

Optics Commands

This module describes the command line interface (CLI) commands for configuring Optics on the Cisco 8000 Series Routers.

Not all commands are supported on both coherent and non-coherent optical modules. Also, the supported keywords of a command vary based on the type of the optical module (coherent or non-coherent).

To use commands of this module, you must be in a user group associated with a task group that includes appropriate task IDs. If the user group assignment is preventing you from using any command, contact your AAA administrator for assistance.

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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* | **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 7.3.1.5	This command was introduced.

Usage Guidelines

Line loopback mode is supported only on Cisco 8000 series line cards and fixed-port routers based on Q100 and Q200 silicon.

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 optics

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** } | **host** { **auto-squelch** } { **disable** } | **pm** { **30-sec |15-min | 24-hour** } { **optics** } { **report | threshold** } *pm-parameter value* | **loopback line** | **loopback internal** | **host loopback line** | **host loopback internal** | **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** | **speed 100g** [**host-lanes** { **4 | 2** }]]
[**appsel simple code** *id*]
[**enh-sop-tol-mode** *mode-value*]

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 • 2x200 • 1x100 • 8x100 The **no** form of this command switches the optics controller from the muxponder mode to the transponder mode.

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: (Release 7.3.1) The range is 0 to +80000 ps/nm. (Release 7.3.2 onwards) 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: (Release 7.3.1) The range is -80000 to 0 ps/nm. (Release 7.3.2 onwards) 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: (Release 7.3.1) The range is -80000 to 0 ps/nm. (Release 7.3.2 onwards) The range is 0 to +160000 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: (Release 7.3.1) The range is 0 to +80000 ps/nm. (Release 7.3.2 onwards) The range is -160000 to 0 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 Release 7.3.15 supports only 16QAM.
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.
host { **auto-squelch** } { **disable** }	Disable squelch for host.

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.
loopback line	Configures line loopback on the optical module.
loopback internal	Configures internal loopback on the optical module.
host loopback line	Configures host line loopback on the optical module.
host loopback internal	Configures host internal loopback on the optical module.
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.
appsel simple code <*id*>	Enables application selection Code on a module, where *id* specifies the application id.
speed 100g host-lanes { 4 | 2 }	Configures the port speed as 100G for the controller with specified optional host-lanes configuration.
enh-sop-tol-mode *mode-value*	Enable the enhanced SOP tolerance mode on a coherent optics controller.

Command Default

Table 1: Default Traffic Configuration Values for supported Optical Modules

	QDD-400G-ZR-S	QDD-400G-ZRP-S	DP04QSDD-HE0	DP04QSDD-ER1	DP01QSDD-ZF1
Client Speed	400G (400GAUI-8)	400G (400GAUI-8)	400G GAUI8	400G GAUI-8	100G GAUI2
Trunk Speed	400G	400G	400G	400G	100G
Frequency	193.10THz	193.10THz	193.10THz	193.10THz	193.10THz
FEC	cFEC	oFEC	oFEC	oFEC	oFEC
Modulation	16QAM	16QAM	16QAM	16QAM	QPSK
DAC-Rate	1x1	1x1.25	1x1.25	1x1	1x1.25
Chromatic Dispersion (CD)	+/-2400	+/-26000	+/-26000	+/-2400	+/-2400

	QDD-400G-ZR-S	QDD-400G-ZRP-S	DP04QSDD-HE0	DP04QSDD-ER1	DP01QSDD-ZF1
Transmitted (Tx) Power	-10.00 dBm	-10.00 dBm	+1dBm	-9dBm	-5dBm

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

Release	Modification
Release 7.3.1.5	This command was introduced.
Release 7.11.1	The **loopback line** , **loopback internal** , **host loopback line** , and **host loopback internal** keywords were introduced.
Release 7.11.1	The **host auto-squelch disable** keyword was introduced.
Release 24.1.1	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 24.1.1	Extended Support for DP04QSDD-HE0 optical module.
Release 25.2.1	A new muxponder mode, **2x200** , was added as an option to the **breakout** keyword.
Release 25.2.1	A new keyword, **appsel simple code** <*id*> , was added as an option.
Release 25.2.1	A new keyword, **enh-sop-tol-mode** *mode-value* , was added as an option.
Release 25.3.1	A new keyword, **speed 100g [host-lanes { 4 | 2 }]** , was added as an option.
Release 24.3.1	• The **media link-down prefec-degrade** keyword was introduced. • Added support for DP04QSDD-ER1 and DP01QSDD-ZF1 optical modules.

