUNT  : 0           Threshold : 0         TCA(enable)   : NO
 LOST-COUNT   : 0           Threshold : 0         TCA(enable)   : NO

 FOUND-AT-TS  : NULL
 LOST-AT-TS   : NULL
```

```
CONFIG-PTRN  : PRBS_PATTERN_PN31
STATUS       : UNLOCKED
```

pm otn report enable

To enable Threshold Crossing Alert (TCA) generation on the Optical Transport Network (OTN) layer, use the **pm otn report enable** command in otu2e/odu2e configuration mode. To disable TCA reporting, use the **no** form of this command.

pm { **30-sec** | **15-min** | **24-hour** } **otn report** *otn-parameter* **enable**

Syntax Description

30-sec	Configures TCA generation for 30-second intervals.
15-min	Configures TCA generation for 15-minute intervals.
24-hour	Configures TCA generation for 24-hour intervals.
otn-parameter	Specific parameter for which to configure the threshold. OTN parameters can be as follows: • **bbe-pm-fe**—Far-end path monitoring background block errors (BBE-PM). Indicates the number of background block errors recorded in the optical transport network (OTN) path during the performance monitoring time interval. • **bbe-pm-ne**—Near-end path monitoring background block errors (BBE-PM). • **bbe-sm-fe**—Far-end section monitoring background block errors (BBE-SM). Indicates the number of background block errors recorded in the OTN section during the performance monitoring time interval. • **bbe-sm-ne**—Near-end section monitoring background block errors (BBE-SM). • **bber-pm-fe**—Far-end path monitoring background block errors ratio (BBER-PM). Indicates the background block errors ratio recorded in the OTN path during the performance monitoring time interval. • **bber-pm-ne**—Near-end path monitoring background block errors ratio (BBER-PM). • **bber-sm-fe**—Far-end section monitoring background block errors ratio (BBER-SM). Indicates the background block errors ratio recorded in the OTN section during the performance monitoring time interval. • **bber-sm-ne**—Near-end section monitoring background block errors ratio (BBER-SM) • **es-pm-fe**—Far-end path monitoring errored seconds (ES-PM). Indicates the errored seconds recorded in the OTN path during the performance monitoring time interval. • **es-pm-ne**—Near-end path monitoring errored seconds (ES-PM). • **es-sm-fe**—Far-end section monitoring errored seconds (ES-SM). Indicates the errored seconds recorded in the OTN section during the performance monitoring time interval. • **es-sm-ne**—Near-end section monitoring errored seconds (ES-SM). • **esr-pm-fe**—Far-end path monitoring errored seconds ratio (ESR-PM). Indicates the errored seconds ratio recorded in the OTN path during the performance monitoring time interval.

- **esr-pm-ne**—Near-end path monitoring errored seconds ratio (ESR-PM).
- **esr-sm-fe**—Far-end section monitoring errored seconds ratio (ESR-SM). Indicates the errored seconds ratio recorded in the OTN section during the performance monitoring time interval.
- **esr-sm-ne**—Near-end section monitoring errored seconds ratio (ESR-SM).
- **fc-pm-fe**—Far-end path monitoring failure counts (FC-PM). Indicates the failure counts recorded in the OTN path during the performance monitoring time interval.
- **fc-pm-ne**—Near-end path monitoring failure counts (FC-PM).
- **fc-sm-fe**—Far-end section monitoring failure counts (FC-SM). Indicates the failure counts recorded in the OTN section during the performance monitoring time interval.
- **fc-sm-ne**—Near-end section monitoring failure counts (FC-SM).
- **ses-pm-fe**—Far-end path monitoring severely errored seconds (SES-PM). Indicates the severely errored seconds recorded in the OTN path during the performance monitoring time interval.
- **ses-pm-ne**—Far-end path monitoring severely errored seconds (SES-PM).
- **ses-sm-fe**—Far-end section monitoring severely errored seconds (SES-SM). Indicates the severely errored seconds recorded in the OTN section during the performance monitoring time interval.
- **ses-sm-ne**—Near-end section monitoring severely errored seconds (SES-SM).
- **sesr-pm-fe**—Far-end path monitoring severely errored seconds ratio (SESR-PM). Indicates the severely errored seconds ratio recorded in the OTN path during the performance monitoring time interval.
- **sesr-pm-ne**—Near-end path monitoring severely errored seconds ratio (SESR-PM).
- **sesr-sm-fe**—Far-end section monitoring severely errored seconds ratio (SESR-SM). Indicates the severely errored seconds ratio recorded in the OTN section during the performance monitoring time interval.
- **sesr-sm-ne**—Near-end section monitoring severely errored seconds ratio (SESR-SM).
- **uas-pm-fe**—Far-end path monitoring unavailable seconds (UAS-PM). Indicates the unavailable seconds recorded in the OTN path during the performance monitoring time interval.
- **uas-pm-ne**—Near-end path monitoring unavailable seconds (UAS-PM).
- **uas-sm-fe**—Far-end section monitoring unavailable seconds (UAS-SM). Indicates the unavailable seconds recorded in the OTN section during the performance monitoring time interval.
- **uas-sm-ne**—Near-end section monitoring unavailable seconds (UAS-SM).

Command Default

TCA generation is not enabled.

Command Modes

OTU2e/ODU2e configuration

Command History

Release	Modification
Release 7.5.1	This command was introduced.

Usage Guidelines

To display performance measurement information for the OTN layer, use the **show controller otu2e/odu2e pm otn** command.

Task ID

Task ID	Operations
otu2e, odu2e	read, write

Examples

The following example shows how to enable TCA generation on the OTN layer reporting for the path monitoring errored seconds ratio (ESR-PM):

```
RP/0/RP0/CPU0:router(config)# controller odu2e 0/0/0/0
RP/0/RP0/CPU0:router(config-odu2e)# pm 30-sec otn pathmonitor report esr-fe enable
```

pm otn threshold

To configure performance monitoring thresholds on the optical transport network (OTN) layer, use the **pm otn threshold** command in otu2e or odu2e configuration mode. To disable TCA reporting, use the **no** form of this command.

pm { **30-sec** | **15-min** | **24-hour** } **otn threshold** *otn-paramter* **enable**

Syntax Description

30-sec	Configures performance monitoring thresholds for 30-second intervals.
15-min	Configures performance monitoring thresholds for 15-minute intervals.
24-hour	Configures performance monitoring thresholds for 24-hour intervals.
otn-parameter	Specific parameter for which to configure the threshold. OTN parameters can be as follows: • **bbe-pm-fe**—Far-end path monitoring background block errors (BBE-PM). Indicates the number of background block errors recorded in the optical transport network (OTN) path during the performance monitoring time interval. • **bbe-pm-ne**—Near-end path monitoring background block errors (BBE-PM). • **bbe-sm-fe**—Far-end section monitoring background block errors (BBE-SM). Indicates the number of background block errors recorded in the OTN section during the performance monitoring time interval. • **bbe-sm-ne**—Near-end section monitoring background block errors (BBE-SM). • **bber-pm-fe**—Far-end path monitoring background block errors ratio (BBER-PM). Indicates the background block errors ratio recorded in the OTN path during the performance monitoring time interval. • **bber-pm-ne**—Near-end path monitoring background block errors ratio (BBER-PM). • **bber-sm-fe**—Far-end section monitoring background block errors ratio (BBER-SM). Indicates the background block errors ratio recorded in the OTN section during the performance monitoring time interval. • **bber-sm-ne**—Near-end section monitoring background block errors ratio (BBER-SM) • **es-pm-fe**—Far-end path monitoring errored seconds (ES-PM). Indicates the errored seconds recorded in the OTN path during the performance monitoring time interval. • **es-pm-ne**—Near-end path monitoring errored seconds (ES-PM). • **es-sm-fe**—Far-end section monitoring errored seconds (ES-SM). Indicates the errored seconds recorded in the OTN section during the performance monitoring time interval. • **es-sm-ne**—Near-end section monitoring errored seconds (ES-SM).

	• **esr-pm-fe**—Far-end path monitoring errored seconds ratio (ESR-PM). Indicates the errored seconds ratio recorded in the OTN path during the performance monitoring time interval. • **esr-pm-ne**—Near-end path monitoring errored seconds ratio (ESR-PM). • **esr-sm-fe**—Far-end section monitoring errored seconds ratio (ESR-SM). Indicates the errored seconds ratio recorded in the OTN section during the performance monitoring time interval. • **esr-sm-ne**—Near-end section monitoring errored seconds ratio (ESR-SM). • **fc-pm-fe**—Far-end path monitoring failure counts (FC-PM). Indicates the failure counts recorded in the OTN path during the performance monitoring time interval. • **fc-pm-ne**—Near-end path monitoring failure counts (FC-PM). • **fc-sm-fe**—Far-end section monitoring failure counts (FC-SM). Indicates the failure counts recorded in the OTN section during the performance monitoring time interval. • **fc-sm-ne**—Near-end section monitoring failure counts (FC-SM). • **ses-pm-fe**—Far-end path monitoring severely errored seconds (SES-PM). Indicates the severely errored seconds recorded in the OTN path during the performance monitoring time interval. • **ses-pm-ne**—Far-end path monitoring severely errored seconds (SES-PM). • **ses-sm-fe**—Far-end section monitoring severely errored seconds (SES-SM). Indicates the severely errored seconds recorded in the OTN section during the performance monitoring time interval. • **ses-sm-ne**—Near-end section monitoring severely errored seconds (SES-SM). • **sesr-pm-fe**—Far-end path monitoring severely errored seconds ratio (SESR-PM). Indicates the severely errored seconds ratio recorded in the OTN path during the performance monitoring time interval. • **sesr-pm-ne**—Near-end path monitoring severely errored seconds ratio (SESR-PM). • **sesr-sm-fe**—Far-end section monitoring severely errored seconds ratio (SESR-SM). Indicates the severely errored seconds ratio recorded in the OTN section during the performance monitoring time interval. • **sesr-sm-ne**—Near-end section monitoring severely errored seconds ratio (SESR-SM). • **uas-pm-fe**—Far-end path monitoring unavailable seconds (UAS-PM). Indicates the unavailable seconds recorded in the OTN path during the performance monitoring time interval. • **uas-pm-ne**—Near-end path monitoring unavailable seconds (UAS-PM).
	• **uas-sm-fe**—Far-end section monitoring unavailable seconds (UAS-SM). Indicates the unavailable seconds recorded in the OTN section during the performance monitoring time interval. • **uas-sm-ne**—Near-end section monitoring unavailable seconds (UAS-SM).
threshold	Threshold for the performance monitoring parameter.

Command Default No thresholds are configured.

Command Modes OTU2e/ODU2e configuration

Command History

Release	Modification
Release 7.5.1	This command was introduced.

Usage Guidelines

To display performance measurement information for the OTN layer, use the **show controller otd2e pm** or **otn or show controller odu2e otn** command.

Task ID

Task ID	Operations
otu2e, odu2e	read, write

Examples

The following example shows how to configure an OTN layer performance monitoring threshold for path monitoring errored seconds ratio (ESR-PM):

