Dense Wavelength Division Multiplexing Commands

This module provides command line interface (CLI) commands for configuring dense wavelength division multiplexing (DWDM) on the Cisco ASR 9000 Series Router.

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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admin-state

To configure the transport administration state on a DWDM port, use the **admin-state** command in DWDM configuration mode. To return the administration state from a DWDM port to the default, use the **no** form of this command.

Note ASR 9000 64-bit (eXR) does not support the **admin-state in-service** and **admin-state out-of-service** commands.

admin-state {**in-service** | **out-of-service**}

Syntax Description

in-service	Places the DWDM port in In Service (IS) state, to support all normal operation.
out-of-service	Places the DWDM port in Out of Service (OOS) state. The laser is turned off and all traffic flow is stopped. This is the default.

Command Default

Out-of-service is the default transport administration state.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

When you configure **admin-state out-of-service**, the DWDM port is placed in OOS state. The laser is turned off, traffic flow is stopped, and proactive protection is disabled. However, configuration changes can still be made on the port.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to turn on the laser and place a DWDM port in In Service (IS) state:

Note This is a required configuration. The DWDM cards will not operate without this configuration.

```
RP/0/RSP0/CPU0:router# configure
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# admin-state in-service
```

```
RP/0/RSP0/CPU0:router(config-dwdm)# commit
```

The following example shows how to stop all operation on a DWDM port:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# admin-state out-of-service
```

controller dwdm

To configure a DWDM controller, use the **controller dwdm** command in Global Configuration mode. To return to the default state, use the **no** form of this command.

controller dwdm *interface-path-id* [**vtxp-monitor**]

Syntax Description

interface-path-id	Physical interface or virtual 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.
vtxp-monitor	Enables VTXP (virtual transponder) attribute on the interface. The purpose of VTXP attribute tagging is to easily identify a set of interfaces (on which VTXP is enabled) and use them for further configuration or monitoring.

Command Default

No default behavior or values

Command Modes

Global Configuration mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

For the *interface-path-id* argument, use the following guidelines:

- If specifying a physical interface, the naming notation is *rack*/*slot*/*module*/*port*/*subport*. 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.
  - *module*: Module number.
  - *port*: Physical port number of the interface.
  - *subport*: Physical port number of the sub-interface.
- If specifying a virtual interface, the number range varies, depending on interface type.

Task ID

Task ID	Operations
dwdm	read, write

Task ID	Operations
interface	read, write
sonet-sdh	read, write

Examples

This example shows how to configure a DWDM controller in slot 6:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/6/0/0

RP/0/RSP0/CPU0:router(config)# controller dwdm 0/6/0/0 vtxp-monitor
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.
show vtxp-monitored ports, on page 57	Displays ports on which VTXP attribute is enabled.

g709 bdi-to-client-gais

To insert a Generic Alarm Indication Signal (GAIS) pattern to client on the detection of a backward defect indication (BDI), use the **g709 bdi-to-client-gais** command in DWDM configuration mode. To disable this feature, use the **no** form of this command.

g709 bdi-to-client-gais

Syntax Description

This command has no keywords or arguments.

Command Default

By default, no GAIS to client is inserted.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Task ID

Task ID	Operations
dwdm	read, write

Examples

This example shows how to configure sending a Generic Alarm Indication Signal (GAIS) pattern signal to client when a BDI is received:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/6/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 bdi-to-client-gais
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

g709 enable

To enable the ITU-T G.709 wrapper, use the **g709 enable** command in DWDM configuration mode. To disable the ITU-T G.709 wrapper, use the **no** form of this command.

g709 enable

Syntax Description

This command has no keywords or arguments.

Command Default

The G.709 wrapper is disabled.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operation
dwdm	read, write

Example

This example shows how to enable the G.709 wrapper on an interface:

```
RP/0/RP0/CPU0:Router(config)# controller dwdm 0/5/0/0
RP/0/RP0/CPU0:Router(config-dwdm)# g709 enable
RP/0/RP0/CPU0:Router(config-dwdm)# admin-state in-service
```

g709 fec

To configure the Forward Error Correction (FEC) mode for the DWDM controller, use the **g709 fec** command in DWDM configuration mode. To return to the default state, use the **no** form of this command.

Note ASR 9000 64-bit (eXR) does not support the **g709 disable**, **g709 enhanced<I.4>**, and **g709 standard** commands.

g709 fec {[**disable**] | **enhanced** | **standard** | **ci-bch** | **high-gain-sd-fec** | **long-haul-sd-fec**}

Syntax Description

disable	Disables FEC.
enhanced	Enables ITU-T G.975.1 I.4 FEC.
standard	Enables standard FEC mode.This is the default.
ci-bch	Continuously Interleaved BCH FEC
high-gain-sd-fec	7% CISCO SD FEC.
long-haul-sd-fec	20% CISCO SD FEC.

Command Default

Standard FEC mode is enabled by default.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 5.3.1	The **ci-bch** keyword was introduced.
Release 5.3.2	The high-gain-sd-fec and long-haul-sd-fec keywords were introduced on the A9K-400G-DWDM-TR line card.

Usage Guidelines

Note The enhanced FEC mode supported on the Cisco CRS Router (ITU-T G.975.1 I.7) and the Cisco ASR 9000 Series Router (ITU-T G.975.1 I.4) are different and therefore, incompatible. To support interoperability of DWDM between these routers, standard FEC must be configured.

The **g709 fec** command can be used only when the DWDM controller port is in the out-of-service administrative state. You stop operation using the **admin-state out-of-service** command.

The G.709 wrapper must be enabled to enable forward error correction (FEC) mode on the controller.

Standard FEC is the default mode; therefore, if you use the **no g709 fec** command, standard FEC is used.

To display the FEC mode, use the **show controller dwdm** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

This example shows how to configure the FEC mode on a DWDM controller:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/6/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# admin-state out-of-service
RP/0/RSP0/CPU0:router(config-dwdm)# commit

RP/0/RSP0/CPU0:router(config-dwdm)# g709 fec standard
RP/0/RSP0/CPU0:router(config-dwdm)# commit
RP/0/RSP0/CPU0:router(config-dwdm)# admin-state in-service
RP/0/RSP0/CPU0:router(config-dwdm)# commit
```

Related Commands

Command	Description
admin-state, on page 3	Configures the transport administration state on a DWDM port.
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.
g709 bdi-to-client-gais, on page 7	Inserts a GAIS pattern to client on the detection of a BDI.

g709 odu overhead tti

To configure the Trail Trace Identifier (TTI) level for an Optical Channel Data Unit (ODU), use the **g709 odu overhead tti** command in DWDM configuration mode. To return to the default, use the **no** form of this command.

g709 odu overhead tti {**expected** | **sent**} {**ascii** | **hex**}*tti-string*

Syntax Description

expected	Configures the expected TTI string.
sent	Configures the transmit TTI string.
ascii	Indicates that the string is in ASCII format.
hex	Indicates that the string is in hexidecimal format.
tti-string	The TTI level string. You can configure the TTI level string in ASCII string format or hexadecimal format. The ASCII text string can be a maximum of 64 characters. The hexadecimal string length must be an even number and can be a maximum of 128 bytes.