Release	Modification
Release 25.3.1	A new muxponder mode **8x100** was added as an option to the **breakout** keyword.

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 Cisco 400G Digital Coherent QSFP-DD optical modules.

For FDD and FED alarms, the **raise threshold value** must always be greater than the **clear threshold value** . Also, the **raise** or **clearthreshold 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.

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
```

The following is a sample in which line loopback is configured on the optical module :

```
Router#configure
Router(config)#controller optics 0/0/0/9
Router(config-Optics)#sec-admin-state maintenance
Router(config-Optics)#loopback line
Loopback is a traffic-affecting operation
Router(config-Optics)#commit
Router(config)#end
```

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:

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
```

This example shows how to configure 2x200G DAC with 2x200G breakout:

```
Router#config
Router(config)#controller optics 0/0/1/1
Router(config-Optics)#breakout 2x200
Router(config-Optics)#commit
```

This example shows how to configure AppSel code on an optical module

```
Router(config)# controller optics 0/0/0/0 appsel simple code 4
 !
!
```

This example shows how to enable enhanced SOP tolerance mode on an optical module

```
Router#config
Router(config)# controller optics 0/0/0/14
Router(config-Optics)# enh-sop-tol-mode 1
Router(config-Optics)# commit
```

interface CEM (PLE)

To specify or create a CEM interface and enter interface configuration mode, use the **interface CEM** command in XR Config mode.

interface CEM *interface-path-id* { **l2transport** | **service-policy** [**input** | **output**] *policy-map-name* | **cem** [**class-attach** | **clock** | **dummy pattern** *pattern-id* | **endpoint** | **idle pattern** *pattern-id* | **payload** *bytes* [**dejitter** *microseconds* | **best-match**]] }

no interface CEM *interface-path-id* { **l2transport** | **service-policy** [**input** | **output**] *policy-map-name* | **cem** [**class-attach** | **clock** | **dummy pattern** *pattern-id* | **endpoint** | **idle pattern** *pattern-id* | **payload** *bytes* [**dejitter** *microseconds* | **best-match**]] }

Syntax Description

CEM	Specifies or creates a CEM interface.
l2transport	Specifies Layer 2 transport for the CEM interface.
service-policy [**input** | **output**] *policy-map-name*	Enables a service policy on the CEM interface
interface-path-id	Physical interface. **Note** Use the **show interfaces** command to see a list of all interfaces currently configured on the router. For more information about the syntax for the router, use the question mark (**?**) online help function.
class-attach	Specifies to attach a CEM class to the interface.
clock	Specifies clocks on this CEM interface
dummy	Specifies dummy frame parameters.
endpoint	Specifies endpoint parameters.
idle	Specifies idle frame parameters.
pattern	Specifies bit pattern for idle frames.
payload	Specifies payload size of CEM frames.
bytes	Specifies payload size in bytes. The value range is from 32 to1472.
dejitter	Specifies dejitter buffer length of CEM frames.
microseconds	Specifies dejitter buffer length. The value is from 1 to 500000 microseconds.
best-match	Specifies payload to best suitable value for given dejitter buffer length.
endpoint	Specifies endpoint parameters.

Command Default

None

Command Modes

XR Config mode

Command History

Release	Modification
Release 7.11.1	This command was introduced.

Usage Guidelines

To specify a physical interface, the notation for the *interface-path-id* 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. Always 0.
- *port*: Physical port number of the CEM interface. The supported port is 0 or 1.

The *interface-path-id* is *rack*/*slot*/*instance*/*port*. The slash between values is required as part of the notation.

This example shows how to enter interface configuration mode for a CEM interface:

```
RP/0/RP0/CPU0:ios(config)#interface CEM0/0/0/0
RP/0/RP0/CPU0:ios(config-if)#l2transport
RP/0/RP0/CPU0:ios(config-if-l2)#service-policy input pm-ingress-cem
RP/0/RP0/CPU0:ios(config-if-l2)#commit
```

show controllers coherentdsp

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 7.3.1.5	This command was introduced.