```
RP/0/RP0/CPU0:router(config)# controller odu2e 0/0/0/0
RP/0/RP0/CPU0:router(config-odu2e)# pm 15-min otn pathmonitor threshold esr-ne 50000
```

port-mode speed

To configure the port mode, use the **port-mode speed** command in optics controller configuration mode.

port-mode speed { **100G** | **150G** | **200G** } **mod** { **16qam** | **8qam** |**qpsk** } **fec** { **15sdfec** | **15sdfecde** | **25sdfec** | **otu7staircase** } **diff** { **enable** | **disable** }

Syntax Description

100G | **150G** | **200G**	Specifies 100 Gbps (DWDM QPSK), 150Gbps (DWDM 8 QAM), or 200Gbps (DWDM 16 QAM) WDM signals.
mod { **16qam** | **8qam** |**qpsk** }	Configures the port speed modulation.
fec {**15sdfec** | **15sdfecde** | **25percent** | **otu7staircase** }	Specifies 15% Forward Error Correction (FEC) or 25% FEC of overhead gain.
diff {**disable** | **enable**}	Specifies differential or non-differential line-encoding mode.

Command Default

No default behavior or values

Command Modes

Optics controller

Command History

Release	Modification
Release 6.2.2	This command was introduced.
Release 6.5.1	Support for QPSK, 16 QAM and 8 QAM modulation was introduced.
Release 7.2.1	Support for 1-port 100G/200G CFP2 DCO (N560-IMA1W) Interface Module for Cisco NCS 560 routers.

Usage Guidelines

You must shut down the controller before you configure the controller or restore a saved configuration.

Note When you bring up the local optics controller, you might briefly see transient loss of signal (LOS) alarms on the console. This behavior might be observed during the initial tuning of the channel.

```
PKT_INFRA-FM-2-FAULT_CRITICAL : ALARM_CRITICAL :LOS-P :DECLARE :CoherentDSP0/3/0/1:
PKT_INFRA-FM-2-FAULT_CRITICAL : ALARM_CRITICAL :LOS-P :CLEAR :CoherentDSP0/3/0/1:
```

During the laser-on process, you might briefly see transient loss of line (LOL) alarms on the console. This alarm is cleared when the laser-on process is complete.

```
PKT_INFRA-FM-3-FAULT_MAJOR : ALARM_MAJOR :CTP2 RX LOL :DECLARE ::
PKT_INFRA-FM-3-FAULT_MAJOR : ALARM_MAJOR :CTP2 RX LOL :CLEAR ::
```

After you configure the port-mode speed for the NC55-6X200-DWDM-S, you can configure the following interfaces:

- 100G – Each optics controller configuration creates a single 100GE port:
  - **interface HundredGE** *r*/*s*/*i*/*p*/**0** (where*p* = CTP2 port 0-5)

    0/3/0/0/0

    0/3/0/1/0

    0/3/0/2/0

    0/3/0/3/0

    0/3/0/4/0

    0/3/0/5/0

- 200G – Each optics controller configuration creates two 100GE ports:
  - **interface HundredGigE** *r*/*s*/*i*/*p*/**0,** *r*/*s*/*i*/*p*/**1** (where*p* = CTP2 port 0-5

    0/3/0/0/0, 0/3/0/0/1

    0/3/0/1/0, 0/3/0/1/1

    0/3/0/2/0, 0/3/0/2/1

    0/3/0/3/0, 0/3/0/3/1

    0/3/0/4/0, 0/3/0/4/1

    0/3/0/5/0, 0/3/0/5/1

- 150G (coupled) – Coupled optics controller configuration creates three 100GE port:
  - **interface HundredGigE** *r*/*s*/*i*/*p*/**0,** *r*/*s*/*i*/*p*/**1,** *r*/*s*/*i*/*p*+1/**0** (where*p* = CTP2 port: 0, 2, 4 [port *p* and *p* +1 are coupled])

    0/3/0/0/0, 0/3/0/0/1, 0/3/0/1/0

    0/3/0/2/0, 0/3/0/2/1, 0/3/0/3/0

    0/3/0/4/0, 0/3/0/4/1, 0/3/0/5/0

Note The line card has three Digital Signal Processors (DSPs), one for each pair of ports:

- Ports 0 and 1 – DSP0
- Ports 2 and 3 – DSP1
- Ports 4 and 5 – DSP2

When you configure the port-mode speed for 150Gbps (8 QAM), the port pairs belonging to a DSP are coupled.

After you configure the port-mode for the N560-IMA1W, you can configure the following interfaces:

- **HundredGigE (HuGig) Ports***R*/*S*/*I*/*P*/*i* (where *i* = subport)

The HuGig ports are created and mapped based on the port-mode configuration of the **controller optics** (*R*/*S*/*I*/*P*)

- **100G/QPSK**

  The controller optics configuration creates a single HuGig port. This is the default configuration where controller optics 0/0/0/0 creates HundredGigE0/0/0/0/0.

- **200G/16QAM** or **200G/8QAM**

  In this mode, each controller optics configuration creates two HuGig ports. For example, controller optics 0/0/0/0 creates HundredGigE0/0/0/0/0 and HundredGigE0/0/0/0/1.

To change the port-mode speed, you must remove the existing port mode speed configuration by entering the **no port-mode** command. You can then change the port mode speed.

Note Starting Cisco IOS XR Release 6.3.3, you do not need to use the **shutdown/no shutdown** and **commit** commands in the below configuration.

Examples

This example shows how to configure the port mode speed to 200Gbps.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller optics 0/3/0/0
RP/0/RP0/CPU0:router(config-Optics)# shutdown
RP/0/RP0/CPU0:router(config-Optics)# commit
RP/0/RP0/CPU0:router(config-Optics)# port-mode speed 200G mod qpsk fec 15percent diff enable
RP/0/RP0/CPU0:router(config-Optics)# commit
RP/0/RP0/CPU0:router(config-Optics)# no shutdown
RP/0/RP0/CPU0:router(config-Optics)# commit
RP/0/RP0/CPU0:router(config-Optics)# exit
RP/0/RP0/CPU0:router(config)#
```