Command Default

No TTI level string is configured.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure the expected TTI string:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 odu overhead tti expected test OTU 5678
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

g709 odu report disable

To disable the logging of selected Optical Channel Data Unit (ODU) alarms to the console for a DWDM controller, use the **g709 odu report disable** command in DWDM configuration mode. To return to the default state, use the **no** form of this command.

g709 odu report {**ais** | **bdi** | **lck** | **oci** | **ptim** | **tim**} **disable**

Syntax Description

ais	Alarm indication signal reporting status.
bdi	Backward defect indication reporting status.
lck	Upstream connection locked reporting status.
oci	Open connection indication error reporting status.
ptim	Payload type identifier mismatch reporting status.
tim	Set Trace Identifier Mismatch reporting status.

Command Default

Reporting is enabled for all keywords.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

This example shows how to disable ODU reporting for OCI:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 odu report oci disable
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

g709 otu overhead tti

To configure the OTU Trail Trace Identifier (TTI) buffer for a DWDM controller, use the **g709 otu overhead tti** command in DWDM configuration mode. To return to the default state, use the **no** form of this command.

Note ASR 9000 64-bit (eXR) does not support the **g709 otu overhead tti sent ascii LINE** and **g709 otu overhead tti sent hex LINE** commands.

g709 otu overhead tti {**expected** | **sent**} {**ascii** | **hex**} *tti-string*

Syntax Description

expected	Configures the expected TTI string.
sent	Configures the transmit TTI string.
ascii	Indicates that the string is in ASCII format.
hex	Indicates that the string is in hexidecimal format.
tti-string	The TTI string. A maximum of 64 characters is allowed.

Command Default

No TTI string is configured

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

To display the TTI strings, use the **show controller dwdm g709** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure the expected TTI string:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 otu overhead tti expected test OTU 5678
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

g709 otu report disable

To disable the logging of selected Optical Channel Transport Unit (OTU) alarms to the console for a DWDM controller, use the **g709 otu report disable** command in DWDM configuration mode. To return to the default state, use the **no** form of this command.

g709 otu report {**bdi** | **fecmismatch** | **iae** | **lof** | **lom** | **los** | **sd-ber** | **sf-ber** | **tim**} **disable**

Syntax Description

bdi	Backward defect indication reporting status.
fecmismatch	FEC mismatch alarm reporting status. **Note** FEC mismatch alarm is deprecated.
iae	Incoming alignment error reporting status.
lof	OTU loss of frame reporting status.
lom	Loss of multiple frame reporting status.
los	Loss of signal reporting status.
sd-ber	SM bit error rate (BER) is in excess of the signal degradation BER threshold.
sf-ber	SM BER is in excess of the signal failure BER threshold.
tim	Trace Identifier Mismatch reporting status.

Command Default

Reporting is enabled for all keywords.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

Configuring two ends of an OTN link with different FEC modes is not supported. Even if different FEC modes are configured, the FEC mismatch alarm will not be raised. Interface may experience continuous port flap in addition to continuous bit interleaved parity (BIP) errors at both OTN and LAN level.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to disable OTU reporting for IAE:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 otu report iae disable
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

g709 otu threshold

To configure thresholds for selected Optical Channel Transport Unit (OTU) bit error rate (BER) alarms, use the **g709 otu threshold** command in DWDM configuration mode. To return to the default state, use the **no** form of this command.

g709 otu threshold {**sd-ber** | **sf-ber**} **bit-error-rate**

Syntax Description

sd-ber *bit-error-rate*	Signal degradation bit error rate (BER) in the range 1 to 9, where *bit-error-rate* specifies a negative exponent of base 10 (10–*bit-error-rate*). The default is 6 (10–6).
sf-ber *bit-error-rate*	Signal failure BER above threshold in the range 1 to 9, where *bit-error-rate* specifies a negative exponent of base 10 (10–*bit-error-rate*). The default is 3 (10–3).

Command Default

The defalut bit error rate for **sd-ber** is 6.

The default bit error rate for **sf-ber** is 3.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

This example shows how to set the signal fail BER rate to be 5:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 otu threshold sf-ber 5
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

g709 tim-to-client-gais

To insert a Generic Alarm Indication Signal (GAIS) on the client side when a Trace Identifier Mismatch (TIM) is detected, use the **g709 tim-to-client-gais** command in DWDM configuration mode. To disable this feature, use the **no** form of this command.

g709 tim-to-client-gais

Syntax Description

This command has no keywords or arguments.

Command Default

By default, no GAIS to client is inserted.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure a GAIS to client when a TIM is received:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 tim-to-client-gais
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

g709 tti-processing

To enable Trace Identifier Mismatch (TIM) alarms, use the **g709 tti-processing** command in DWDM configuration mode. To disable TIM alarms, use the **no** form of this command.

Note ASR9000 64-bit (eXR) does not support the **g709 tti-processing** command.

g709 tti-processing

Syntax Description

This command has no keywords or arguments.

Command Default

By default, trace identifier mismatch (TIM) alarms are disabled.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

Note Trace identifier mismatch (TIM) alarms can be set only when TTI processing is enabled.

Task ID

Task ID	Operations
dwdm	read, write

Examples

This example shows how to configure the expected TTI string:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# g709 tti-processing
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

log signal

To enable 10 millisecond proactive monitoring of Forward Error Correction-Fast Re-Route (FEC-FRR), use the **log signal** command in DWDM configuration mode. To disable proactive monitoring, use the no form of this command.

log signal *file-name*

Syntax Description

file-name	Specifies the name of the log file.

Command Default

No default behavior or values

Command Modes

DWDM configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.

Usage Guidelines

The proactive feature is used to trigger Forward Error Correction-Fast Re-Route (FEC-FRR).

Note The **log signal** command is supported on the legacy line cards but does not function on the A9K-8X100GE-SE line cards though it is supported on them.

To see the proactive status, use the **show controller dwdm proactive status** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to enable 10 millisecond proactive monitoring of Forward Error Correction-Fast Re-Route (FEC-FRR).

