Configuring Controllers

This chapter describes the Optics Controller . This chapter also describes the procedures used to configure the controllers.

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Note   When you plan to replace a configured optical module with a different type of optical module, you must clear the configurations of the old module before installing the new optical module.

Optics Controllers

Controllers are represented in the *rack*/*slot*/*instance*/*port* format (*r*/*s*/*i*/*p*); for example, 0/3/0/1. Each port has an optics controller that is created on startup.

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

- Configure the controller

- Restore a saved configuration

- Upgrade the DSP processor or CFP2 optics module Field Programmable Device (FPD)

How to Configure Controllers

This section contains the following procedures:

Configuring Optics Controller

To configure the Optics controller, use the following commands:

Before you begin

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

- Configure the controller

- Restore a saved configuration

Procedure

	Command or Action	**Purpose**
Step 1	**configure** **Example:** RP/0/RP0/CPU0:router# configure terminal	Enters global configuration mode.
Step 2	**controller optics** *r*/*s*/*i*/*p* **Example:** RP/0/RP0/CPU0:router(config)# controller optics 0/3/0/1	Enters optics controller configuration mode.
Step 3	**shutdown** **Example:** RP/0/RP0/CPU0:router(config-Optics)# shutdown	Shuts down the optics controller.
Step 4	**commit** **Example:** RP/0/RP0/CPU0:router(config-Optics)# commit	Saves the configuration changes to the running configuration file and remains within the configuration session.
Step 5	**rx-high-threshold** *rx-high* **Example:** RP/0/RP0/CPU0:router(config-Optics)# rx-high-threshold 200	Configures the high receive power threshold. The range is -400 to 300 (in the units of 0.1 dBm).
Step 6	**tx-high-threshold** *tx-high* **Example:** RP/0/RP0/CPU0:router(config-Optics)# tx-high-threshold 300	Configures the high transmit power threshold. The range is -400 to 300 dBm (in the units of 0.1 dBm).
Step 7	**no shutdown** **Example:**	Removes the shutdown configuration on the optics controller.

	Command or Action	Purpose
	RP/0/RP0/CPU0:router(config-Optics)# no shutdown	
Step 8	**commit** **Example:** RP/0/RP0/CPU0:router(config-Optics)# commit	Saves the configuration changes to the running configuration file and remains within the configuration session.

Configuring Port Mode Speed

To configure the port mode speed, use the following commands:

Before you begin

Ensure that you shut down the controller before you configure the controller or restore a saved configuration.

Procedure

	Command or Action	Purpose
Step 1	**configure** **Example:** RP/0/RP0/CPU0:router# **configure**	Enters global configuration mode.
Step 2	**controller optics** *r*/*s*/*i*/*p* **Example:** RP/0/RP0/CPU0:router(config)# **controller optics 0/3/0/0**	Enters optics controller configuration mode
Step 3	**shutdown** **Example:** RP/0/RP0/CPU0:router(config-Optics)# **shutdown**	Shuts down the optics controller.
Step 4	**commit** **Example:** RP/0/RP0/CPU0:router(config-Optics)# **commit**	Saves the configuration changes to the running configuration file and remains within the configuration session.
Step 5	**port-mode speed** { **100G** | **150G** | **200G** } **mod** { **16qam** | **8qam** |**qpsk** } **fec** { **15sdfec** | **15sdfecde** | **25sdfec** | **otu7staircase** } **diff** { **enable** | **disable** }	Configures the port mode speed.

	Command or Action	Purpose
	Example: `RP/0/RP0/CPU0:router(config-Optics)#` **`port-mode speed 100G mod qpsk fec 15sdfec diff`**	
Step 6	**no shutdown** **Example:** `RP/0/RP0/CPU0:router(config-Optics)#` **`no shutdown`**	Removes the shutdown configuration on the optics controller.
Step 7	**commit** **Example:** `RP/0/RP0/CPU0:router(config-Optics)#` **`commit`**	Saves the configuration changes to the running configuration file.

If you need to change the port-mode speed, ensure that you remove the existing port mode speed configuration by entering the **no port-mode** command. You can then change the port mode speed.

The following example shows how to change the port mode speed to 100Gbps.

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

What to do next

Configuring Port Speed on 25G ports

The 25G ports are divided into four quads (0-3). Each quad houses the following ports:

- Quad 0 - Ports 24-27

- Quad 1 - Ports 28-31

- Quad 2 - Ports 32-35

- Quad 3 - Ports 36-39

Generic Limitations and Guidelines

- 25G is the default mode set on the quad.

- 1G and 10G cannot co-exist on the same quad as 25G.

- 10G mode supports both 1G and 10G.