This example shows how to change the port mode speed from 200G to 100Gbps.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller optics 0/3/0/0
RP/0/RP0/CPU0:router(config-Optics)# shutdown
RP/0/RP0/CPU0:router(config-Optics)# commit
RP/0/RP0/CPU0:router(config-Optics)# no port-mode
RP/0/RP0/CPU0:router(config-Optics)# commit
RP/0/RP0/CPU0:router(config-Optics)# port-mode speed 100G mod qpsk fec 15percent diff enable
RP/0/RP0/CPU0:router(config-Optics)# commit
RP/0/RP0/CPU0:router(config-Optics)# no shutdown
RP/0/RP0/CPU0:router(config-Optics)# commit
RP/0/RP0/CPU0:router(config-Optics)# exit
RP/0/RP0/CPU0:router(config)#
```

port-mode

To configure the Ethernet, Fibre Channel (FC), Optical Transport Network (OTN), Synchronous Digital Hierarchy (SDH), or Synchronous optical networking (SONET) port mode, use the **port-mode** command in optics controller configuration mode.

port-mode *controller-type* **framing cem-packetize rate** *rate-options*

Syntax Description

controller-type	Specifies the port mode type. The supported port mode options are: • Ethernet • FC • otn • SDH • Sonet
framing	Specifies the port mode framing type.
cem-packetize	Configures the circuit emulation option.
rate *rate-options*	Specifies port mode rate options. The following *rate-options* are available for each of the selected port mode type:

Port mode type	Rate options
Ethernet	1GE and 10GE
FC	FC1, FC2, FC4, FC8, FC16, and FC32
otn	otu2 and otu2e
SDH	STM16 and STM64
Sonet	OC48 and OC192

Command Default

None

Command Modes

Optics controller

Command History

Release	Modification
Release 7.7.1	This command was introduced.

Usage Guidelines

To change the port-mode type, you must remove the existing port mode configuration by executing the **no port-mode** command. You can then configure the required port mode.

Examples

This example shows how to configure the Ethernet port mode and enable 10GbE rate.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller optics 0/0/2/4
RP/0/RP0/CPU0:router(config-Optics)# port-mode Ethernet framing cem-packetize rate 10GE
RP/0/RP0/CPU0:router(config-Optics)# exit
RP/0/RP0/CPU0:router(config)#
```

Examples

This example shows how to change the Ethernet port mode to Fibre Channel port mode and enable FC1 rate.

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# controller optics 0/0/2/4
RP/0/RP0/CPU0:router(config-Optics)# no port-mode Ethernet framing cem-packetize rate 10GE
RP/0/RP0/CPU0:router(config-Optics)# port-mode FC framing cem-packetize rate FC1
RP/0/RP0/CPU0:router(config-Optics)# exit
RP/0/RP0/CPU0:router(config)#
```

port-mode sonet framing WIS

To enable the WAN-PHY mode, use the **port-mode sonet framing WIS** command in the optics controller configuration mode.

port-mode sonet framing WIS

Syntax Description

sonet framing WIS	Specifies WAN Interface Sublayer (WIS) framing type

Command Default

No default behavior or values

Command Modes

Optics controller

Command History

Release	Modification
Release 7.2.1	This command was introduced.

Usage Guidelines

This command is supported on NC55-MPA-12T-S card and on SFP-10G-LR-X optics.

Example

This sample configuration shows how to enable WAN-PHY on the interface 0/0/1/10:

```
RP/0/RP0/CPU0:ios# controller Optics 0/0/1/10
RP/0/RP0/CPU0:ios# port-mode sonet framing WIS
```

port-mode sdh framing WIS

To enable the SDH mode, use the **port-mode sdh framing WIS** command in the optics controller configuration mode:

port-mode sdh framing WIS

Syntax Description

framing WIS	Specifies WAN Interface Sublayer (WIS) framing type

Command Default

No default behavior or values

Command Modes

Optics controller

Command History

Release	Modification
Release 7.2.2	This command was introduced.

Usage Guidelines

This command is supported on NC55-MPA-12T-S card and on SFP-10G-LR-X optics.

In SDH mode, WIS transports 10GE frames in a STM-64 payload.

Example

This sample configuration shows how to enable SDH mode on the interface 0/0/2/1:

```
RP/0/RP0/CPU0:ios# controller Optics 0/0/2/1
RP/0/RP0/CPU0:ios# port-mode sdh framing WIS
```

show coherent driver

To display Coherent driver and port state, use the **show coherent driver** command in XR EXEC mode.

show coherent driver {**internal** | **summary** | **detail port** *port* | **timestats**} **location** *node-id*

Syntax Description

internal	Displays Coherent driver internal and port status.
summary	Displays a summary of Coherent driver status.
detail port *port*	Displays detailed Coherent driver and port status.
timestats	Displays Coherent driver timing-related status.
location *node-id*	Specifies the node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Examples

```
RP/0/RP0/CPU0:router# show coherent driver summary location 0/3/CPU0
Wed Apr 20 15:19:53.292 UTC
PORT ADMIN-STATE    PLUGGABLE TRAFFIC TYPE             FREQUENCY(100MHz) LASER STATE
=============================================================================================

 0   UP             CFP2      100G_QPSK_FEC15_DIFF     1937000           ON
 1   UP             CFP2      100G_QPSK_FEC15_DIFF     1937000           ON
 2   UP             CFP2      100G_QPSK_FEC15_DIFF     1937000           ON
 3   UP             CFP2      100G_QPSK_FEC15_DIFF     1937000           ON
 4   UP             CFP2      100G_QPSK_FEC15_DIFF     1937000           ON
 5   UP             CFP2      100G_QPSK_FEC15_DIFF     1937000           ON


RP/0/RP0/CPU0:router# show coherent driver timestats location 0/3/CPU0
Thu Mar 16 01:09:52.269 UTC
=============================================================================================

                Driver operation stats
=============================================================================================
Driver Started at               :        [15-02-2017  16:04:30.832]
Driver Operational at           :        [15-02-2017  16:05:02.228]
Device created                  :        [15-02-2017  16:04:56.626]
Optics controllers created at   :        [15-02-2017  16:04:59.489]
```

```
Dsp controllers created at      :        [15-02-2017  16:05:02.228]
Eth interfaces created at       :        [15-02-2017  16:05:02.228]
Optics ea bulk create stats     :        Completed [15-02-2017  16:05:44.194]
Optics ea bulk config stats     :        Completed [15-02-2017  16:05:44.194]
Dsp ea bulk create stats        :        Completed [15-02-2017  16:05:44.194]
Dsp ea bulk config stats        :        Completed [15-02-2017  16:05:44.194]
```

show coherent lib

To display coherent library state information, use the **show coherent lib** command in XR EXEC mode.

Note This command can be executed only on the active RP.

show coherent lib summary location *location*

Syntax Description

summary	Displays the summary of all ports
location *location*	Specifies the active RP location. The *location* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.2.1	The command was introduced on the Cisco NCS 560 routers.

Usage Guidelines

No specific guidelines impact the use of this command.

Example

```
RP/0/RP0/CPU0:ios# show coherent lib summary location 0/RP0/CPU0

PORT      ADMIN-STATE    PLUGGABLE TRAFFIC TYPE                      FREQUENCY(100MHz)
LASER STATE
=============================================================================================
0/0/0/0   UP             CFP2      200G_8QAM_SDFEC_15_NODIFF         1913000           ON

0/1/0/0   UP             CFP2      200G_8QAM_SDFEC_15_NODIFF         1927000           ON

0/2/0/0   UP             CFP2      100G_QPSK_SDFEC_15_NODIFF         1937000           ON

RP/0/RP0/CPU0:ios#
```

show coherent mappingdevices

To display configured optics and Coherent DSP controllers mapped to Coherent line card, use the **show coherent mappingdevices** command in XR EXEC mode.

show coherent mappingdevices location *node-id*

Syntax Description

location *node-id*	Specifies the node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Example

```
RP/0/RP0/CPU0:router# show coherent mappingdevices location 0/3/CPU0

Wed Apr 20 15:26:01.866 UTC
 Coherent Node Information
 Coherent node device mapping info
device_address  Interface handle  Interface Name
0xff0000ff      0x1800010         Optics0_3_0_0
0xff0201ff      0x1800018         Optics0_3_0_5
0xff0200ff      0x1800020         Optics0_3_0_4
0xff0101ff      0x1800028         Optics0_3_0_3
0xff0100ff      0x1800030         Optics0_3_0_2
0xff0001ff      0x1800038         Optics0_3_0_1