Usage Guidelines

The following table lists the details of the following host PM parameters:

- **Host-Intf-{n}-FEC-BER**
- **Host-Intf-{n}-FEC-FERC**

The following table lists the details of the host PM parameters:

PM Parameter	Mode Type	Number of Host Interfaces	Description
Host-Intf-{n}-FEC-BER	Transponder	1	*n*=0 For example, Host-Intf-0-FEC-BER
	Muxponder	4	*n* = 0, 1, 2, and 3. For example: • Host-Intf-0-FEC-BER • Host-Intf-1-FEC-BER • Host-Intf-2-FEC-BER • Host-Intf-3-FEC-BER

PM Parameter	Mode Type	Number of Host Interfaces	Description
Host-Intf-{n}-FEC-FERC	Transponder	1	*n*=0 For example, Host-Intf-0-FEC-FERC
	Muxponder	4	*n* = 0, 1, 2, and 3 For example: • Host-Intf-0-FEC-FERC • Host-Intf-1-FEC-FERC • Host-Intf-2-FEC-FERC • Host-Intf-3-FEC-FERC

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

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 controllers optics *R/S/I/P* [**pm** { **current** | **history** } { **30-sec** | **15-in** | **24-hour** } **optics** *lane-number* | **observable-info** | **information [loopback| all| counters]** | **fec-thresholds**] **appsel** { **advertised** | **detailed** | **active** }

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.
obervable-info	Displays the following details for an optical transceiver (gray optics or non-coherent optics): • Effective Signal to Noise Ratio (eSNR) • Pulse Amplitude Modulation with Four Levels (PAM4) Level Transition Parameter (LTP) • Pre-Forward Error Correction (FEC) and Post-FEC Bit Error Rate (BER) • Frame Error Count (FERC) • Laser age • Thermoelectric Cooler (TEC) current • Laser frequency • Laser temperature **Note** Not all optical modules support the **observable-info** keyword. Also, the parameters that are displayed depend on what the optical module supports, that is, not all optical modules display the same parameters. For additional information on VDM (Versatile Diagnostics Monitoring), see the Common Management Interface Specification.
information loopback	Displays the loopback types that the optical transceiver supports.
information all	Displays all the details related to the optical transceiver.

information counters	Displays counter details related to the optical transceiver.
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.
appsel advertised	Displays application advertised or supported by the module in a tabular format. It also displays if the host supports the **host-id** advertised by the module in each application.
appsel detailed	Displays full details of an application including **host-id**, **media-id**, **host-lane** and **media-lane counts**, **host-lane** and **media-lane** assignment options.
appsel active	Displays the details of currently the active applications on the module.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 7.3.1.5	This command was introduced.
Release 7.5.5/Release 7.11.1	The **observable-info** and **information loopback** keywords were introduced.
Release 24.1.1	The **fec-thresholds** keyword was introduced. The display of **information counters** and **information counters** keywords was enhanced.
Release 25.2.1	The **appsel** { **advertised** | **detailed** | **active** } options were introduced.

Usage Guidelines

The supported keywords in the show controllers optics command vary based on the type of the optical module (coherent or non-coherent). Not all keywords are supported on coherent and non-coherent optical modules.

Example

```
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 monitoring parameters using the **observable-info** keyword. Based on the requirement, the network administrators can use the displayed values of this command for monitoring and troubleshooting.

```
Router#show controllers optics 0/0/0/9 observable-info

Observable Information

[eSNR Media Input]
 Unit: dB
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                     Low High  Low High
 Lane0    21.30               0.00                0.00                0.00
0.00                 n   n     n   n
 Lane1    22.05               0.00                0.00                0.00
0.00                 n   n     n   n
 Lane2    22.62               0.00                0.00                0.00
0.00                 n   n     n   n
 Lane3    22.05               0.00                0.00                0.00
0.00                 n   n     n   n

[PAM4 Level Transition Parameter Media Input]
 Unit: dB
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                     Low High  Low High
 Lane0    47.79               0.00                0.00                0.00
0.00                 n   n     n   n
 Lane1    54.70               0.00                0.00                0.00
0.00                 n   n     n   n
 Lane2    64.34               0.00                0.00                0.00
0.00                 n   n     n   n
 Lane3    59.64               0.00                0.00                0.00
0.00                 n   n     n   n

[Pre-FEC BER Minimum Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm
```

```
                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[Pre-FEC BER Minimum Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[Pre-FEC BER Maximum Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[Pre-FEC BER Maximum Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[Pre-FEC BER Average Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[Pre-FEC BER Average Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[Pre-FEC BER Current Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[Pre-FEC BER Current Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm
```

```
                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Minimum Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Minimum Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Maximum Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Maximum Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Average Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Average Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Current Media Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
```

```
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n

[FERC Current Host Input]
 Unit: n/a
 Id       Value               LowThreshWarn       HighThresWarn       LowThreshAlarm
HighThreshAlarm     TCAWarn   TCAAlarm

                    Low High  Low High
 Module   0.000E+00           0.000E+00           0.000E+00           0.000E+00
0.000E+00           n   n     n   n
```

The following is an example to view the loopback types supported by the optical transceiver using the **information loopback** keyword.