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# log signal LogFile1
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

loopback (DWDM)

To configure the DWDM controller for loopback mode, use the **loopback** command in DWDM configuration mode. To remove the loopback DWDM command from the configuration file, use the **no** form of this command.

Note ASR 9000 64-bit (eXR) does not support the **loopback** command.

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

Syntax Description

internal	Specifies that all the packets be looped back to the router.
line	Specifies that the incoming network packets be looped back to the DWDM network.

Command Default

This command is disabled by default.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

The DWDM controller supports two loopback operation modes for diagnostic purposes: internal and line. The terminal (internal) loopback mode allows the received data from the Layer 2 Framer (for example, a SONET/SDH framer for POS or Ethernet MAC for 10GE) of the PLIM to be looped back to the ingress side of the Framer. This allows the packets to be looped back to the PLIM. The line loopback mode allows the received trunk/DWDM line Rx to be connected to the trunk/DWDM line Tx towards the line. This is used for line diagnostics.

Task ID

Task ID	Operations
dwdm	read, write

Examples

In the following example, all packets are looped back to the DWDM controller:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# loopback internal
```

network connection id

To configure a connection identifier for the Multi Service Transport Protocol (MSTP), use the **network connection id** command in DWDM configuration mode. To remove a connection identifier, use the no form of this command.

network connection id *id-number*

Syntax Description

id-number	Connection identifier.

Command Default

No default behavior or values

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure a connection identifier for the Multi Service Transport Protocol (MSTP).

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# network connection id 1/1/1/1
```

Related Commands

Command	Description
network port id, on page 23	Assigns an identifier number to a port for the MSTP.

network port id

To assign an identifier number to a port for the Multi Service Transport Protocol (MSTP), use the **network port id** command in DWDM configuration mode. To remove an identifier number from a port, use the no form of this command.

network port id *id-number*

Syntax Description

id-number	Port identifier.

Command Default

No default behavior or values

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to assign an identifier number to a port for the Multi Service Transport Protocol (MSTP):

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# network port id 1/0/1/1
```

Related Commands

Command	Description
network connection id, on page 22	Configures a connection identifier for the MSTP.

pm fec report enable

To enable Threshold Crossing Alert (TCA) generation for FEC, use the **pm fec report enable** command in DWDM configuration mode. To disable TCAs, use the **no** form of this command.

pm {**15-min** | **24-hour**} **fec report** {**ec-bits** | **uc-words**} **enable**

Syntax Description

15-min	Configures the TCA generation for 15-minute intervals.
24-hour	Configures TCA generation for 24-hour intervals.
ec-bits	Bit errors corrected (BIEC). Indicates the number of bit errors corrected in the DWDM trunk line during the performance monitoring time interval.
uc-words	Uncorrectable words. This is the number of uncorrectable words detected in the DWDM trunk line during the performance monitoring time interval.

Command Default

TCA is not enabled.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

To display FEC performance measurement information, use the **show controller dwdm pm fec** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to enable TCAs in FEC reporting for uncorrectable words:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# pm 15-min fec report uc-words enable
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

pm fec threshold

To configure performance monitoring thresholds on the FEC layer, use the **pm fec threshold** command in DWDM configuration mode. To return to the default state, use the **no** form of this command.

pm {**15-min** | **24-hour**} **fec threshold** {**ec-bits** | **uc-words**} *threshold*

Syntax Description

15-min	Configures the performance monitoring thresholds for 15-minute intervals.
24-hour	Configures performance monitoring thresholds for 24-hour intervals.
ec-bits	Bit errors corrected (BIEC). Indicates the number of bit errors corrected in the DWDM trunk line during the performance monitoring time interval.
uc-words	Uncorrectable Words. This is the number of uncorrectable words detected in the DWDM trunk line during the performance monitoring time interval.
threshold	Threshold for the performance monitoring parameter in the range 1–4294967295.

Command Default

No threshold is configured.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

To display performance measurement information for the FEC layer, use the **show controller dwdm pm fec** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure an FEC layer performance monitoring threshold for uncorrectable words:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# pm 15-min fec threshold uc-words 2000000
```

Related Commands

Command	Description
show controller dwdm pm, on page 52	Displays performance monitoring information for a DWDM controller.

pm optics report enable

To enable Threshold Crossing Alert (TCA) generation on the optics layer, use the **pm optics report enable** command in DWDM configuration mode. To disable TCA reporting, use the **no** form of this command.

pm {**15-min** | **24-hour**} **optics report** {**lbc** | **opr** | **opt**} {**max-tca** | **min-tca**} **enable**

Syntax Description

15-min	Configures TCA generation for 15-minute intervals.
24-hour	Configures TCA generation for 24-hour intervals.
lbc	Laser bias current.
opr	Optical power on the unidirectional port.
opt	Transmit optical power in dBm.
max-tca	Indicates that the maximum value of the parameter is compared against the threshold to determine if a TCA should be generated.
min-tca	Indicates that the minimum value of the parameter is compared against the threshold to determine if a TCA should be generated.

Command Default

TCA reporting is not enabled.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

To display performance monitoring information for the optics, use the **show controller dwdm pm optics** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to enable TCA reporting on the optics layer reporting for the maximum OPT:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# pm 15-min optics report opt max-tca enable
```

Related Commands

Command	Description
show controller dwdm pm, on page 52	Displays performance monitoring information for a DWDM controller.

pm optics threshold

To configure performance monitoring thresholds on the optics layer, use the **pm optics threshold** command in DWDM configuration mode. To return to the default state, use the **no** form of this command.

pm {**15-min** | **24-hour**} **optics threshold** {**lbc** | **opr** | **opt**} {**max** | **min**} *threshold*

Syntax Description

15-min	Configures the performance monitoring thresholds for 15-minute intervals.
24-hour	Configures performance monitoring thresholds for 24-hour intervals.
lbc	Laser bias current.
opr	Optical power on the unidirectional port.
opt	Transmit optical power in dBm.
max	Indicates that the *threshold* is for the maximum value of the parameter.
min	Indicates that the *threshold* is for the minimum value of the parameter.
threshold	Threshold for the performance monitoring parameter.

Command Default

No thresholds are configured.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

To display performance monitoring information for the optics layer, use the **show controller dwdm pm optics** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure an optics layer performance monitoring threshold for maximum OPT:

```
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# pm 15-min optics threshold opt max 2000000
```

Related Commands

Command	Description
show controller dwdm pm, on page 52	Displays performance monitoring information for a DWDM controller.

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 DWDM configuration mode. To disable TCA reporting, use the **no** form of this command.

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

Syntax Description

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

DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
dwdm	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/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# pm 15-min otn report esr-pm-fe enable
```

Related Commands

Command	Description
show controller dwdm pm, on page 52	Displays performance monitoring information for a DWDM controller.