0xff0000ff      0x1800070         CoherentDSP0_3_0_0
0xff0201ff      0x1800078         CoherentDSP0_3_0_5
0xff0200ff      0x1800080         CoherentDSP0_3_0_4
0xff0101ff      0x1800088         CoherentDSP0_3_0_3
0xff0100ff      0x1800090         CoherentDSP0_3_0_2
0xff0001ff      0x1800098         CoherentDSP0_3_0_1
```

show coherent pm

To display current optical performance values, use the **show coherent pm** command in XR EXEC mode.

show coherent pm optics *interface* **location** *location*

Syntax Description

optics *interface*	Specifies the optics controller. The *interface* argument is entered in the *rack/slot/instance/port* notation.
location *node-id*	Specifies the node. The *node-id* argument is entered in the *rack/slot/module* notation.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Example

```
RP/0/RP0/CPU0:router# show coherent pm Optics 0/3/0/0 location 0/3/CPU0
Mon Dec  5 11:41:58.806 UTC
Coherent Node Performance Statistics for Interface Optics0_3_0_0
Performance Statistics for the Interface Optics0_3_0_0
--------------------------------------------------
CD Current: -9 ps/nm
CD Average: -7 ps/nm
CD Minimum: -13 ps/nm
CD Maximum: -2 ps/nm

TX Power:        -0.240000 dBm
RX Power:        0.210000 dBm
RX Signal Power: 0.020000 dBm

DGD Current: 2 ps
DGD Average: 1 ps
DGD Minimum: 1 ps
DGD Maximum: 2 ps

OSNR Current: 26.800000 dB
OSNR Average: 26.800000 dB
OSNR Minimum: 26.800000 dB
OSNR Maximum: 26.800000 dB

TX Laser Bias 8 %
RX Laser Bias 8 %
```

```
CTP2 Temperature 44.500000 C
```

show controllers

To display status and configuration information about the interfaces on a specific node, use the **show controllers** command in XR EXEC mode.

show controllers *controller-type r/s/i/p* [**dwdm-carrier-map**] | [**pm** *type time-period* { **optics** *linenumber* | **otn** | **fec** }] | [**stats**] | [**summary**]

Syntax Description

controller-type	Type of the controller. The possible values are: **coherentDSP** or **optics**
r/s/i/p	Specifies the Rack/Slot/Instance/Port number of the controller.
dwdm-carrier-map	Displays the wavelength and channel mapping.
pm *type*	Displays performance monitoring parameters for the controller The available options are: • current • history
time-period	Specifies the performance monitoring intervals. The available options are: • 30-sec • 15-min • 24-hour
optics *linenumber*	Display the PM data for Optics controller. The *linenumber* range is 1 to 12.
otn	Displays OTN PM data for CoherentDSP controller.
fec	Displays FEC PM data for CoherentDSP controller.
stats	Displays the cumulative statistics of the controller port.
summary	Displays brief information in a tabular format. This parameter cannot be used with the stats parameter.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.2.2	This command was introduced.

Release	Modification
Release 7.2.1	The command was updated to display the WAN PHY information.

Example

```
RP/0/RP0/CPU0:ios# show controllers optics 0/0/0/0

 Controller State: Up

 Transport Admin State: In Service

 Laser State: On

 LED State: Green

 Optics Status

         Optics Type:  CFP2 DWDM
         DWDM carrier Info: C BAND, MSA ITU Channel=69, Frequency=192.70THz,
         Wavelength=1555.747nm

         Alarm Status:
         -------------
         Detected Alarms: None


         LOS/LOL/Fault Status:
         Alarm Statistics:

         -------------
         HIGH-RX-PWR = 1            LOW-RX-PWR = 671
         HIGH-TX-PWR = 0            LOW-TX-PWR = 312
         HIGH-LBC = 0               HIGH-DGD = 0
         OOR-CD = 0                 OSNR = 0
         WVL-OOL = 0                MEA  = 0
         IMPROPER-REM = 0
         TX-POWER-PROV-MISMATCH = 0
         Laser Bias Current = 0.0 %
         Actual TX Power = -1.49 dBm
         RX Power = -2.85 dBm

         Performance Monitoring: Enable

         THRESHOLD VALUES
         ----------------

         Parameter                High Alarm  Low Alarm  High Warning  Low Warning
         -----------------------  ----------  ---------  ------------  -----------
         Rx Power Threshold(dBm)         1.5      -30.0           0.0          0.0
         Tx Power Threshold(dBm)         3.5      -10.0           0.0          0.0
         LBC Threshold(mA)               N/A        N/A          0.00         0.00

         LBC High Threshold = 98 %
         Configured Tx Power = -1.50 dBm
         Configured OSNR lower Threshold = 0.00 dB
         Configured DGD Higher Threshold = 180.00 ps
         Chromatic Dispersion 0 ps/nm
         Configured CD-MIN -10000 ps/nm  CD-MAX 16000 ps/nm
         Optical Signal to Noise Ratio = 17.60 dB
```

```
        Polarization Dependent Loss = 0.00 dB
        Differential Group Delay = 2.00 ps

 Transceiver Vendor Details

        Form Factor             : CFP2
        Name                    : CISCO-ACACIA
        Part Number             : AC200-D13-192
        Rev Number              : 16928
        Serial Number           : ACZ2317000S
        PID                     : CFP2-WDM-DS-1HL
        VID                     : V01
        Date Code(yy/mm/dd)     : 19/04/12
```

```
RP/0/RP0/CPU0:router# show controllers optics 0/3/0/0 pm current 15-min optics 1
Mon Dec  5 11:43:53.877 UTC
Optics in the current interval [11:30:00 - 11:43:53 Mon Dec 5 2016]
Optics current bucket type : Valid
             MIN       AVG       MAX     Threshold  TCA     Threshold  TCA
                                           (min)    (enable)    (max)    (enable)
LBC[% ]    : 7.0       7.9       8.0       0.0       NO        0.0       NO
OPT[dBm]   : -0.25     -0.24     -0.23     0.00      NO        0.00      NO
OPR[dBm]   : -0.02     0.04      0.10      0.00      NO        0.00      NO
CD[ps/nm]  : -13       -7        0         -1        NO        -1        NO
DGD[ps ]   : 1.00      1.66      3.00      0.00      NO        0.00      NO
SOPMD[ps^2]: 0.00      0.00      0.00      0.00      NO        0.00      NO
OSNR[dB]   : 26.60     26.75     26.90     0.00      NO        0.00      NO
PDL[dB]    : 0.00      0.00      0.00      0.00      NO        0.00      NO
PCR[rad/s] : 0.00      0.00      0.00      0.00      NO        0.00      NO
```

```
RP/0/RP0/CPU0:ios# show controllers coherentDSP 0/0/0/0

Port                                          : CoherentDSP 0/0/0/0
Controller State                              : Up
Inherited Secondary State                     : Normal
Configured Secondary State                    : Normal
Derived State                                 : In Service
Loopback mode                                 : None
BER Thresholds                                : SF = 1.0E-5  SD = 1.0E-7
Performance Monitoring                        : Enable

Alarm Information:
LOS = 0 LOF = 1 LOM = 0
OOF = 0 OOM = 0 AIS = 0
IAE = 0 BIAE = 0        SF_BER = 0
SD_BER = 0      BDI = 1 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0
Detected Alarms                               : None

Bit Error Rate Information
PREFEC  BER                                   : 1.6E-04
POSTFEC BER                                   : 0.0E+00

OTU TTI Received

FEC mode                                      : STANDARD
RP/0/RP0/CPU0:ios#
```

```
RP/0/RP0/CPU0:router# show controllers coherentDSP 0/3/0/3 pm current 15-min otn
Wed Mar 15 15:09:16.820 UTC
```

