

Configure Controllers

Note *This software release has reached end-of-life status. For more information, see the* End-of-Life and End-of-Sale Notices.

This chapter describes how to configure OTS and OTS OCH controllers.

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Controllers

Controllers are represented in the Rack/Slot/Instance/Port format; for example, 0/1/0/1.

Rack	0
Slot	1 to 3. Slots for pluggable optical modules.
Instance	0
Port	Depends on the specific pluggable optical module.

Configure OTS Controller

The Optical Transport Section (OTS) controller holds all the optical parameters for the OTS optical interfaces. The optical interface has different capabilities depending on its hardware components such as photodiode, VOA, amplifier, and OCM. Hence, the parameters enabled or disabled on the OTS controller depend on the actual hardware capability on the specific optical interface. Each parameter might refer to RX or TX section.

For example, if a photodiode is present, the OTS controller can read the total optical power. When the controller is created, each hardware capability is enabled or disabled.

You can configure parameters such as low power threshold, VOA attenuation setpoint, amplifier gain range, amplifier tilt, and amplifier gain set point for the OTS controller. The description on OTS interfaces cannot be added as they are on the optical amplifier module. To configure the OTS controller, use the following commands.

configure

controller *controllertype Rack/Slot/Instance/Port*

rx enable

rx-low-threshold *value*

tx enable

tx-low-threshold *value*

rx-voa-attenuation *value*

tx-voa-attenuation *value*

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

ampli-gain-range {**normal** | **extended**}

ampli-gain *value*

ampli-tilt *value*

ampli-channel-power *value*

channel-power-max-delta *value*

osri {**on** | **off**}

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

commit

end

Example

The following is a sample in which the amplifier gain range is set to extended and amplifier gain set point is set to 29.0 dB.

```
configure
    controller ots 0/3/0/0
    ampli-gain-range extended
    ampli-gain 290
    commit
end
```

The following is a sample in which the safety control mode of the pre-amplifier is set to auto.

```
configure
    controller ots 0/3/0/0
    safety-control-mode auto
    commit
end
```

The following is a sample in which the safety control mode of the booster amplifier is set to disabled.

```
configure
    controller ots 0/3/0/1
    safety-control-mode disabled
    commit
end
```

OTS Controller Configuration Parameters

Table 1: OTS Controller Configuration Parameters

Parameter	Description	Hardware Capability	Range	Default	Notes
rx-low-threshold (0.1 dBm)	Low receive power threshold	Photodiode	-400 to +300	-40.0	
tx-low-threshold (0.1 dBm)	Low transmit power threshold	Photodiode	-400 to +300	-20.0	
rx-voa-attenuation (0.1 dBm)	RX VOA attenuation set point	VOA	0 to 200	0.0	
tx-voa-attenuation (0.1 dBm)	TX VOA attenuation set point	VOA	0 to 200	0.0	
ampli-control-mode	Amplifier control mode	Amplifier	automatic and manual	automatic	The Automatic value is compatible only when the grid is specified through the hw-module configuration.
ampli-gain-range	Amplifier gain range	Amplifier	normal and extended	normal	The amplifier gain range is configurable only when the controller is in shutdown state.
ampli-gain (0.1 dBm)	Amplifier gain set point	Amplifier	0 to 500	0.0	The actual range of amplifier gain set point depends on amplifier gain range.
ampli-tilt (0.1 dBm)	Amplifier tilt	Amplifier	-50 to +50	0.0	

Parameter	Description	Hardware Capability	Range	Default	Notes
channel-power-max-delta (0.1 dBm)	Maximum difference among all measured channel powers	Amplifier	0 to 200	3.0	
ampli-channel-power (0.1 dBm)	Amplifier per channel power set point	Amplifier	-400 to +300	0.0	
osri	Optical safety remote interlock	Amplifier	on and off	off	When osri is on, the laser is off and vice versa.
safety-control-mode	Safety control mode	Amplifier	auto and disabled	auto	If the safety control mode is disabled, the amplifier optical power is less than 20dB for safety.

Display Parameters of OTS Controllers

Use this procedure to display the parameters of OTS controllers.

show controllers *controllertype Rack/Slot/Instance/Port* [**summary**]

- The **show controllers** command displays all the configuration parameters, PM thresholds and alarms when keywords are not provided.
- The **show controllers** command displays the rx/tx power value and minimal information to understand port status when **summary** keyword is provided.
- A * wild card can be used to display all the controllers associated with a slot. For example, **show controllers ots 0/1/0/* summary**

Example

RP/0/RP0/CPU0:ios#**show controllers ots 0/3/0/1**

```
Wed Aug 23 09:08:27.962 UTC

 Controller State: Up

 Transport Admin State: In Service

 Port Type: Line

 Laser State: Off
```

```
Optics Status::


Alarm Status:
-------------
Detected Alarms:
RX-LOC

Alarm Statistics:
-----------------
LOW-RX-PWR = 0
LOW-TX-PWR = 0
RX-LOS-P = 0
RX-LOC = 1
AMPLI-GAIN-DEG-LOW = 0
AMPLI-GAIN-DEG-HIGH = 0
AUTO-LASER-SHUT = 0
AUTO-POW-RED = 89
AUTO-AMPLI-CTRL-DISABLED = 0
AUTO-AMPLI-CFG-MISMATCH = 0
SWITCH-TO-PROTECT = 0
AUTO-AMPLI-CTRL-RUNNING = 0

Parameter Statistics:
---------------------
TX Power = -40.00 dBm
RX Power = -40.00 dBm
Ampli Gain = -1.00 dB
Ampli Tilt = 0.00
Total TX Power = -40.00 dBm
Total RX Power = -40.00 dBm

Configured Parameters:
-------------
Rx Low Threshold = -25.0 dBm
Tx Low Threshold = -20.0 dBm
Ampli Gain = 1.00 dB
Ampli Tilt = 0.00
Ampli Channel power = 0.00 dBm
Channel Power Max Delta = 3.00 dBm
Ampli Control mode = Manual
Ampli Gain Range = Normal
Ampli Safety Control mode = auto
Osri = OFF
```