pm otn threshold

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

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

Syntax Description

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 DWDM configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

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

Task ID

Task ID	Operations
dwdm	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/RSP0/CPU0:router(config)# controller dwdm 0/0/0/0
RP/0/RSP0/CPU0:router(config-dwdm)# pm 15-min otn threshold esr-pm-ne 500000
```

Related Commands

Command	Description
show controller dwdm pm, on page 52	Displays performance monitoring information for a DWDM controller.

proactive

To enable automatic triggering of Forward Error Correction-Fast Re-Route (FEC-FRR), use the **proactive** command in DWDM configuration mode. To disable automatic triggering, use the no form of this command.

Note ASR 9000 64-bit (eXR) does not support the **proactive** command.

proactive

Syntax Description

This command has no keywords or arguments.

Command Default

No default behavior or values

Command Modes

DWDM configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.2.3	Support for Proactive protection feature was included on these Modular Port Adaptors(MPAs): • A9K-MPA-2X40GE • A9K-MPA-1X40GE

Usage Guidelines

The proactive feature is used to trigger Forward Error Correction-Fast Re-Route (FEC-FRR).

Note The **proactive** command is supported on the legacy line cards but does not function on the A9K-8X100GE-SE line cards though it is supported on them.

To see the proactive status, use the **show controller dwdm proactive status** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to enable automatic triggering of Forward Error Correction-Fast Re-Route (FEC-FRR):

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# proactive
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

proactive revert threshold

To configure the revert threshold to trigger reverting from the Forward Error Correction-Fast Re-Route (FEC-FRR) route back to the original route, use the **proactive revert threshold** command in DWDM configuration mode. To remove the revert threshold, use the no form of this command.

Note ASR 9000 64-bit (eXR) does not support the **proactive revert threshold <1-9> <3-10>** command.

proactive revert threshold *x-coefficient y-power*

Syntax Description

x-coefficient	Bit error rate coefficient (x of xE-y) . The range is 1 to 9. Default is 1.
y-power	Bit error rate exponent (y of xE-y). The range is 3 to 9.

Command Default

No default behavior or values

Command Modes

DWDM configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.2.3	Support for **proactive revert threshold** command was included on these Modular Port Adaptors(MPAs): • A9K-MPA-2X40GE • A9K-MPA-1X40GE

Usage Guidelines

The proactive feature is used to trigger Forward Error Correction-Fast Re-Route (FEC-FRR).

Note The **proactive revert threshold** command is supported on the legacy line cards but does not function on the A9K-8X100GE-SE line cards though it is supported on them.

To see the proactive status, use the **show controller dwdm proactive status** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure the revert threshold for FEC-FRR:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# proactive revert threshold 1 9
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

proactive revert window

To configure the revert window in which reverting from the Forward Error Correction-Fast Re-Route (FEC-FRR) route back to the original route is triggered, use the **proactive revert window** command in DWDM configuration mode. To remove the revert window, use the **no** form of this command.

Note ASR 9000 64-bit (eXR) does not support the **proactive revert window <500-100000>** command.

proactive revert window *window*

Syntax Description

window	The length of time (in milliseconds) of the window in which reverting from FEC-FRR may be triggered. The range is 2000 to 100000.

Command Default

No default behavior or values

Command Modes

DWDM configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.2.3	Support for proactive protection was included on these Modular Port Adaptors(MPAs): • A9K-MPA-2X40GE • A9K-MPA-1X40GE

Usage Guidelines

The proactive feature is used to trigger Forward Error Correction-Fast Re-Route (FEC-FRR).

Note The **proactive revert window** command is supported on the legacy line cards but does not function on the A9K-8X100GE-SE line cards though it is supported on them.

To see the proactive status, use the **show controller dwdm proactive status** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure the window in which reverting from FEC-FRR may be triggered:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# proactive revert window 100000
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

proactive trigger threshold

To configure the trigger threshold of Forward Error Correction-Fast Re-Route (FEC-FRR), use the **proactive trigger threshold** command in DWDM configuration mode. To remove the trigger threshold, use the no form of this command.

Note ASR 9000 64-bit (eXR) does not support the **proactive trigger threshold <1-9> <2-9>** command.

proactive trigger threshold *x-coefficient y-power*

Syntax Description

x-coefficient	Bit error rate coefficient (x of xE-y) . The range is 1 to 9. Default is 1.
y-power	Bit error rate exponent (y of xE-y). The range is 3 to 9.

Command Default No default behavior or values

Command Modes DWDM configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.2.3	Support for **proactive trigger threshold** command was included on these Modular Port Adaptors(MPAs): • A9K-MPA-2X40GE • A9K-MPA-1X40GE

Usage Guidelines The proactive feature is used to trigger Forward Error Correction-Fast Re-Route (FEC-FRR).

Note The **proactive trigger threshold** command is supported on the legacy line cards but does not function on the A9K-8X100GE-SE line cards though it is supported on them.

To see the proactive status, use the **show controller dwdm proactive status** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples The following example shows how to configure the trigger threshold of Forward Error Correction-Fast Re-Route (FEC-FRR)

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# proactive trigger threshold 1 9
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

proactive trigger window

To configure the trigger window (in milliseconds) in which Fast Re-Route may be triggered, use the **proactive trigger window** command in DWDM configuration mode. To remove the trigger window, use the no form of this command.

Note ASR 9000 64-bit (eXR) does not support the **proactive trigger window <10-10000>** command.

proactive trigger window *window*

Syntax Description

window	The length of time (in milliseconds) of the window in which FEC-FRR may be triggered. The range is 10 to 10000.

Command Default No default behavior or values

Command Modes DWDM configuration

Command History

Release	Modification
Release 4.0.0	This command was introduced.
Release 4.2.3	Support for **proactive trigger window** command was included on these Modular Port Adaptors(MPAs): • A9K-MPA-2X40GE • A9K-MPA-1X40GE

Usage Guidelines The proactive feature is used to trigger Forward Error Correction-Fast Re-Route (FEC-FRR).

Note The **proactive trigger window** command is supported on the legacy line cards but does not function on the A9K-8X100GE-SE line cards though it is supported on them.

To see the proactive status, use the **show controller dwdm proactive status** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to configure the trigger window (in milliseconds) in which triggering of Fast Re-Route may happen:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm 0/1/0/1
RP/0/RSP0/CPU0:router(config-dwdm)# proactive trigger window 10000
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.

show controller dwdm

To display optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller, use the **show controller dwdm** command in EXEC mode.

show controller dwdm interface-path-id [**g709** [**registers**] | **log** | **optics** | **wavelength-map**]

Syntax Description

interface-path-id	Physical interface or virtual 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.
g709	(Optional) Displays the G.709 Optical Transport Network (OTN) protocol alarms and counters for bit errors, along with the FEC statistics and threshold-based alerts. g709 mode and g709 fec set to enhanced by default.
log	(Optional) Displays information about signal logging.
optics	(Optional) Displays optical related information about the interface, such as output power level and wavelength.
registers	(Optional) For **g709**, displays platform-specific OTN framer registers; for **optics**, displays transponder registers.
tdc	(Optional) Displays tunable dispersion compensator (TDC) information.
wavelength-map	(Optional) Displays the wavelength information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.
Release 5.3.1	g709 standard FEC mode is enabled by default.

Usage Guidelines

DWDM interfaces with g709 capability(enabled) and FEC(enabled) would report with Threshold Crossing Alerts (TCA) for Error Correction based PREFEC version of SD and SF BER. The thresholds act independent of FRR thresholds. If FRR is also enabled, then PREFEC thresholds are expected to be manually tuned to provide an early warning before the protection is triggered. The information regarding PREFEC_SD and PREFEC_SF are made available for the **show controller dwdm interface-path-id g709** command. 10 GigE and 40 GigE DWDM interfaces support standard FEC and enhanced i.4 and i.7 FEC modes while 100GigE supports standard FEC.

Task ID

Task ID	Operations
dwdm	read
interface	read
sonet-sdh	read

Examples

This example shows sample output from the **show controllers dwdm g709** command when FEC and g709 are both active:

```
RP/0/RSP0/CPU0:Router# show controller dwdm 0/5/0/0 g709
Mon Feb 10 13:12:00.268 IST

G709 Status


OTU
         LOS  = 0           LOF  = 0           LOM  = 0
         BDI  = 0           IAE  = 1           BIP  = 0
         BEI  = 0           TIM  = 0

ODU
         AIS  = 0           BDI  = 0           OCI  = 0
         LCK  = 0           BIP  = 0           BEI  = 0
         PTIM = 0           TIM  = 0

FEC Mode: Enhanced  (Default)
         EC(current second) = 0           EC   = 0           UC   = 0
         PREFEC BER < 9.01E-11           Q > 6.46           Q Margin > 7.26


Detected Alarms: None
Asserted Alarms: None
Alarm Reporting Enabled for: LOS LOF LOM IAE OTU-BDI OTU-TIM OTU_SD_BER PREFEC_SD_BER
PREFEC_SF_BER ODU-AIS ODU-BDI OCI LCK PTIM ODU-TIM ODU_SF_BER ODU_SD_BER
 FECMISMATCH
BER Thresholds: preFEC-SF = E-9     preFEC-SD = E-11
                OTU-SF    = E-3     OTU-SD    = E-6
                ODU-SF    = E-3     ODU-SD    = E-6

Connectivity Info
                Network Port ID:  Not Configured
                Network Connection ID:  Not Configured

OTU TTI Sent     String ASCII  : Tx TTI Not Configured
OTU TTI Received String ASCII  : Rx TTI Not Received
OTU TTI Expected String ASCII  : Exp TTI Not Configured

ODU TTI Sent     String ASCII  : Tx TTI Not Configured
ODU TTI Received String ASCII  : Rx TTI Not Received
ODU TTI Expected String ASCII  : Exp TTI Not Configured
```

This table describes selected fields from the **show controllers dwdm** command output.

Table 1: show controllers dwdm Command Output Field Descriptions

Field	Description
AIS	Number of alarm indication signal (AIS) alarms. AIS is a signal sent downstream as an indication that an upstream defect has been detected.
Alarm reporting enabled for	Lists the alarms that are enabled for reporting.
Asserted Alarms	Alarms indicated to be reported by the user.
BDI	Number of backward defect indication (BDI) alarms. The BDI is a single bit that conveys information regarding signal failure in the upstream direction.
BER thresholds	Values of the configured bit error rate thresholds.
BIP	Number of bit interleaved parity alarms. The BIP is comprised of one byte and is used for error detection. It is computed over the entire optical channel payload unit (OPU).
Controller State	Status of the controller.
Detected Alarms	Alarms detected by the hardware.
EC	Corrected code words. This is the number of words corrected by the FEC and is displayed as a per second rate.
FEC Mode	Indicates the forward error correction (FEC) mode for the controller. This can be Disabled, Enhanced FEC G.975.1 1.4, or Standard FEC (Default).
IAE	Number of incoming alignment errors (IAE).
LCK	Number of upstream connection locked alarms. LCK is a signal sent downstream as an indication that upstream the connection is locked, and no signal is passed through.
LOF	Number of OTU loss of frame (LOF) alarms.
LOM	Number of OTU loss of multiframe (LOM) alarms.
Loopback	Loopback status. Indicates whether or not loopback is enabled and the type of loopback enabled.
LOS	Number of OTU loss of signal (LOS) alarms. If the receive optical power is less than or equal to this defined threshold, the optical LOS alarm is raised.
OCI	Number of open connection indication alarms. OCI is a signal sent downstream as an indication that upstream the signal is not connected to a trail termination source.
ODU	Optical channel data unit alarms.
OTU	Optical transport unit overhead alarms.

Field	Description
OTU TTI Expected	Value of the expected TTI.
OTU TTI Received	Value of the received TTI.
OTU TTI Sent	Value of the transmit trail trace identifier (TTI).
PTIM	Number of payload type identifier mismatch alarms. This occurs when there is a mismatch between the way the ITU-T G.709 option is configured on the PLIM at each end of the optical span.
TDC Info	Tunable Dispersion Compensator (TDC) information.
Transport Admin State	Current status of the port as set by the **admin-state** command. Possible values are: IS (In-Service) and OOS (Out-of-Service).
UC	Uncorrectable code words. This is a raw counter.
Pre-FEC BER	Pre - bit error rate (BER) forward error correction (FEC). The pre-FEC BER is calculated using pre-forward error correction (FEC) error counts.
Q	The general signal quality bit error rate (BER) per voltage. The Q and Q margin are calculated using the Pre-FEC BER.
Q Margin	The general signal quality bit error rate (BER) per voltage. The Q and Q margin are calculated using the Pre-FEC BER.
Operational Mode	Indicates whether the tunable dispersion compensator (TDC) operational mode option is set to Auto or Manual.
Status	Indicates whether the tunable dispersion compensator (TDC) is in the acquiring state or locked state. The status is invalid if there is a major alarm.
Dispersion Setting	Indicates a value between –700 and +700 packets per second (pps). The dispersion setting is read from the optics module after the tunable dispersion compensator (TDC) has locked.
Reroute Control	Not used.
Reroute BER	Not used.

See Table 2: show controllers dwdm optics Command Output Field Descriptions, on page 50 for a description of the optics fields.

The following example shows the output from the **show controllers dwdm** command with the **optics** keyword:

```
RP/0/RSP0/CPU0:router# show controllers dwdm 0/2/0/0 optics
Mon Jul 12 21:04:29.254 UTC

Optics Status

         Optics Type:  10GBASE-ZR,
        Wavelength Info: C-Band, MSA ITU Channel= N/A, Frequency=192THz, Wavelength=1558nm
```

```
        TX Power = 1.50 dBm
        RX Power = -11.86 dBm
```

This table describes selected fields from the **show controllers dwdm** command output with the **optics** keyword.

Table 2: show controllers dwdm optics Command Output Field Descriptions

Field	Description
Optics Type	Indicates the optics type: GE or OC-768c/STM-256c DWDM.
Clock Source	Indicates whether the clock is internal or line.
Wavelength Band	Indicates the wavelength band: C-band or L-band.
MSA ITU Channel	Multi Source Agreement (MSA) ITU channel number.
Frequency	Frequency of the channel in terahertz.
Wavelength	Wavelength corresponding to the channel number in nanometers.
TX power	Value of the transmit power level.
RX Power	Actual optical power at the RX port.
RX LOS Threshold	Receive loss of signal threshold. If the receive optical power is less than or equal to this threshold, the optical LOS alarm is raised.

This example shows sample output from the **show controllers dwdm** command with the **wavelength-map** keyword on a Gigabit Ethernet controller:

```
RP/0/RSP0/CPU0:router# show controller dwdm 0/5/0/3 wavelength-map

Wavelength band: C-band
MSA ITU channel range supported: 3~84

Wavelength map table
 ----------------------------------------
 Channel Frequency       Wavelength
  Num      (THz)            (nm)
 ----------------------------------------
 03       196.00          1529.553
 ----------------------------------------
 04       195.95          1529.944
 ----------------------------------------
 05       195.90          1530.334
 ----------------------------------------
 06       195.85          1530.725
 ----------------------------------------
 07       195.80          1531.116
 ----------------------------------------
 08       195.75          1531.507
 ----------------------------------------
 09       195.70          1531.898
 ----------------------------------------
 10       195.65          1532.290
 ----------------------------------------
 11       195.60          1532.681
```

```
----------------------------------------
12       195.55          1533.073
----------------------------------------
13       195.50          1533.465
----------------------------------------
14       195.45          1533.858
----------------------------------------
15       195.40          1534.250
----------------------------------------
16       195.35          1534.643
----------------------------------------
17       195.30          1535.036
----------------------------------------
18       195.25          1535.429
----------------------------------------
19       195.20          1535.822
.
.
.
```

This table describes selected fields from the **show controllers dwdm** command output with the **wavelength-map** keyword.

Table 3: show controllers dwdm wavelength Command Output Field Descriptions

Field	Description
channel Num	Channel number.
frequency (THz)	Frequency of the wavelength in terahertz.
wavelength (nm)	Wavelength in nanometers.

Related Commands

Command	Description
admin-state, on page 3	Configures the transport administration state on a DWDM port.

show controller dwdm pm

To display performance monitoring information for a DWDM controller, use the **show controller dwdm pm** command in EXEC mode.

show controller dwdm *instance* **pm history** [**15-min** | **24-hour** | **fec** | **optics** | **otn**]
show controller dwdm *instance* **pm interval** [**15-min** | **24-hour**][**fec** | **optics** | **otn**] *index*

Syntax Description

instance	Physical interface instance. Naming notation is *rack/slot/module/port* and a slash between values is required as part of the notation. • *rack*: Chassis number of the rack. • *slot*: Physical slot number of the line card. • *module*: Module number. A physical layer interface module (PLIM) is always 0. Shared port adapters (SPAs) are referenced by their subslot number. • *port*: Physical port number of the interface. For more information about the syntax for the router, use the question mark (?) online help function.
history	Displays all performance monitoring data.
interval	Displays specific performance monitoring data in a particular interval.
15-min	Displays performance monitoring data in a 15-minute interval.
24-hour	Displays performance monitoring data in a 24-hour interval.
fec	Displays FEC performance parameters, such as bit errors corrected (BIEC) and uncorrectable words.
optics	Displays optics performance parameters, such as optical power.
otn	Displays OTN performance parameters, such as path monitoring failure counts (FC-PM) and section monitoring unavailable seconds (UAS-SM).
index	Interval for which to display the performance monitoring information.

Command Default

No default behavior or values

Command Modes

EXEC mode

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
dwdm	read

Task ID	Operations
interface	read
sonet-sdh	read

Examples

The following examples show sample output for a DWDM controller:

```
RP/0/RSP0/CPU0:Router# show controller dwdm 0/5/0/0 pm interval 15-min fec 0
Thu Jul  1 18:58:09.353 UTC

g709 FEC in the current interval [18:45:00 - 18:58:09 Thu Jul 1 2010]
    EC-BITS   : 0               Threshold : 0              TCA(enable)  : NO
    UC-WORDS  : 0               Threshold : 0             TCA(enable)  : NO

RP/0/RSP0/CPU0:Router# show controller dwdm 0/5/0/0 pm history 15-min
Thu Jul  1 18:59:04.585 UTC

g709 OTN in the current interval [18:45:00 - 18:59:04 Thu Jul 1 2010]
    ES-SM-NE    : 0         Threshold : -1       TCA(enable)  : NO
    ESR-SM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    SES-SM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    SESR-SM-NE  : 0         Threshold : -1       TCA(enable)  : NO
    UAS-SM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    BBE-SM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    BBER-SM-NE  : 0         Threshold : -1       TCA(enable)  : NO
    FC-SM-NE    : 0         Threshold : -1       TCA(enable)  : NO
    ES-PM-NE    : 0         Threshold : -1       TCA(enable)  : NO
    ESR-PM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    SES-PM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    SESR-PM-NE  : 0         Threshold : -1       TCA(enable)  : NO
    UAS-PM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    BBE-PM-NE   : 0         Threshold : -1       TCA(enable)  : NO
    BBER-PM-NE  : 0         Threshold : -1       TCA(enable)  : NO
    FC-PM-NE    : 0         Threshold : -1       TCA(enable)  : NO