To modify the default 25G quad ports into 10G ports, perform the below configuration:

Before Release 7.5.1:

```
RP/0/RP0/CPU0:router(config)# hw-module quad X location 0/0/CPU0
```

```
RP/0/RP0/CPU0:router(config-quad-0x0)# mode 10g
```

From Release 7.5.1:

```
RP/0/RP0/CPU0:router(config)# hw-module quad X location 0/0/CPU0 instance Y mode 10g
```

```
RP/0/RP0/CPU0:router(config-quad-0x0)# mode 10g
```

Here, X is the number of quads (0,1,2,3...n) supported. Each quad has a default speed of 25G.

Note To revert to the default 25G mode, use the `no` form of the `hw-module quad` command.

Y denotes MPA card instance. It can range from 0-5. For Cisco NCS 540 Series Routers, it is always 0. Whereas, for Cisco NCS 5500 Series Routers, the instance can be between 0-5, adding 1 for every MPA instance. The default value is 0.

Note A quad number always starts from 0 to the maximum supported number. The number of quads supported varies from platform to platform and the CLI validates it. For example, the NCS 540 Series Router supports two quads (0 and 1). If you enter X=3, the CLI returns an error.

After you configure the port-mode speed, you can configure the following interfaces:

- 100G – Each optics controller configuration creates a single 100GE port:

  - **interface HundredGigE** *r*/*s*/*i*/*p*/**0** (where*p* = CTP2 port 0-5)

    0/3/0/0/0

    0/3/0/1/0

    0/3/0/2/0

    0/3/0/3/0

    0/3/0/4/0

    0/3/0/5/0

- • 200G – Each optics controller configuration creates two 100GE ports:

  - **interface HundredGigE** *r*/*s*/*i*/*p*/**0,** *r*/*s*/*i*/*p*/**1** (where*p* = CTP2 port 0-5

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

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

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

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

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

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

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

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

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

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

For more information, see the Configuring Ethernet Interfaces chapter.

Configuring Wavelength

To configure wavelength, use the following commands:

Before you begin

- Before configuring the wavelength, use the **show controllers optics**$r/s/i/p$ **dwdm-carrrier-map** command to display the wavelength and channel mapping for optics controllers.
- You must shut down the controller before you configure the controller or restore a saved configuration.

Procedure

	Command or Action	**Purpose**
Step 1	**configure** **Example:** `RP/0/RP0/CPU0:router#` **`configure`**	Enters global configuration mode.
Step 2	**controller optics** $r/s/i/p$ **Example:** `RP/0/RP0/CPU0:router(config)#` **`controller optics 0/3/0/1`**	Enters optics controller configuration mode.
Step 3	**shutdown** **Example:** `RP/0/RP0/CPU0:router(config-Optics)#` **`shutdown`**	Shuts down the optics controller.

	Command or Action	Purpose
Step 4	**commit** **Example:** `RP/0/RP0/CPU0:router(config-Optics)#` **`commit`**	Saves the configuration changes to the running configuration file and remains within the configuration session.
Step 5	**dwdm-carrier** {**100MHz-grid frequency** *frequency* } | {**50GHz-grid** [**frequency** *frequency* | *channel-number*] } **Example:** `RP/0/RP0/CPU0:router(config-Optics)#` **`dwdm-carrier 100MHz-grid frequency`** **`1960875`**	Configures the frequency on the trunk port.
Step 6	**no shutdown** **Example:** `RP/0/RP0/CPU0:router(config-Optics)#` **`no`** **`shutdown`**	Removes the shutdown configuration on the optics controller.
Step 7	**commit** **Example:** `RP/0/RP0/CPU0:router(config-Optics)#` **`commit`**	Saves the configuration changes to the running configuration file and remains within the configuration session.

To configure a DWDM carrier with the required frequency:

```
RP/0/RP0/CPU0:router#config
RP/0/RP0/CPU0:router(config)#controller Optics0/3/0/0
RP/0/RP0/CPU0:router(config-Optics)#dwdm-carrier
RP/0/RP0/CPU0:router(config-Optics)#dwdm-carrier 100MHz-grid
RP/0/RP0/CPU0:router(config-Optics)#dwdm-carrier 100MHz-grid frequency
RP/0/RP0/CPU0:router(config-Optics)#dwdm-carrier 100MHz-grid frequency 1960625
```

The output of `show run controller optics 0/3/0/0` command is:

```
RP/0/RP0/CPU0:router#show run controller optics 0/3/0/0
Wed Nov  6 13:47:33.178 UTC
controller Optics0/3/0/0
transmit-power -7
port-mode speed 100G mod qpsk fec 25sdfec diff disable
dwdm-carrier 100MHz-grid frequency 1960625
```

![note icon]

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

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

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

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