```
g709 OTN in the current interval [15:00:00 - 15:09:16 Wed Mar 15 2017]
OTN current bucket type : Valid
    ES-NE   : 0         Threshold : 500      TCA(enable)  : YES
    ESR-NE  : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    SES-NE  : 0         Threshold : 500      TCA(enable)  : YES
    SESR-NE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    UAS-NE  : 0         Threshold : 500      TCA(enable)  : YES
    BBE-NE  : 0         Threshold : 10000    TCA(enable)  : YES
    BBER-NE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    FC-NE   : 0         Threshold : 10       TCA(enable)  : YES
    ES-FE   : 0         Threshold : 500      TCA(enable)  : YES
    ESR-FE  : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    SES-FE  : 0         Threshold : 500      TCA(enable)  : YES
    SESR-FE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    UAS-FE  : 0         Threshold : 500      TCA(enable)  : YES
    BBE-FE  : 0         Threshold : 10000    TCA(enable)  : YES
    BBER-FE : 0.00000   Threshold : 0.00000  TCA(enable)  : NO
    FC-FE   : 0         Threshold : 10       TCA(enable)  : YES
Last clearing of "show controllers OTU" counters never
```

Note When the port-mode speed is configured for 150G (coupled optics controller), some of the OTN PM values, such as FC and UAS, are not counted for the far-end (FE) secondary controller. These values are counted on the far-end primary controller.

This command displays WAN-PHY related alarms and PM:

```
RP/0/RP0/CPU0:router#show controllers optics 0/0/1/10

 Controller State: Up

 Transport Admin State: In Service

 Laser State: On

 LED State: Green

 Optics Status

         Optics Type:  SFP+ 10G LR
         Wavelength = 1310.00 nm

         Alarm Status:
         -------------
         Detected Alarms: None

         LOS/LOL/Fault Status:

         Laser Bias Current = 29.9 mA
         Actual TX Power = -2.67 dBm
         RX Power = -3.45 dBm

         Performance Monitoring: Disable

         THRESHOLD VALUES
         ----------------

         Parameter                High Alarm  Low Alarm  High Warning  Low Warning
         -----------------------  ----------  ---------  ------------  -----------
         Rx Power Threshold(dBm)          3.4      -18.3           0.4        -14.4
         Tx Power Threshold(dBm)          3.4      -12.1           0.4         -8.1
```

```
        LBC Threshold(mA)              80.00       8.00         75.00        10.00
        Temp. Threshold(celsius)       90.00     -10.00         85.00        -5.00
        Voltage Threshold(volt)         3.63       2.97          3.46         3.13

Polarization parameters not supported by optics

        Temperature = 20.00 Celsius
        Voltage = 3.28 V

 Transceiver Vendor Details

        Form Factor            : SFP+
        Optics type            : SFP+ 10G LR
        Name                   : CISCO-OCLARO
        OUI Number             : 00.0b.40
        Part Number            : TRS5024EE-S101
        Rev Number             : 0000
        Serial Number          : OPT1949011Q
        PID                    : SFP-10G-LR-X
        VID                    : V01
        Date Code(yy/mm/dd)    : 15/12/14
```

show controllers (CEM)

To display status and configuration information about the CEM (Circuit Emulation) client controller on a specific node, use the **show controllers** command in XR EXEC mode.

show controllers CEM *r/s/i/p* [**capabilities** | **description** | **payload-dejitter-mapping** | **periodic** | **pm** | **stats** | **xgxs**]

Syntax Description

CEM	Specifies CEM controller option.
r/s/i/p	Specifies the Rack/Slot/Instance/Port number of the controller.
capabilities	Displays CEM client capabilities information.
description	Displays controllers description.
payload-dejitter-mapping	Displays CEM client payload-dejitter mapping information.
periodic	Displays performance monitoring data periodically.
pm	Displays CEM performance monitoring.
stats	Displays stats information.
xgxs	Displays the 10 Gigabit Ethernet Extended Sublayer (XGXS) information.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.7.1	This command was introduced.

Usage Guidelines

The CEM command option is supported only on NC55-OIP-02 MPA.

Example

This example shows CEM status and configuration information:

```
RP/0/RP0/CPU0:router#show controllers CEM 0/0/2/4
Wed Jul 27 05:38:10.552 UTC
Interface                          : CEM0/0/2/4
Admin state                        : Up

Oper  state                        : Up

Port bandwidth                     : 10037274 kbps
Dejitter buffer (oper/in-use)      : 835/3526 usec
Payload size (oper)                : 1024 bytes
PDV (min/max/avg)                  : 1007/2784/1895 usec
```

```
Dummy mode                          : last-frame
Dummy pattern                       : 0xaa
Idle pattern                        : 0xff
Signalling                          : No CAS
RTP                                 : Enabled
Clock type                          : Differential
Detected Alarms                     : None
Statistics Info

Ingress packets          : 6088676782, Ingress packets drop     : 0
Egress packets           : 0, Egress packets drop      : 0
Total error              : 0
Missing packets          : 0, Malformed packets        : 0
Jitter buffer underrun   : 0, Jitter buffer overrun    : 0
Misorder drops           : 0
Reordered packets        : 0, Frames fragmented        : 0
Error seconds            : 0, Severely error seconds   : 0
Unavailable seconds      : 0, Failure counts           : 0

Generated L bits         : 0, Received  L bits         : 0
Generated R bits         : 0, Received  R bits         : 0
Endpoint Info

Passthrough     : No
```

show controllers (Ethernet controller)

To display status and configuration information about the Ethernet controller on a specific node, use the **show controllers command** in XR EXEC mode.

show controllers *controller-type r/s/i/p* [**all** | **description** | **periodic** | **pm** | **priority-flow-control** | **xgxs**]

Syntax Description

controller-type	Specifies the type of Ethernet interface whose status and configuration information you want to display. The available options are: • GigabitEthCtrlr • TenGigECtrlr
r/s/i/p	Specifies the Rack/Slot/Instance/Port number of the controller.
all	Displays detailed information for the specified interface.
description	Displays controllers description.
periodic	Displays the performance monitoring data periodically.
pm	Displays the ethernet performance monitoring data.
priority-flow-control	Displays priority flow control information for the interface.
xgxs	Displays information about the Ethernet Extended Sublayer (XGXS).

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.7.1	This command was introduced.

Usage Guidelines

Note This command is supported only on NC55-OIP-02 MPA.

For the *r/s/i/p* argument, use the following guidelines:

- The naming notation for specifying a physical interface is *rack*/*slot*/*instance*/*port*. The slash between values is required as part of the notation. An explanation of each component of the naming notation is as follows:
  - *rack*: Chassis number of the rack.

- *slot*: Physical slot number of the line card.
- *instance*: Instance number. Minimum value is 2 and maximum value is 3.
- *port*: Physical port number of the interface.

Examples

The following example shows sample output from the **show controllers tengigEctrlr** command:

```
RP/0/RP0/CPU0:router#show controllers tengigEctrlr 0/0/3/7?
0/0/3/7  R/S/I/P
RP/0/RP0/CPU0:router#show controllers tengigEctrlr 0/0/3/7 ?
  all                     Show all the information
  description             Controllers description
  periodic                show pm data periodically
  pm                      show ethernet performance monitoring
  priority-flow-control   Show priority flow control information
  stats                   Show stats information
  xgxs                    Show xgxs information
  |                       Output Modifiers
  <cr>
RP/0/RP0/CPU0:router#show controllers tengigEctrlr 0/0/3/7
Tue Jul 19 12:02:00.154 IST
Operational data for interface TenGigECtrlr0/0/3/7:

State:
    Administrative state: enabled
    Operational state: Up
    LED state: Green On
    PRBS:
      Status: Not Running
      Mode: None
      Pattern: None
      Direction: Not configured
      Error-inject: None
      Framing: Not Configured
      User-pattern: 0x0

Phy:
    Media type: Not known

Autonegotiation disabled.