```
Router#show controllers optics 0/0/0/0 information looopback
Supported Loopback Types :
============================
 [1.] Media Internal
 [2.] Media Line
 [3.] Host Line
 [4.] Host Internal
 [5.] Host Per Lane
 [6.] Media Per Lane
 [7.] Simultaneous Media Host

 Unsupported Loopback Types :
==============================

 Media Configured Loopback : Media Loopback None
 Media Applied Loopback    : Media Loopback None


 Host Configured Loopback : Host Loopback None
 Host Applied Loopback    : Host Loopback None
```

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
```

The following is an example to view the module state and datapath state of the optical transceivers: using the **information counters** keyword:

```
Router#show controllers optics 0/0/0/8 information counters
Fri Feb 16 11:06:31.415 UTC

Module State : Ready

Datapath State [Client-0]: TX Turn On

Acquisition Counter:    INVALID

HOST SIDE ALARM COUNTERS
=====================================
```

```
Host-Intf-0-FDD-Alarm-Counter[            0]               Host-Intf-0-FED-Alarm-Counter[
             0]


HOST SIDE FEC-BER FEC-FERC CURRENT VALUES
=========================================
Host-Intf-0-FEC-BER[0.00E+00]                  Host-Intf-0-FEC-FERC[0.00E+00]


 Supported Loopback Types :
============================
 [1.] Media Internal
 [2.] Media Line
 [3.] Host Line
 [4.] Host Internal
 [5.] Host Per Lane
 [6.] Media Per Lane
 [7.] Simultaneous Media Host

 Unsupported Loopback Types :
==============================

 Media Configured Loopback : Media Loopback None
 Media Applied Loopback    : Media Loopback None


 Host Configured Loopback : Host Loopback None
 Host Applied Loopback    : Host Loopback None



FW Upgrade Capability Mode:
===========================
 Supports Both Warm & Cold boot
 Supports Cold boot only
```

This is an example that displays the applications advertised by the module.

```
Router# #show controllers optics 0/0/0/10 appsel advertised

Sun Feb  2 20:00:04.884 UTC
```

App-ID	Host-ID		Media-ID		Standard
	Host	Power			
	Supported	Consumption(W)			
1	17	ETH 400GAUI-8 C2M (Annex	62	OIF 400ZR, DWDM, amplifi	OIF
	Yes	n/a			
2	13	ETH 100GAUI-2 C2M (Annex	62	OIF 400ZR, DWDM, amplifi	OIF
	Yes	n/a			
3	17	ETH 400GAUI-8 C2M (Annex	70	OpenZR+ ZR400-OFEC-16QAM	OpenZR+
	Yes	n/a			
4	13	ETH 100GAUI-2 C2M (Annex	70	OpenZR+ ZR400-OFEC-16QAM	OpenZR+
	Yes	n/a			
5	17	ETH 400GAUI-8 C2M (Annex	199	0xC0-0xFE Vendor Specif	0xC0-0xFE
	Yes	n/a			
6	15	ETH 200GAUI-4 C2M (Annex	199	0xC0-0xFE Vendor Specif	0xC0-0xFE
	Yes	n/a			
7	13	ETH 100GAUI-2 C2M (Annex	199	0xC0-0xFE Vendor Specif	0xC0-0xFE

```
     |  Yes       |  n/a             |
  8       |  17    ETH 400GAUI-8 C2M (Annex |  196   0xC0-0xFE  Vendor Specif |  0xC0-0xFE
     |  Yes       |  n/a             |
  9       |  15    ETH 200GAUI-4 C2M (Annex |  196   0xC0-0xFE  Vendor Specif |  0xC0-0xFE
     |  Yes       |  n/a             |
  10      |  13    ETH 100GAUI-2 C2M (Annex |  196   0xC0-0xFE  Vendor Specif |  0xC0-0xFE
     |  Yes       |  n/a             |
  11      |  17    ETH 400GAUI-8 C2M (Annex |  200   0xC0-0xFE  Vendor Specif |  0xC0-0xFE
     |  Yes       |  n/a             |
  12      |  15    ETH 200GAUI-4 C2M (Annex |  200   0xC0-0xFE  Vendor Specif |  0xC0-0xFE
     |  Yes       |  n/a             |
  13      |  13    ETH 100GAUI-2 C2M (Annex |  200   0xC0-0xFE  Vendor Specif |  0xC0-0xFE
     |  Yes       |  n/a             |
  14      |  17    ETH 400GAUI-8 C2M (Annex |  83    OTN-ITU-T FOIC4.8-DO (G. |  OTN-ITU-T
     |  Yes       |  n/a             |
  15      |  254   0xC0-0xFE  Vendor Specif |  254   0xC0-0xFE  Vendor Specif |  0xC0-0xFE
     |  Yes       |  n/a             |
--------------------------------------------------------------------------------------------------------------
```