    ES-SM-FE    : 0         Threshold : -1       TCA(enable)  : NO
    ESR-SM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    SES-SM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    SESR-SM-FE  : 0         Threshold : -1       TCA(enable)  : NO
    UAS-SM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    BBE-SM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    BBER-SM-FE  : 0         Threshold : -1       TCA(enable)  : NO
    FC-SM-FE    : 0         Threshold : -1       TCA(enable)  : NO
    ES-PM-FE    : 0         Threshold : -1       TCA(enable)  : NO
    ESR-PM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    SES-PM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    SESR-PM-FE  : 0         Threshold : -1       TCA(enable)  : NO
    UAS-PM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    BBE-PM-FE   : 0         Threshold : -1       TCA(enable)  : NO
    BBER-PM-FE  : 0         Threshold : -1       TCA(enable)  : NO
    FC-PM-FE    : 0         Threshold : -1       TCA(enable)  : NO


g709 FEC in the current interval [18:45:00 - 18:59:04 Thu Jul 1 2010]
    EC-BITS   : 0               Threshold : 0              TCA(enable)  : NO
    UC-WORDS  : 0               Threshold : 0             TCA(enable)  : NO


Optics in the current interval [18:45:00 - 18:59:04 Thu Jul 1 2010]
             MIN     AVG     MAX  Threshold  TCA  Threshold    TCA
```

```
                                    (min)   (enable) (max)     (enable)
LBC[mA ] :  17210   17542   17662   0           NO       0         NO
OPT[dBm] :  -1.46   -1.46   -1.46   0.00        NO       0.00      NO
OPR[dBm] :  -31.67   -31.66   -31.65   0.00        NO       0.00      NO


g709 OTN in interval 1 [18:30:00 - 18:45:00 Thu Jul 1 2010]
    ES-SM-NE    : 0             ES-SM-FE    : 0
    ESR-SM-NE   : 0             ESR-SM-FE   : 0
    SES-SM-NE   : 0             SES-SM-FE   : 0
    SESR-SM-NE  : 0             SESR-SM-FE  : 0
    UAS-SM-NE   : 0             UAS-SM-FE   : 0
    BBE-SM-NE   : 0             BBE-SM-FE   : 0
    BBER-SM-NE  : 0             BBER-SM-FE  : 0
    FC-SM-NE    : 0             FC-SM-FE    : 0
    ES-PM-NE    : 0             ES-PM-FE    : 0
    ESR-PM-NE   : 0             ESR-PM-FE   : 0
    SES-PM-NE   : 0             SES-PM-FE   : 0
    SESR-PM-NE  : 0             SESR-PM-FE  : 0
    UAS-PM-NE   : 0             UAS-PM-FE   : 0
    BBE-PM-NE   : 0             BBE-PM-FE   : 0
    BBER-PM-NE  : 0             BBER-PM-FE  : 0
    FC-PM-NE    : 0             FC-PM-FE    : 0


g709 FEC in interval 1 [18:30:00 - 18:45:00 Thu Jul 1 2010]
    EC-BITS   : 0                UC-WORDS  : 0

Optics in interval 1 [18:30:00 - 18:45:00 Thu Jul 1 2010]
             MIN       AVG       MAX
LBC[mA ] :   17210     17526     17662
OPT[dBm] :   -1.46     -1.46     -1.46
OPR[dBm] :   -31.67    -31.67    -31.66

g709 OTN in interval 2 [18:15:00 - 18:30:00 Thu Jul 1 2010]
    ES-SM-NE    : 0             ES-SM-FE    : 0
    ESR-SM-NE   : 0             ESR-SM-FE   : 0
    SES-SM-NE   : 0             SES-SM-FE   : 0
    SESR-SM-NE  : 0             SESR-SM-FE  : 0
    UAS-SM-NE   : 0             UAS-SM-FE   : 0
    BBE-SM-NE   : 0             BBE-SM-FE   : 0
    BBER-SM-NE  : 0             BBER-SM-FE  : 0
.
.
.
```

This table describes selected fields from the **show controllers dwdm pm** command output.

Table 4: show controllers dwdm pm Command Output Field Descriptions

Field	Description
EC-BITS	Bit errors corrected (BIEC). Indicates the number of bit errors corrected in the DWDM trunk line during the performance monitoring time interval.
UC-WORDS	Uncorrectable words. This is the number of uncorrectable words detected in the DWDM trunk line during the performance monitoring time interval.
LBC	Laser bias current.
OPR	Optical power on the unidirectional port.

Field	Description
OPT	Transmit optical power in dBm.
MAX	Indicates the maximum value of the parameter.
AVG	Indicates the average value of the parameter
MIN	Indicates the minimum value of the parameter.
THRESHOLD	Indicates the parameter's configured threshold.
TCA	Indicates if TCA reporting is enabled or not.
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.

Field	Description
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	Near-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).

show vtxp-monitored ports

To display the list of DWDM controller interfaces on which VTXP attribute is enabled, use the use the **show vtxp-monitored ports** command in Global Configuration mode.

show vtxp-monitored ports

Syntax Description

This command has no keywords or arguments.

Command Default

None

Command Modes

Global Configuration mode

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

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

Examples

The following example shows how to view the interfaces on which the VTXP attribute is enabled:

```
RP/0/RSP0/CPU0:router# show vtxp-monitored ports

Thu Jan  8 17:01:29.931 IST
dwdm ifName : dwdm0/1/0/0
dwdm ifName : dwdm0/1/0/1
dwdm ifName : dwdm0/1/0/2
```

Related Commands

Command	Description
controller dwdm, on page 5	Configures a DWDM controller.

transport-mode (WAN/OTN)

To specify the transport mode for a 10-Gigabit Ethernet interface, use the **transport-mode** command in interface configuration mode. To return to the default mode, use the **no** form of this command.

transport-mode {**wan** | **otn bit-transparent** {**opu1e** | **opu2e**}}

Syntax Description

wan	Configures the interface for 10GBASE-W WAN SONET/SDH (9.95328Gb/s) transport.
otn bit-transparent	Configures the interface for 10-Gigabit Ethernet over Optical Transport Network (ITU-T G.709) with 10GBASE-R transparently mapped into OTU-2.
opu1e	Configures the interface for 10GBASE-R over OPU1e without fixed stuffing (11.0491Gb/s).
opu2e	Configures the interface for 10GBASE-R over OPU2e with fixed stuffing (11.0957Gb/s)

Command Default

The interface is in LAN mode. Neither WAN mode or OTN mode is configured.

Command Modes

Interface configuration

Command History

Release	Modification
Release 3.9.0	This command was introduced.

Usage Guidelines

Three modes are supported for a 10-Gigabit Ethernet interface: LAN, WAN, or OTN on these Ethernet line cards and Modular Port Adaptors (MPAs):

- 2-Port 10-Gigabit Ethernet, 20-Port Gigabit Ethernet Combination line card (A9K-2T20GE-B and A9K-2T20GE-L)
- 8-Port 10-Gigabit Ethernet line card (A9K-8T-L, -B, or -E)
- 16-Port 10-Gigabit Ethernet SFP+ line card (A9K-16T/8-B and A9K-16T/8-B+AIP)
- 24-Port 10-Gigabit Ethernet line card (A9K-24X10GE-SE/TR)
- 36-Port 10-Gigabit Ethernet line card (A9K-36X10GE-SE/TR)
- 2-Port 10-Gigabit Ethernet Modular Port Adaptor (A9K-MPA-2x10GE)
- 4-Port 10-Gigabit Ethernet Modular Port Adaptor (A9K-MPA-4x10GE)
- 8-Port 10-Gigabit Ethernet Modular Port Adaptor (A9K-MPA-8x10GE)

Limitation:

On TenGig breakout interface of Cisco ASR 9000 High Density 100GE Ethernet (8x100G and 4x100G) line cards, configure same transport mode (OPU1E or OPU2E) on both ends of the interface. Different transport modes at both ends results in flapping of the interface status and the router console displays continuous interface UP/DOWN messages.

If you want to configure the interface for DWDM support, configure the 10-Gigabit Ethernet interface for OTN transport mode.

These 40GE MPAs support LAN and OTU3 modes:

- A9K-MPA-1x40GE
- A9K-MPA-2x40GE

Note Before Cisco IOS XR Software Release 4.2.0, only **transport-mode wan** was used under the interface configuration mode to set WAN PHY controller. Then, both Operational Mode and Configuration Mode would be changed to WAN Mode.

After Cisco IOS XR Software Release 4.2.0, you can use **transport-mode wan** under the interface configuration mode to use basic function of WAN PHY. In addition, we can use **wanmode on** under the wanphy controller mode to use alarm function and BIP counter.

Note On the Cisco A9K-4T16GE-TR and Cisco A9K-4T16GE-SE line cards, mixed use of LAN and WAN transport modes is not supported due to hardware limitation. In other words, WAN PHY is configured on all the four 10GigE ports to be operated either in LAN mode or WAN mode for 10 GigE ports 16, 17, 18 and 19.

On applying the configuration change from LAN to WAN or back on port 16, the same configuration shall be applied on all the other 10 GigE ports 17, 18, and 19. The ports 17, 18 or 19 cannot be used to make configuration changes using the **transport-mode** command. Also, the running configuration shows the configuration change only on port 16.

Task ID

Task ID	Operations
interface	read, write

Examples

This example shows how to configure the interface for WAN PHY mode:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# interface 10gigabitethernet 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# transport-mode wan
RP/0/RSP0/CPU0:router(config-if)# commit
```

The following configuration is needed to operate in WAN PHY mode:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller wanphy <>
RP/0/RSP0/CPU0:router(config)# wanmode on
RP/0/RSP0/CPU0:router(config)# commit
```

This example shows how to configure a DWDM interface using OTN transport:

```
RP/0/RSP0/CPU0:router# config
```

```
RP/0/RSP0/CPU0:router(config)# interface 10gigabitethernet 0/5/0/7/0
RP/0/RSP0/CPU0:router(config-if)# transport-mode otn bit-transparent opu1e
RP/0/RSP0/CPU0:router(config-if)# commit
```

The following additional configuration is also needed:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# controller dwdm <>
RP/0/RSP0/CPU0:router(config)# admin-state in-service
RP/0/RSP0/CPU0:router(config)# commit
```

This example shows how to return the interface configuration to its default LAN mode from OTN or WAN PHY mode:

```
RP/0/RSP0/CPU0:router# config
RP/0/RSP0/CPU0:router(config)# interface 10gigabitethernet 0/1/0/1
RP/0/RSP0/CPU0:router(config-if)# no transport-mode
RP/0/RSP0/CPU0:router(config-if)# commit
```

Related Commands

Command	Description
controller wanphy	Enters WAN physical controller configuration mode in which you can configure a 10-Gigabit Ethernet WAN PHY controller.

wavelength

To set the wavelength on a DWDM controller to a specific ITU channel or to define a specific frequency or wavelength to a DWDM controller, use the **wavelength** command in DWDM configuration mode. To return the wavelength to its default value, use the **no** form of this command.

Note ASR 9000 64-bit (eXR) does not support the **wavelength 100MHz-Grid frequency** command.

wavelength {**50GHz-grid** {*channel-number* | **frequency** *frequency* | **update** *wavelength*}} | {**100MHz-grid frequency** *frequency*}

Syntax Description

50GHz-grid	Specifies 50-GHz frequency grid.
100MHz-grid	Specifies 100-GHz frequency grid.
channel-number	ITU channel number. ITU channel numbers have predefined frequencies as defined by Multi Source Agreement (MSA) International Telecommunication Union (ITU) grid. • The range is 1 to 100 for conventional band (C-band)
frequency *frequency*	Keyword that specifies the frequency for the DWDM controller. Enter the 5-digit frequency value in the range of 19115 to 19610 GHz. For example, enter **frequency 19580** to specify 195.8 THz.
update *wavelength*	Keyword that defines a specific wavelength for the DWDM controller. Enter the 7-digit frequency value in the range of 1528773-1563863 micrometers (mm). For example, enter **update 1532290** to specifiy 1532.29 nanometers (nm).

Command Default

The default channel is 96.

Command Modes

DWDM configuration

Command History

Release	Modification
Release 4.3.0	This command was introduced.
Release 5.3.2	50 GHZ or 100 GHz options were introduced.

Usage Guidelines

You can set the wavelength to a specific ITU channel, that is represented by a channel number in the Multi Source Agreement (MSA) ITU grid.

The spacing between wavelengths is 50 GHZ or 100 GHz. Use the **show controllers dwdm** command with the **wavelength-map** keyword to view the channel numbers and wavelengths that are supported for a particular controller.

The controller must be in the out-of-service state before you can use the **wavelength** command.

Task ID

Task ID	Operations
dwdm	read, write

Examples

The following example shows how to set the DWDM wavelength to ITU channel 10.

```
RP/0/RP0/CPU0:router(config)# controller dwdm 0/1/0/0
RP/0/RP0/CPU0:router(config-dwdm)# wavelength 50GHz-grid 10
```

The following example shows how to set the frequency of ITU channel 10 to 195.8 THz.

```
RP/0/RP0/CPU0:router(config)# controller dwdm 0/1/0/0
RP/0/RP0/CPU0:router(config-dwdm)# wavelength 50GHz-grid frequency 19580
```

Related Commands

Command	Description
show controller dwdm, on page 46	Displays optical parameters, G.709 alarms and counters, and register and module information for a DWDM controller.