Operational values:
    Speed: 10Gbps
    Duplex: Full Duplex
    Flowcontrol: None
    Loopback: None (or external)
    Inter-packet gap: standard (12)
    BER monitoring:
        Not supported
```

show controllers (Fibre Channel)

To display the Fibre Channel controller details, use the **show controllers** command in XR EXEC mode.

show controllers *controller-type r/s/i/p* [**description** | **periodic** | **pm** | **prbs-info** | **summary** | **xgxs**]

Syntax Description

controller-type	Specifies the type of fibre channel interface whose status and configuration information you want to display. The available options are: • OneGigFibreChanCtrlr • twoGigFibreChanCtrlr • fourGigFibreChanCtrlr • eightGigFibreChanCtrlr • sixteenGigFibreChanCtrlr • thirtytwoGigFibreChanCtrlr
r/s/i/p	Specifies the Rack/Slot/Instance/Port number of the controller.
all	Displays detailed information for the specified interface.
description	Displays information for the specified interface.
periodic	Displays performance monitoring data periodically.
pm	Displays otu performance monitoring.
prbs-info	Displays the pseudorandom binary sequence (prbs) details.
statistics	Displays statistical information for the interface.
xgxs	Displays information about the 10 Gigabit Ethernet Extended Sublayer (XGXS).

Command Default

None

Command Modes

Optics controller

Command History

Release	Modification
Release 7.7.1	This command was introduced.

Usage Guidelines

Note This command is supported only on NC55-OIP-02 MPA.

No specific guidelines impact the use of this command.

Examples

This sample show command displays the 1G fibre channel parameters for an interface at location 0/0/2/5:

```
RP/0/RP0/CPU0:router# show controllers OneGigFibreChanCtrlr0/0/2/5
Thu Jul 14 10:43:16.130 UTC

Operational data for Fibre Channel controller OneGigFibreChanCtrlr0/0/2/5

State:
        Admin State           : Up
        Operational state     : Down
        LED state             : Red On
        Secondary admin state : Normal
        Laser Squelch         : Disabled

Performance Monitoring is enabled

Operational values:
        Speed                     : 1 Gbps
        Loopback                  : None
        BER monitoring:
                Signal Degrade    : 1e-0
                Signal Fail       : 1e-0
        Hold-off Time             : 0 ms
        Forward Error Correction : Not Configured

Alarms :
        Current :
                Loss of Signal
                Loss of Synchronization
        Previous :
                Loss of Signal
                Loss of Synchronization
RP/0/RP0/CPU0:ios#
```

show controllers (OTN)

To display the OTN controller details, use the **show controllers** command in XR EXEC mode.

show controllers *controller-type r/s/i/p* [**description** | **periodic** | **pm** | **prbs-details** | **summary** | **xgxs**]

Syntax Description

controller-type	Specifies the type of otn interface whose status and configuration information you want to display. The available options are: • otu2 • odu2 • otu2e • odu2e
r/s/i/p	Specifies the Rack/Slot/Instance/Port number of the controller.
description	Displays information for the specified interface.
periodic	Displays performance monitoring data periodically.
pm	Displays otu performance monitoring.
prbs-details	Displays the pseudorandom binary sequence (prbs) details.
summary	Display a summary of controller information.
xgxs	Displays information about the 10 Gigabit Ethernet Extended Sublayer (XGXS).

Command Default

None

Command Modes

Optics controller

Command History

Release	Modification
Release 7.7.1	This command was introduced.

Usage Guidelines

This command is supported only on NC55-OIP-02 MPA and NC55-MPA-12T-S MPA.

Examples

This sample show command displays the otu2 parameters for an interface at location 0/0/2/1:

```
RP/0/RP0/CPU0:router# show controllers otu20/0/2/1
Thu Jul 14 10:41:57.642 UTC
```

```
Port                                                : OTU2 0/0/2/1
Controller State                                    : Down
LED state                                           : Red Flashing
Inherited Secondary State                           : Normal
Configured Secondary State                          : Normal
Derived State                                       : In Service
Loopback mode                                       : None
BER Thresholds                                      : SF = 1.0E-6  SD = 1.0E-7
Performance Monitoring                              : Enable

Alarm Information:
LOS = 0 LOF = 1 LOM = 0
OOF = 1 OOM = 1 AIS = 0
IAE = 0 BIAE = 0        SF_BER = 0
SD_BER = 0      BDI = 0 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0     FLEXO_GIDM = 0
FLEXO-MM = 0    FLEXO-LOM = 0   FLEXO-RDI = 0
FLEXO-LOF = 0
Detected Alarms                                     : LOF OOF OOM

OTU TTI Received

FEC mode                                            : STANDARD

AINS Soak                                           : None
AINS Timer                                          : 0h, 0m
AINS remaining time                                 : 0 seconds
```

show controllers coherentdsp (400G DCO)

To display the status and configuration information about the interfaces configured as coherent DSP controllers on a specific node, use the **show controllers coherentDSP** command in XR EXEC mode.

show controller coherentDSP *R/S/I/P* [**pm** { **current | history** } { **30-sec | 15-min | 24-hour** } { **fec** }]

Syntax Description

R/S/I/P	Rack/Slot/Instance/Port of the coherent DSP controller.
pm	Displays performance monitoring parameters for the controller.
current	Displays the current performance monitoring data in 30-second, 15- minute, and 24-hour intervals.
history	Displays the historical performance monitoring data in 30-second, 15-minute, and 24-hour intervals.
fec	The **fec** keyword displays FEC PM data in 30-second, 15-minute, or 24-hour intervals.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.3.2	This command was introduced.

Example

The following is a sample to view the status and configuration information about the coherent DSP controller.

```
Router#show controllers coherentDSP 0/0/0/13
Thu May 27 06:56:37.505 UTC

Port                                          : CoherentDSP 0/0/0/13
Controller State                              : Up
Inherited Secondary State                     : Normal
Configured Secondary State                    : Normal
Derived State                                 : In Service
Loopback mode                                 : None
BER Thresholds                                : SF = 1.0E-5  SD = 1.0E-7
Performance Monitoring                        : Enable
Bandwidth                                     : 400.0Gb/s

Alarm Information:
LOS = 32        LOF = 0 LOM = 0
OOF = 0 OOM = 0 AIS = 0
IAE = 0 BIAE = 0        SF_BER = 0
SD_BER = 0      BDI = 0 TIM = 0
FECMISMATCH = 0 FEC-UNC = 0     FLEXO_GIDM = 0
FLEXO-MM = 0    FLEXO-LOM = 0   FLEXO-RDI = 0
FLEXO-LOF = 43
Detected Alarms                               : None
```

```
Bit Error Rate Information
PREFEC  BER                                     : 8.5E-04
POSTFEC BER                                     : 0.0E+00
Q-Factor                                        : 9.90 dB

Q-Margin                                        : 2.70dB

OTU TTI Received
```

The following is a sample to view the current performance monitoring parameters of the coherent DSP controller in 30 second intervals.

```
Router#show controllers coherentDSP 0/0/0/13 pm current 30-sec fec
g709 FEC in the current interval [07:03:00 - 07:03:29 Thu May 27 2021]

FEC current bucket type : Valid
    EC-BITS   : 11885430510            Threshold : 83203400000            TCA(enable)  :
YES
    UC-WORDS  : 0                      Threshold : 5                      TCA(enable)  :
YES

                                       MIN       AVG        MAX       Threshold   TCA
Threshold     TCA
                                                                          (min)     (enable)
  (max)     (enable)
PreFEC BER                     :     8.4E-04   8.6E-04   8.7E-04      0E-15        NO
0E-15         NO
PostFEC BER                    :     0E-15     0E-15     0E-15        0E-15        NO
0E-15         NO
Q[dB]                          :     9.90      9.90      9.90         0.00         NO
 0.00         NO
Q_Margin[dB]                   :     2.70      2.70      2.70         0.00         NO
 0.00         NO

Last clearing of "show controllers OTU" counters never
```

show controllers optics (400G DCO)

To display status and configuration information about the interfaces configured as optics controller on a specific node, use the **show controllers optics** command in XR EXEC mode.

show controller optics *R/S/I/P* [**pm** { **current | history** } { **30-sec | 15-min | 24-hour** } { **optics** } { *lane-number* } **| fec-thresholds**]

Syntax Description

R/S/I/P	Rack/Slot/Instance/Port of the optics controller.
pm	Displays performance monitoring parameters for the controller.
current	Displays the current performance monitoring data in 30 second, 15 minute, and 24 hour intervals.
history	Displays the historical performance monitoring data in 30 second, 15 minute, and 24 hour intervals.
optics	Displays the PM data for optics controller.
lane-number	Displays the performance monitoring data for the applicable lanes in the optical module. The lane number is always 1.
fec-thresholds	Displays the FEC detected degrade (FDD) and FEC excessive degrade (FED) threshold values of the host and media side of the optical transceiver.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.3.2	This command was introduced.
Release 24.3.1	The **fec-thresholds** keyword was introduced.

Example

The following is a sample to view the status and configuration information about the optics controller:

```
Router#show controllers optics 0/0/0/7
 Controller State: Up
 Transport Admin State: In Service
 Laser State: On
 LED State: Green
 FEC State: FEC ENABLED
 Optics Status
         Optics Type:  QSFPDD 400G ZR
         DWDM carrier Info: C BAND, MSA ITU Channel=61, Frequency=193.10THz,
         Wavelength=1552.524nm
         Alarm Status:
```