This is an example that displays the applications detailed by the module.

```
Router# show controllers optics 0/0/0/10 appsel detailed

Sun Feb  2 20:00:29.702 UTC
--------------------------------------------------------------------------------------------------------------

  App-ID  |  Host-ID     |  Media-ID    |  Host Lane |  Media Lane|  Host Lane   |  Media
Lane  |  Host      |
          |              |              |  Count     |  Count     |  Assign      |  Assign
      |  Supported |
          |              |              |            |            |              |
      |            |
--------------------------------------------------------------------------------------------------------------

  1       |  17          |  62          |  8         |  1         |  1           |  1
      |  Yes       |
  2       |  13          |  62          |  2         |  1         |  85          |  1
      |  Yes       |
  3       |  17          |  70          |  8         |  1         |  1           |  1
      |  Yes       |
  4       |  13          |  70          |  2         |  1         |  85          |  1
      |  Yes       |
  5       |  17          |  199         |  8         |  1         |  1           |  1
      |  Yes       |
  6       |  15          |  199         |  4         |  1         |  17          |  1
      |  Yes       |
  7       |  13          |  199         |  2         |  1         |  85          |  1
      |  Yes       |
  8       |  17          |  196         |  8         |  1         |  1           |  1
      |  Yes       |
  9       |  15          |  196         |  4         |  1         |  17          |  1
      |  Yes       |
  10      |  13          |  196         |  2         |  1         |  85          |  1
      |  Yes       |
  11      |  17          |  200         |  8         |  1         |  1           |  1
      |  Yes       |
  12      |  15          |  200         |  4         |  1         |  17          |  1
      |  Yes       |
  13      |  13          |  200         |  2         |  1         |  85          |  1
      |  Yes       |
  14      |  17          |  83          |  8         |  1         |  1           |  1
      |  Yes       |
  15      |  254         |  254         |  8         |  1         |  255         |  1
```

```
      |  Yes       |
-------------------------------------------------------------------------------------------------------------------
```

This is an example that displays the active applications on a module.

```
Router# show controllers optics 0/0/0/10 appsel active

Sun Feb  2 20:00:47.776 UTC
 Instance           : 1
 App-ID             : 3
 Host-ID            : 17    ETH 400GAUI-8 C2M (Annex
 Media-ID           : 70    OpenZR+ ZR400-OFEC-16QAM
 Host Lane Count    : 8
 Media Lane Count   : 1
 Host Lane Assign   : 0x1
 Media Lane Assign  : 0x1
```

show controllers optics prbs-info

To display the real-time diagnostic parameters and current status of the Pseudo Random Binary Sequence (PRBS) test on an optical module, use the **show controllers optics prbs-info** command in XR EXEC mode.

show controllers optics *R/S/I/P* **prbs-info**

Syntax Description

optics *R/S/I/P*	Specifies the rack, slot, instance, and port of the optics controller.
prbs-info	Displays the PRBS diagnostic details and statistics.

Command Default

No default behavior or values.

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 26.2.1	This command was introduced for Grey and ZR optical modules.

Usage Guidelines

Use this command to monitor PRBS link diagnostics on your optical modules. The system actively polls all diagnostics every 1 second. If a specific statistic is not supported by the underlying optics hardware, the output displays a hyphen (-) in the corresponding field.

