



Coherent Optics Commands

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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 <i>description</i>	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 } <i>value</i>	<p>Configures performance monitoring parameters for 30-second, 15-minute, or 24-hour intervals.</p> <p>The fec keyword configures FEC PM data in 30-second, 15-minute, or 24-hour intervals.</p> <p>The report keyword configures threshold crossing alerts (TCA) reporting status for the PM parameters.</p> <p>The threshold keyword configures threshold values for the PM parameters.</p> <p>The PM parameters that can be configured are:</p> <ul style="list-style-type: none"> • 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 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 | 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 | osnr-low-threshold osnr-value
description description | fec fec-mode | sec-admin-state {maintenance | normal} | shutdown
| transmit-power transmit-power | perf-mon { enable | disable } | host { auto-squelch
} { disable } | pm { 30-sec | 15-min | 24-hour } { optics } { report | threshold }
pm-parameter value ]
```

Syntax Description	<i>R/S/I/P</i>	Rack/Slot/Instance/Port of the optics controller.
DAC-Rate <i>rate</i>		Sets the DAC (digital to analog conversion) sampling rate for this controller. The sampling rate options available are: <ul style="list-style-type: none"> • 1x1 • 1x1.25
cd-max <i>cd-max</i>		(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 +80000 ps/nm.
cd-min <i>cd-min</i>		(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 -80000 to 0 ps/nm.
cd-low-threshold <i>cd-low</i>		(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 -80000 to 0 ps/nm.
cd-high-threshold <i>cd-high</i>		(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 +80000 ps/nm.
dgd-high-threshold <i>dgd-value</i>		(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 <i>channel-grid</i>		Configures the DWDM carrier channel. Options are: <ul style="list-style-type: none"> • 100MHz-grid • 50GHz-grid

lbc-high-threshold <i>lbc-value</i>	Configures the high laser bias current threshold. This is an alarm threshold parameter. The range is 0 to 100%
osnr-low-threshold <i>osnr-value</i>	(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 0.01 db).
description <i>description</i>	Description of the optics controller.
fec <i>fec-mode</i>	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 } <i>pm-parameter</i> <i>value</i>	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: <ul style="list-style-type: none"> • 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 <i>transmit-power</i>	(Only for trunk optics controllers) Configures the transmit power. The range is -190 to 50 dBm (in the units of 0.1 dBm).
host { auto-squelch } { disable }	Disable squelch for host.
perf-mon { enable disable }	Enables or disables performance monitoring.

Command Default

Table 1: Supported Line Cards and Modes

Line Card	Default Port Speed	Supported Front Panel Ports	1x400G Transponder Mode	4x100G Muxponder Mode	3x100G Muxponder Mode	2x100G Muxponder Mode	1x100G Transponder Mode
A9K-20HG-FLEX-SE / A9K-20HG-FLEX-TR	1x100G	0, 7, 8, 12, 19	Yes	Yes	No	No	Yes
A9K-8HG-FLEX-SE / A9K-8HG-FLEX-TR	1x100G	0, 7	Yes	Yes	No	No	Yes
A99-10X400GE-X-SE / A99-10X400GE-X-TR	1x400G	3, 5, 6, 7, 9	Yes	Yes	No	Yes	Yes
A9903-20HG-PEC	1x100G	0, 4, 8, 12, 16	Yes	No	No	No	Yes

Command History

Release	Modification
Release 7.3.2	This command was introduced.
Release 7.10.1	The following keyword was introduced: <ul style="list-style-type: none"> • host auto-squelch disable

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.

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 disable laser squelching for host on controller optics:

```
router#config  
router(config)#controller 0/0/0/0  
router(config-Optics)#host auto-squelch disable  
router(config-Optics)#commit
```

hw-module location

To configure breakout, use the **hw-module location** command in the global configuration mode.

hw-module location *node-id* [**bay** *bay-number*] **port** *port-number* **breakout** *muxponder-mode*

Syntax Description

location <i>node-id</i>	Specify the node location.
bay <i>bay-number</i>	Applicable only for Cisco ASR 9903 router. The <i>bay-number</i> is always 1.
port <i>port-number</i>	Specify the port number.
breakout <i>breakout-mode options</i>	Configures the breakout for this controller. The router displays these breakout mode options: <ul style="list-style-type: none"> • 1x400GbE • 1x100GbE • 2x100GbE • 4x100GbE • 2x40GbE • 1x40GbE • 4x25GbE • 4x10GbE • 1x10GbE

Command Default

None.

Command Modes

Global Configuration

Command History

Release	Modification
Release 7.3.2	This command was enhanced to support QDD-400G-ZR-S and QDD-400G-ZRP-S optical modules.
Release 24.3.1	This command was enhanced to support the 1x10GbE breakout mode on the Cisco ASR 9903 router and Cisco A9K-20HG-FLEX-SE line cards with SFP-10G-ER, SFP-10G-ZR, and SFP-10G-LR hot-pluggable transceiver modules.

Usage Guidelines

For additional information, see the "Configuring Breakout" section in the "Configuring 400G Digital Coherent Optics" chapter of *Interface and Hardware Component Configuration Guide for Cisco ASR 9000 Series Routers*.

Example

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

```
Router#configure  
Router(config)#hw-module port 1 location 0/1/0/3 breakout 4xHundredGigE  
Router(config)#commit
```

This example shows how to configure the 1x10GbE breakout mode using the **hw-module location** command:

```
Router#configure  
Router(config)#hw-module location 0/0/CPU0 bay 1 port 9 breakout 1xTenGbE  
Router(config)#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 7.3.2	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 0/19/0/3