```
        -------------
        Detected Alarms: None
        LOS/LOL/Fault Status:
        Alarm Statistics:
        -------------
        HIGH-RX-PWR = 0            LOW-RX-PWR = 0
        HIGH-TX-PWR = 0            LOW-TX-PWR = 0
        HIGH-LBC = 0               HIGH-DGD = 0
        OOR-CD = 0                 OSNR = 55
        WVL-OOL = 0                MEA  = 0
        IMPROPER-REM = 0
        TX-POWER-PROV-MISMATCH = 0
        Laser Bias Current = 0.0
        Actual TX Power = -8.16 dBm
        RX Power = -7.85 dBm
        RX Signal Power = -7.55 dBm
        Frequency Offset = 5 MHz
        Performance Monitoring: Enable
        THRESHOLD VALUES
        ----------------
        Parameter                 High Alarm  Low Alarm  High Warning  Low Warning
        ------------------------  ----------  ---------  ------------  -----------
        Rx Power Threshold(dBm)          1.9      -28.2           0.0        -25.0
        Tx Power Threshold(dBm)          0.0      -15.0          -2.0        -16.0
        LBC Threshold(mA)               0.00       0.00          0.00         0.00
        Temp. Threshold(celsius)       80.00      -5.00         75.00        15.00
        Voltage Threshold(volt)         3.46       3.13          3.43         3.16
        LBC High Threshold = 98 %
        Configured Tx Power = -6.00 dBm
        Configured CD High Threshold = 80000 ps/nm
        Configured CD lower Threshold = -80000 ps/nm
        Configured OSNR lower Threshold = 9.00 dB
        Configured DGD Higher Threshold = 80.00 ps
        Baud Rate =  59.8437500000 GBd
        Modulation Type: 16QAM
        Chromatic Dispersion 2 ps/nm
        Configured CD-MIN -2400 ps/nm  CD-MAX 2400 ps/nm
        Second Order Polarization Mode Dispersion = 87.00 ps^2
        Optical Signal to Noise Ratio = 36.30 dB
        Polarization Dependent Loss = 0.40 dB
        Polarization Change Rate = 0.00 rad/s
        Differential Group Delay = 2.00 ps
        Temperature = 51.00 Celsius
        Voltage = 3.36 V
 Transceiver Vendor Details
        Form Factor            : QSFP-DD
        Optics type            : QSFPDD 400G ZR
        Name                   : CISCO-ACACIA
        OUI Number             : 7c.b2.5c
        Part Number            : DP04QSDD-E20-19E
        Rev Number             : 10
        Serial Number          : ACA2449003P
        PID                    : QDD-400G-ZR-S
        VID                    : ES03
        Firmware Version       : 61.12
        Date Code(yy/mm/dd)    : 20/12/03
```

The following is a sample to view the current performance monitoring parameters of the optics controller in 30 second intervals.

```
Router#show controllers optics 0/0/0/7 pm current 30-sec optics 1
Thu May 27 07:11:33.466 UTC
Optics in the current interval [07:11:30 - 07:11:33 Thu May 27 2021]
Optics current bucket type : Valid
```

```
            MIN       AVG       MAX      Operational      Configured      TCA   Operational
      Configured     TCA
                                                 Threshold(min)   Threshold(min) (min) Threshold(max)
   Threshold(max) (max)
LBC[mA ]       : 52        52        52         0.0               NA               NO    100.0
          NA               NO
OPT[dBm]      : -8.17     -8.17     -8.17     -15.09             NA               NO    0.00
          NA               NO
OPR[dBm]      : -7.80     -7.80     -7.80     -30.00             NA               NO    8.00
          NA               NO
CD[ps/nm]     : 1         1         1         -2400              -2400            YES   2400
          2400             YES
DGD[ps ]      : 2.00      2.00      2.00      0.00               NA               NO    80.00
          NA               NO
SOPMD[ps^2]   : 53.00     53.00     53.00     0.00               NA               NO    2000.00
          NA               NO
OSNR[dB]      : 36.30     36.30     36.30     9.00               55.00            NO    40.00
          NA               NO
PDL[dB]       : 0.40      0.40      0.40      0.00               NA               NO    7.00
          NA               NO
PCR[rad/s]    : 0.00      0.00      0.00     3.00              3.00             NO   2500000.00
       3000000.00       YES
RX_SIG[dBm]   : -7.54     -7.54     -7.54     -30.00             NA               NO    1.00
          NA               NO
FREQ_OFF[Mhz]: 33         33        33        -3600              NA               NO    3600
          NA               NO
SNR[dB]       : 17.90     17.90     17.90     7.00               NA               NO    100.00
          NA               NO

Last clearing of "show controllers OPTICS" counters never
```

The following is an example to view the FDD and FED threshold values of the host and media side of the optical transceiver using the **fec-thresholds** keyword.

```
Router#show controllers optics 0/0/0/10 fec-thresholds
FEC Threshold Information
                                 Raise                Clear
 Media FEC excess degrade   :    2.2222E-02           1.1111E-03
 Media FEC detected degrade :    4.4444E-02           3.3333E-03
 Host FEC excess degrade    :    6.6667E-02           5.5556E-03
 Host FEC detected degrade  :    8.8889E-02           7.7778E-03
```

show controllers npu interface-bandwidth-usage

To display the provisioned ports and to know the allocated or the remaining bandwidth availability and to know the possible port combinations, use `show controllers npu interface-bandwidth-usage` command in XR EXEC mode.

show controllers npu interface-bandwidth-usage [**brief** | **detail**]

Command Default None

Command Modes XR EXEC mode

Command History

Release	Modification
7.4.1	This command is introduced for N540-24Q8L2DD-SYS.

Example

The following example displays the bandwidth usage details `show controllers npu interface-bandwidth-usage brief instance 0 location 0/RP0/CPU0` command:

```
RP/0/RP1/CPU0:router#show controllers npu interface-bandwidth-usage brief instance 0 location
 0/RP0/CPU0

================================
Bandwidth usage
--------------------------------
Total BW             : 1000 GB
Total BW used        :    0 GB
Total BW available   : 1000 GB
================================
```

Example

The following example displays interfaces created `show controllers npu interface-bandwidth-usage detail instance 0 location 0/RP0/CPU0` command:

```
RP/0/RP0/CPU0:ios#show controllers npu interface-bandwidth-usage detail instance 0 location
 0/RP0/CPU0
Tue Dec  8 20:15:11.856 UTC
================================
Bandwidth usage
--------------------------------
Total BW             : 1000 GB
Total BW used        : 1000 GB
Total BW available   :    0 GB
================================

Bandwidth usage details
=======================
[X] : BW currently allocated
 X  : BW allocation possible
 -  : BW allocation not possible
 #  : Mandatory de-provisioning dependency
--------------------------------------------------------------------------------
```

```
    Port     1GigE  10GigE  25GigE  40GigE  50GigE 100GigE 200GigE 300GigE 400GigE
-------------------------------------------------------------------------------------
  0/0/0/00       -       -       -       X       -     [X]       -       -       -
  0/0/0/01       -       -       -       X       -     [X]       -       -       -
  0/0/0/02       X       X     [X]       -       #       -       -       -       -
  0/0/0/03       X       X     [X]       -       -       -       -       -       -
  0/0/0/04       X       X     [X]       -       #       -       -       -       -
  0/0/0/05       X       X     [X]       -       -       -       -       -       -
  0/0/0/06       X       X     [X]       -       #       -       -       -       -
  0/0/0/07       X       X     [X]       -       -       -       -       -       -
  0/0/0/08       X       X     [X]       -       #       -       -       -       -
  0/0/0/09       X       X     [X]       -       -       -       -       -       -
  0/0/0/10       X       X     [X]       -       -       -       -       -       -
  0/0/0/11       X       X     [X]       -       -       -       -       -       -
  0/0/0/12       X       X     [X]       -       -       -       -       -       -
  0/0/0/13       X       X     [X]       -       -       -       -       -       -
  0/0/0/14       X       X     [X]       -       -       -       -       -       -
  0/0/0/15       X       X     [X]       -       -       -       -       -       -
  0/0/0/16       X       X     [X]       -       -       -       -       -       -
  0/0/0/17       X       X     [X]       -       -       -       -       -       -
  0/0/0/18       X       X     [X]       -       -       -       -       -       -
  0/0/0/19       X       X     [X]       -       -       -       -       -       -
  0/0/0/20       X       X     [X]       -       -       -       -       -       -
  0/0/0/21       X       X     [X]       -       -       -       -       -       -
  0/0/0/22       X       X     [X]       -       -       -       -       -       -
  0/0/0/23       X       X     [X]       -       -       -       -       -       -
  0/0/0/24       X       X     [X]       -       -       -       -       -       -
  0/0/0/25       X       X     [X]       -       -       -       -       -       -
  0/0/0/26       X       X     [X]       -       -       -       -       -       -
  0/0/0/27       X       X     [X]       -       -       -       -       -       -
  0/0/0/28       X       X     [X]       -       -       -       -       -       -
  0/0/0/29       X       X     [X]       -       -       -       -       -       -
  0/0/0/30       X       X     [X]       -       -       -       -       -       -
  0/0/0/31       X       X     [X]       -       -       -       -       -       -
  0/0/0/32       X       X     [X]       -       -       -       -       -       -
  0/0/0/33       X       X     [X]       -       -       -       -       -       -