Task ID

Task ID	Operation
interface	read

Example

The following example displays sample output for the `show controllers optics prbs-info` command:

```
Router#show controllers optics 0/5/0/0 prbs-info
                PRBS ----------------------------------------------
                Port:    Optics0/5/0/0

                ----------------------PRBS details------------------
                PRBS Test   : Enable
                PRBS Mode   : Source-Sink
                PRBS Pattern   : PN31Q
                PRBS Status   : Locked
                PRBS Direction   : Line
                PRBS Configured Time  : 27 Jan 17:48:23 (714 seconds elapsed)
                PRBS First Lock Established Time: 27 Jan 17:49:50 (627 seconds elapsed)
                Counter last updated timestamp  : 27 Jan 18:00:11 (6 seconds elapsed)

                Lane       SNR(dBm)           MaxSNR(dBm)           ErrorCount
TotalBits               BER                MaxBER
                0          23.29                23.87                2216183985
65764212962176          3.300e-05           5.230e-01
```

```
                Lane      LockStatus           LostCount             FoundCount
LockTime(secs)     LockLostTimestamp
                0          Locked                 0                     1
 629                    -
```

Table 1: show controllers optics prbs-info Field Descriptions

Field	Description
PRBS Test	Indicates whether the PRBS test is currently enabled or disabled on the module.
PRBS Mode	The operational mode configured for the test (for example, `Source`, `Sink`, or `Source-Sink`).
PRBS Pattern	The specific pseudo-random bit pattern being generated and analyzed (for example, `PN31Q`, `PN15Q`).
PRBS Status	The overall synchronization status of the PRBS test across the module (for example, `Locked` or `Unlocked`).
PRBS Direction	The configured direction of the test (`Line` or `System`).
PRBS Configured Time	The timestamp recording exactly when the PRBS test was configured, along with the total seconds elapsed since configuration.
PRBS First Lock Established Time	The timestamp recording when the PRBS receiver first successfully synchronized to the pattern.
Counter last updated timestamp	The timestamp of the most recent 1-second diagnostic poll.
Lane	The physical lane number on the optics module (for example, 0, 1, 2, 3).
SNR(dBm)	The current Signal-to-Noise Ratio for the specific lane, measured in decibels relative to a milliwatt (dBm).
MaxSNR(dBm)	The worst-case Signal-to-Noise Ratio (SNR) observed across all 1-second diagnostic polling intervals since PRBS was configured.
ErrorCount	The total number of bit errors detected by the PRBS checker on this lane. This aligns with the Common Management Interface Specification (CMIS) 5.2 diagnostic standards.
TotalBits	The total number of bits received and evaluated by the PRBS checker since pattern lock was established.
BER	The current Bit Error Rate, calculated as the ratio of `ErrorCount` to `TotalBits`.
MaxBER	The worst-case Bit Error Rate (BER) observed across all 1-second diagnostic polling intervals since PRBS was configured.
LockStatus	Indicates the synchronization state of the PRBS sink checker for the individual lane. Displays as **Locked** when synchronized, or **Unlocked** if synchronization fails.

Field	Description
LostCount	The total number of times the PRBS receiver has lost lock on this lane after initially acquiring it.
FoundCount	The total number of times the PRBS receiver has successfully found and acquired pattern lock on this lane.
LockTime(secs)	The cumulative time, in seconds, that the lane's PRBS checker has remained in a locked state.
LockLostTimestamp	The timestamp recording the exact occurrence of the most recent loss of pattern lock on this lane.

ampli-control-mode

To configure the mode of operation of the OLS pluggable to either gain control or power control mode, use the **ampli-control-mode** command in the controller ots configuration mode.

ampli-control-mode { **powermode** | **manual** }

Syntax Description

powermode	Configures the OLS pluggable to power control mode.
manual	Configures the OLS pluggable to gain control mode.

Command Default

None.

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

None.

Task ID

Task ID	Operation
dwdm	read, write

Example

The following example shows how to configure the gain control operational mode and the amplifier gain of the OLS pluggable :

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#ampli-control-mode manual
Router(config-Ots)#egress-ampli-gain +30
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

controller ots (QDD OLS)

To configure the QDD OLS pluggable (ots controller), use the **controller ots** command in the global configuration mode.

controller ots *R/S/I/P/SuP*

Syntax Description

R/S/I/P/SuP	Rack/Slot/Instance/Port/Sub-Port of the QDD OLS pluggable. *SuP* is the QDD pluggable subport which can be 0 or 1. Com port is represented as 0 and line port is represented as 1.

Command Default

None.

Command Modes

Global Configuration

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

None.