Port                               : CoherentDSP 0/19/0/3
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                         : 100.0Gb/s

Alarm Information:
LOS = 0 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 = 1
Detected Alarms                   : None

Bit Error Rate Information
```

```

PREFEC BER                : 0.0E+00
POSTFEC BER               : 0.0E+00
Q-Factor                  : 16.50 dB

Q-Margin                   : 9.90dB

OTU TTI Received

FEC mode                   : O_FEC

```

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

```

Threshold	TCA		MIN	AVG	MAX	Threshold	TCA
(max)	(enable)					(min)	(enable)
PreFEC BER	NO	:	8.4E-04	8.6E-04	8.7E-04	0E-15	NO
0E-15	NO						
PostFEC BER	NO	:	0E-15	0E-15	0E-15	0E-15	NO
0E-15	NO						
Q[dB]	NO	:	9.90	9.90	9.90	0.00	NO
0.00	NO						
Q_Margin[dB]	NO	:	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 controller optics R/S/I/P [ pm { current | history } { 30-sec | 15-min | 24-hour } { optics } { lane-number } ]
```

Syntax Description							
<i>R/S/I/P</i>	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.						
<i>lane-number</i>	Displays the performance monitoring data for the applicable lanes in the optical module. The lane number is always 1.						
Command Default	No default behavior or values						
Command Modes	XR EXEC mode						
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>Release 6.4.1</td> <td>This command was introduced.</td> </tr> <tr> <td>Release 7.3.2</td> <td>This command was updated to reflect the QDD-400G-ZR-S and QDD-400G-ZRP-S changes in the output.</td> </tr> </tbody> </table>	Release	Modification	Release 6.4.1	This command was introduced.	Release 7.3.2	This command was updated to reflect the QDD-400G-ZR-S and QDD-400G-ZRP-S changes in the output.
Release	Modification						
Release 6.4.1	This command was introduced.						
Release 7.3.2	This command was updated to reflect the QDD-400G-ZR-S and QDD-400G-ZRP-S changes in the output.						
Usage Guidelines	<p>To display the firmware version of the optical module, use the show controllers optics <i>R/S/I/P</i> inc Firmware command.</p> <pre>Router#show controllers optics 0/0/0/3 inc Firmware Firmware Version : 61.20 (Build : 13)</pre>						

Example

The following example displays the output of the **show controllers optics** command:

```
Router#show controllers optics 0/0/0/3
Controller State: Up
Transport Admin State: In Service
Laser State: On
LED State: Green
FEC State: FEC CFEC
Optics Status
  Optics Type: 400G QSFP-DD 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:
Laser Bias Current = 52.5 mA
Actual TX Power = -8.51 dBm
RX Power = -8.67 dBm
RX Signal Power = -8.66 dBm
Frequency Offset = 0 MHz
Laser Temperature = 62.21 Celsius
Laser Age = 0 %
DAC Rate = 1x1

```

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	-18.0	-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 = -7.00 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 = 180.00 ps
Baud Rate = 59.8437500000 GBd
Modulation Type: 16QAM
Chromatic Dispersion 0 ps/nm
Configured CD-MIN -2400 ps/nm CD-MAX 2400 ps/nm
Second Order Polarization Mode Dispersion = 25.00 ps^2
Optical Signal to Noise Ratio = 36.40 dB
Polarization Dependent Loss = 0.07 dB
Polarization Change Rate = 0.00 rad/s
Differential Group Delay = 1.00 ps

```

```

Temperature = 59.00 Celsius
Voltage = 3.31 V

```

Transceiver Vendor Details

```

Form Factor           : QSFP-DD
Optics type           : QSFP-DD 400G-ZR-S
Name                  : CISCO-ACACIA
OUI Number            : 7c.b2.5c
Part Number           : DP04QSDD-E20-19E
Rev Number            : 01
Serial Number         : ACA2504002U
PID                   : QDD-400G-ZR-S
VID                   : ES03
Firmware Version      : 161.20 (Build : 9)
Date Code (yy/mm/dd) : 21/02/03

```

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
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)
LBC[%]	: 0.0	0.0	0.0	0.0	NA	NO	100.0
	NA	NO					
OPT[dBm]	: -7.92	-7.92	-7.92	-15.09	NA	NO	0.00
	NA	NO					
OPR[dBm]	: -8.20	-8.19	-8.18	-30.00	NA	NO	8.00
	NA	NO					
CD[ps/nm]	: -1	-1	0	-80000	NA	NO	80000
	NA	NO					
DGD[ps]	: 4.00	4.00	4.00	0.00	NA	NO	80.00
	NA	NO					
SOPMD[ps^2]	: 46.00	48.00	50.00	0.00	NA	NO	2000.00
	NA	NO					
OSNR[dB]	: 36.40	36.40	36.40	9.00	NA	NO	40.00
	NA	NO					
PDL[dB]	: 0.08	0.09	0.09	0.00	NA	NO	7.00
	NA	NO					
PCR[rad/s]	: 0.00	0.00	0.00	0.00	NA	NO	2500000.00
	NA	NO					
RX_SIG[dBm]	: -7.40	-7.40	-7.39	-30.00	NA	NO	1.00
	NA	NO					
FREQ_OFF[Mhz]	: -99	-93	-87	-3600	NA	NO	3600
	NA	NO					
SNR[dB]	: 18.40	18.45	18.50	7.00	NA	NO	100.00
	NA	NO					

Last clearing of "show controllers OPTICS" counters never