#: Mandatory de-provisioning dependency details:
================================================
  Port           Bandwidth        De-provision ports      Configuration
-------------------------------------------------------------------------------
0/0/0/01         300GigE          0/0/0/07, 0/0/0/09      no speed 50G
0/0/0/01         400GigE          0/0/0/03, 0/0/0/05,     no speed 50G
                                  0/0/0/07, 0/0/0/09
0/0/0/02          50GigE          0/0/0/03                speed none/speed 50G
0/0/0/03     1GigE,10GigE,25G     0/0/0/02                no speed 50G
0/0/0/03          50GigE          0/0/0/01                speed 40G/speed 100G/speed 200G
0/0/0/04          50GigE          0/0/0/05                speed none/speed 50G
0/0/0/05     1GigE,10GigE,25G     0/0/0/04                no speed 50G
0/0/0/05          50GigE          0/0/0/01                speed 40G/speed 100G/speed 200G
0/0/0/06          50GigE          0/0/0/07                speed none/speed 50G
0/0/0/07     1GigE,10GigE,25G     0/0/0/06                no speed 50G
0/0/0/07          50GigE          0/0/0/01                speed 40G/speed 100G/speed
200G/speed 300G
0/0/0/08          50GigE          0/0/0/09                speed none/speed 50G
0/0/0/09     1GigE,10GigE,25G     0/0/0/08                no speed 50G
0/0/0/09          50GigE          0/0/0/01                speed 40G/speed 100G/speed
200G/speed 300G
```

show controllers (SONET)

To display the SONET controller details, use the **show controllers** command in XR EXEC mode.

show controllers *controller-type r/s/i/p* [**description** | **periodic** | **pm** | **summary** | **xgxs**]

Syntax Description

controller-type	Specifies the type of SONET interface whose status and configuration information you want to display. The available options are: • OC48 • OC192
r/s/i/p	Specifies the Rack/Slot/Instance/Port number of the controller.
all	Displays detailed information for the specified interface.
description	Displays information for the specified interface.
periodic	Displays performance monitoring data periodically.
pm	Displays otu performance monitoring.
xgxs	Displays information about the 10 Gigabit Ethernet Extended Sublayer (XGXS).

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.2.1	This command is introduced.
Release 7.7.1	Support for **OC48** option was introduced.

Usage Guidelines

This command display a valid output for the specified interface only if WAN-PHY is enabled on that interface or on NC55-OIP-02 MPA.

Note The OC48 option is supported only on NC55-OIP-02 MPA.

Example

This sample show command displays the OC192 parameters for an interface at location 0/0/1/10:

```
RP/0/RP0/CPU0:ios#show controllers OC192 0/0/1/10
Port OC1920/0/1/10:


 Status:
 Primary State: Up
 Configured Sec admin State: Normal
 Inherited Sec admin State: Normal
 Derived State: In Service
 performace_monitoring enabled

Loopback: None

SECTION
  LOF = 0          LOS    = 0          TIM-S = 0          BIP(B1) = 0
Overhead
J0 Transmit:    (0)
J0 Receive:     (0)
J0 Expected:    (0)

LINE
  AIS = 0          RDI    = 0          FEBE = 0          BIP(B2) = 0

Last clearing of "show controllers SONET" counters never

Detected Alarms: None
Masked Alarms: None
Detected Alerts: None
Masked Alerts: None

Framing: SONET
BER thresholds:  SF = 1.0E-3  SD = 1.0E-6
TCA thresholds:  B1 = 1.0E-6  B2 = 1.0E-6
  Clock source: internal (actual) line (configured)
```

show controller STS192c

To display the STS192c controller details, use the **show controllers STS192c** command in XR EXEC mode.

show controllers STS192c

Syntax Description

STS192c	Specifies SONET STS-192c format for mapping Ethernet frames into SONET.

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.2.1	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Example

This sample show command displays the STS192c parameters for an interface at location 0/0/1/10:

```
RP/0/RP0/CPU0:router#show controllers STS192c 0/0/1/10

 Primary State: Up

 Sec Admin State: Normal

 Derived State: In Service

PATH
  FEBE   = 0          BIP(B3) = 0
  NEWPTR = 0          PSE    = 0          NSE  = 0
Detected Alarms:       None

Mask for Detected->Asserted:      None

Detected Alerts: None
Mask for Detected->Reported: None
Payload Scrambling: Disabled
C2 State: Stable   C2_rx = 0x0 (0)   C2_tx = 0x0 (0) / Scrambling Derived
B3 = 10e-6
Overhead J1
Transmit        : (0)
Received        : (0)
Expected        : (0)

 performace_monitoring enabled
```

show controllers (SDH)

To display the SDH controller details, use the **show controllers** command in XR EXEC mode.

show controllers *controller-type r/s/i/p* [**description** | **periodic** | **pm** | **summary** | **xgxs**]

Syntax Description

controller-type	Specifies the type of SDH interface whose status and configuration information you want to display. The available options are: • STM16 • STM64
r/s/i/p	Specifies the Rack/Slot/Instance/Port number of the controller.
all	Displays detailed information for the specified interface.
description	Displays information for the specified interface.
periodic	Displays performance monitoring data periodically.
pm	Displays otu performance monitoring.
xgxs	Displays information about the 10 Gigabit Ethernet Extended Sublayer (XGXS).

Command Default

None

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.2.2	This command was introduced.
Release 7.7.1	Support for **STM16** option was introduced.

Usage Guidelines

The **STM16** option is supported only on NC55-OIP-02 MPA.

Example

This sample show command displays the STM64 parameters for an interface at location 0/0/2/1:

```
RP/0/RP0/CPU0:router#show controllers STM64 0/0/2/1

 Mon Dec  7 11:13:31.697 UTC


Port STM640/0/2/1:
```

```
Status:
 Primary State: Down

 Configured Sec admin State: Normal

 Inherited Sec admin State: Normal

 Derived State: In Service

 performace_monitoring enabled

Loopback: None

REGENERATOR SECTION
  LOF = 1          LOS    = 0          RS-TIM = 0     RS-BIP = 0
Overhead
J0 Transmit:    (0)
J0 Receive:     (0)
J0 Expected:    (0)

MULTIPLEX SECTION
  AIS = 0          RDI    = 0          FEBE = 0          MS-BIP  = 0

Last clearing of "show controllers SDH" counters never

Detected Alarms: LOF
Masked Alarms: None
Detected Alerts: None
Masked Alerts: None

Framing: SDH
BER thresholds:  SF = 1.0E-3  SD = 1.0E-6
TCA thresholds:  B1 = 1.0E-6  B2 = 1.0E-6
  Clock source: internal (actual) line (configured)
```

This sample show command displays the STM16 parameters for an interface at location 0/0/3/4:

```
RP/0/RP0/CPU0:router#show controllers STM16 0/0/3/4
Tue Jul 19 12:13:14.626 IST


Port STM160/0/3/4:

Status:
 Primary State: Up

 Configured Sec admin State: Maintenance

 Inherited Sec admin State: Normal

 Derived State: Maintenance

 LED state: Green On

 performace_monitoring enabled

Loopback: None

REGENERATOR SECTION
  LOF = 1          LOS    = 0          RS-TIM = 1     RS-BIP = 0
Overhead
J0 Transmit:    (0)
J0 Receive:     0x1(1)
J0 Expected:    0x1(1)
```

```
MULTIPLEX SECTION
  AIS = 0          RDI    = 0          FEBE = 0          MS-BIP  = 0

Last clearing of "show controllers SDH" counters never

Detected Alarms: None
Masked Alarms: None
Detected Alerts: None
Masked Alerts: None

Framing:
BER thresholds:  SF = 1.0E-3  SD = 1.0E-6
TCA thresholds:  B1 = 1.0E-6  B2 = 1.0E-6
  Clock source: internal (actual) None (configured)

PRBS details:
        Status       : Not Running
        Mode         : None
        Pattern      : None
        Framing      : None
        Direction    : None
        Error Inject : None
        User-pattern : 0x0
```