Task ID

Task ID	Operation
dwdm	read, write
sonet-sdh	read, write
interface	read, write

Example

This example shows how to configure the ots controller and set the low- power threshold at the transmit and receive side.

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#rx-low-threshold -200
Router(config-Ots)#tx-low-threshold -200
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

egress-ampli-force-apr

To enable or disable Force Automatic Power Reduction (APR) on the OLS pluggable, use the **egress-ampli-force-apr** command in the controller ots configuration mode.

egress-ampli-force-apr {on | off}

Syntax Description

on	Enables Force APR on the OLS pluggable.
off	Disables Force APR on the OLS pluggable.

Command Default

None.

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

Automatic Power Reduction (APR) is an eye-safe output power level of the OLS pluggable when you restart the pluggable (amplifier).

If the OLS pluggable is in the APR state, then the default value for APR power is 8 dBm and APR timer is 9 seconds. When **Force APR** is configured or enabled, the OLS pluggable continues to remain in the APR state. If force APR is not configured or disabled, then the OLS pluggable remains in the Gain mode or Power mode, based on the **ampli-control-mode** user configuration.

Example

The following example shows how to enable Force APR on the OLS pluggable :

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#egress-ampli-force-apr on
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

egress-ampli-gain

To configure the amplifer gain of the OLS pluggable, use the **egress-ampli-gain** command in the controller ots configuration mode.

egress-ampli-gain *gain-value*

Syntax Description

gain-value	Sets the amplifier gain value. The range is <+30, +400> in units of 0.1dB. • For subport 0, the range is from +30 db to + 250 db • For subport 1, the range is from +70 db to +250 db

Command Default

None.

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

None.

Task ID

Task ID	Operation
dwdm	read, write

Example

The following example shows how to configure the gain control operational mode and the amplifier gain of the OLS pluggable :

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#ampli-control-mode manual
Router(config-Ots)#egress-ampli-gain +30
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

egress-ampli-osri

To shutdown the amplifier (QDD OLS pluggable), use the **egress-ampli-osri** command in the controller ots configuration mode.

egress-ampli-osri { **off** | **on** }

Syntax Description

off	Disables the Optical Safety Remote Interlock (OSRI) configuration.
on	Enables the Optical Safety Remote Interlock (OSRI) configuration.

Command Default

None

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

The OSRI configuration is used during the maintenance of the pluggable, debugging scenarios, and when the OLS pluggable is not in use.

Task ID

Task ID	Operation
dwdm	read, write

Example

The following example shows how to configure the Optical Safety Remote Interlock (OSRI) on the OLS pluggable:

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#egress-ampli-osri on
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

egress-ampli-power

To configure the amplifier output power of the OLS pluggable, use the **egress-ampli-power** command in the controller ots configuration mode.

egress-ampli-power *power-value*

Syntax Description

power-value	Sets the amplifier power value. The range is <-30, +250> in units of 0.1dB. • For subport 0, the range is from 10 dB to 170 dB • For subport 1, the range is from 0 dB to 170 dB

Command Default

None.

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

None.

Task ID

Task ID	Operation
dwdm	read, write

Example

The following example shows how to configure the power control operational mode and the amplifier output power of the OLS pluggable :

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#ampli-control-mode powermode
Router(config-Ots)#egress-ampli-power 30
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

egress-ampli-safety-control-mode

To enable the safety control mode in the OLS pluggable, use the **egress-ampli-safety-control-mode** command in the controller ots configuration mode.

egress-ampli-safety-control-mode { **auto** | **disabled** }

Syntax Description

auto	Enables the safety control mode (automatic laser shutdown (ALS)) only on sub-port 1 of the OLS pluggable.
disabled	Disables the safety control mode (automatic laser shutdown (ALS)) on sub-port 1 of the OLS pluggable.

Command Default

None

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

You can enable safety control mode only on subport 1. With safety-control-mode set as **auto** and if LOS is detected on the line RX, the line TX normalizes the signal output power to 8 dBm and the ALS alarm is raised.

Task ID

Task ID	Operation
dwdm	read, write

Example

The following example shows how to enable the safety control mode on the OLS pluggable (on sub-port 1):

```
Router#config
Router(config)#controller ots 0/0/2/1/1
Router(config-Ots)#egress-ampli-safety-control-mode auto
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

rx-low-threshold

To configure the low receive (RX) power threshold on the QDD OLS pluggable, use the **rx-low-threshold** command in the controller ots configuration mode.

rx-low-threshold *rx-low*

Syntax Description

rx-low	Configures the low receive power threshold. The range is -400 to 400 (in the units of 0.1 dBm). • For subport 0, the range is from -300 dBm to 170 dBm • For subport 1, the range is from -300 dBm to 170 dBm

Command Default

None.

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

None.

Task ID

Task ID	Operation
dwdm	read, write

Example

This example shows how to configure the ots controller and set the low power threshold at the receiving side.

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#rx-low-threshold -200
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```

show controllers ots (QDD OLS)

To display the configuration details of the OLS pluggable, use the **show controllers ots** command in XR EXEC mode.

show controllers ots *R/S/I/P/SuP*

Syntax Description

R/S/I/P/SuP	Rack/Slot/Instance/Port/Sub-Port of the QDD OLS pluggable. *SuP* is the QDD pluggable sub-port which can be 0 or 1. Com port is represented as 0 and line port is represented as 1.

Command Default

None.

Command Modes

XR EXEC

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

None

Task ID

Task ID	Operation
interface	read

Example

The following example displays the configuration details of the OLS pluggable:

```
Router#show controllers ots 0/0/1/1/1
Wed Mar 29 06:59:00.016 UTC

 Controller State: Up

 Transport Admin State: In Service

 LED State: Yellow

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


         Alarm Statistics:
         -----------------
         RX-LOS-P = 1
         RX-LOC = 0
         TX-POWER-FAIL-LOW = 0
         INGRESS-AUTO-LASER-SHUT = 0
         INGRESS-AUTO-POW-RED = 0
         INGRESS-AMPLI-GAIN-LOW = 0
         INGRESS-AMPLI-GAIN-HIGH = 0
```

```
        EGRESS-AUTO-LASER-SHUT = 1
        EGRESS-AUTO-POW-RED = 1
        EGRESS-AMPLI-GAIN-LOW = 0
        EGRESS-AMPLI-GAIN-HIGH = 0
        HIGH-TX-BR-PWR = 0
        HIGH-RX-BR-PWR = 0
        SPAN-TOO-SHORT-TX = 0
        SPAN-TOO-SHORT-RX = 0

        Parameter Statistics:
        ---------------------
        Total Tx Power = 7.52 dBm
        Rx Signal Power = -26.77 dBm
        Tx Signal Power = 7.23 dBm
        Egress Ampli Gain = 20.8 dB
        Egress Ampli Safety Control mode = auto
        Egress Ampli OSRI = OFF


        Configured Parameters:
        ----------
        Egress Ampli Gain = 15.0 dB
        Egress Ampli Power = 8.0 dBm
        Egress Ampli Safety Control mode = auto
        Egress Ampli OSRI = OFF
        Ampli Control mode = Manual
        Rx Low Threshold = -30.0 dBm
        Tx Low Threshold = -5.0 dBm


        Temperature = 35.09 Celsius
        Voltage = 3.37 V

Optical Module Details

        Optics type            : QDD DUAL EDFA
        Name                   : CISCO-ACCELINK
        OUI Number             : 00.00.00
        Part Number            : EDFA-211917-QDD
        Rev Number             : 21
        Serial Number          : ACW2651Z003
        PID                    : ONS-QDD-OLS
        VID                    : VES1
        Firmware Version       : 2.01
        Date Code(yy/mm/dd)    : 22/12/28
        Fiber Connector Type   : CS
```

tx-low-threshold

To configure the low transmit (TX) power threshold on the QDD OLS pluggable, use the **tx-low-threshold** command in the controller ots configuration mode.

tx-low-threshold *tx-low*

Syntax Description

tx-low	Configures the low transmit power threshold. The range is -400 to 400 (in the units of 0.1 dBm). • For subport 0, the range is from -50 dBm to 190 dBm • For subport 1, the range is from -50 dBm to 190 dBm

Command Default

None.

Command Modes

controller ots

Command History

Release	Modification
Release 24.1.1	This command was introduced.

Usage Guidelines

None.

Task ID

Task ID	Operation
dwdm	read, write

Example

This example shows how to configure the ots controller and set the low power threshold at the transmit side.

```
Router#config
Router(config)#controller ots 0/0/2/1/0
Router(config-Ots)#tx-low-threshold -200
Router(config-Ots)#commit
Router(config-Ots)#exit
Router(config)#exit
```