Example

RP/0/RP0/CPU0:ios#**show controllers ots 0/1/0/1**

```
Controller State: Down

Transport Admin State: In Service

Port Type: Line

Laser State: Apr

Optics Status::


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

```
Detected Alarms:
        AUTO-POW-RED

Alarm Statistics:
-----------------
LOW-RX-PWR = 0
LOW-TX-PWR = 0
RX-LOS-P = 0
RX-LOC = 1
AMPLI-GAIN-DEG-LOW = 0
AMPLI-GAIN-DEG-HIGH = 0
AUTO-LASER-SHUT = 0
AUTO-POW-RED = 1
AUTO-AMPLI-CTRL-DISABLED = 0
AUTO-AMPLI-CFG-MISMATCH = 0
SWITCH-TO-PROTECT = 0
AUTO-AMPLI-CTRL-RUNNING = 0

Parameter Statistics:
---------------------
TX Power = -40.00 dBm
RX Power = -11.90 dBm
Ampli Gain = -1.00 dB
Ampli Tilt = -90.00
Total TX Power = 7.99 dBm
Total RX Power = -11.90 dBm
Ampli Gain Range = Normal
Ampli Safety Control mode = disabled
Osri = OFF
TX Enable = Enabled
RX Enable = Enabled
RX Span Loss = N/A
TX Span Loss = N/A
Rx Low Threshold Current = -25.0 dBm
Back Reflection = -6.40 dBm

Configured Parameters:
-------------
Rx Low Threshold = -25.0 dBm
Tx Low Threshold = -20.0 dBm
Ampli Gain = 12.00 dB
Ampli Tilt = 0.00
Ampli Channel power = 0.00 dBm
Channel Power Max Delta = 3.00 dBm
Ampli Channel Psd = 31.250 nW/MHz
Rx Low Threshold Psd = 0.099 nW/MHz
Ampli Control mode = Manual
Ampli Safety Control mode = disabled
Osri = OFF
TX Enable = Enabled
RX Enable = Enabled
```

The **Back Reflection** parameter in 0.1 dBm is raised only on port 1. This parameter is raised on the line TX port of the booster amplifier.

Span Loss Calculation

The Span Loss Calculation is an automatic calculation of span losses between NCS 1001 systems. This feature applies to each topology such as protected or non-protected, linear with or without ILA nodes in the middle.

The Span Loss Calculation is a software functionality available for OTS controller and it can be statically enabled or disabled through `hw-module` configuration. Span Loss calculation is made using the TX and RX total power on EDFA ports.

For this feature 2 new parameters are managed in the show controller ots command for EDFA cards:

- RX Span Loss
- TX Span Loss

The Span Loss Calculation runs automatically every 5 minutes and when there is a configuration change. In the order of priority, the possible configurations are:

- Remote node.
- OSC through OSPF.

Limitation

- Span Loss calculation is done by considering the total power of the transmission end and receiver end on the EDFA ports. If the PSM card is connected to the span (for example, in case of Path Protection Topology), the span boundaries are assumed to be the closer EDFA ports.

Display Span Loss Calculation

Once the feature is enabled and after the first span loss calculation, the loss calculated (for both IPv4 and IPv6) can be retrieved using the `show controller ots` command. In the output RX Span Loss and TX Span Loss are added. RX Span Loss and TX Span Loss are obtained as a result of difference between **TX Total Power** and **RX Total Power** read on the edge of the span.

In case of a TERM node, the command is applied to LINE port. For example, in case of EDFA in slot 1, the span loss calculated are shown in the output of the following command:

```
#show controllers ots 0/1/0/1
…
…
 RX Span Loss = 15.20 dB
 TX Span Loss = 14.80 dB
…
…
```

In case of an ILA node, the command is applied to LINE port (`controller ots 0/slot/0/1`) to obtain RX Span Loss of related span, and to COM port (`controllers ots 0/slot/0/0`) to obtain TX Span Loss of related span.

For example, in case of an EDFA of ILA site equipped in slot 3:

```
show controllers ots 0/3/0/1
…
 RX Span Loss = 12.40 dB
show controllers ots 0/3/0/0
…
 TX Span Loss = 11.90 dB
```

Dual IP Address

Dual independent XR interfaces allows you to connect the two ethernet interfaces to two different switches of different subnet and also of the same subnet. From release 6.5.1, there are different ports from the ethernet switch MGMT RJ45, and Optical SFP MGMT to the CPU.

The two different Management Ethernet interfaces in to XR are:

- MgmtEth 0/RP0/CPU0/0 (already existing) representing the RJ45 port.
- MgmtEth 0/RP0/CPU0/1 (new one) representing the SFP port.

iPXE is not supported at power-on over the new optical interface.

Upgrades from previous releases using only SFP loses MGMT connectivity. In this case, you must configure through Console port.

Before using the two different interfaces, you must upgrade the BIOS and reload the 0/RP0 location.

The following example shows the output of the *show running-config* command:

Example

```
RP/0/RP0/CPU0:MYST-144#show running-config
….
 interface MgmtEth0/RP0/CPU0/0
 ipv4 address xxx.xxx.xxx.xxx yyy.yyy.yyy.yyy
!
interface MgmtEth0/RP0/CPU0/1
 ipv6 address xxxx:xxxx:xxxx:xxxx::xxx:xxx/yy
 ipv6 enable
!
interface MgmtEth0/RP0/OSC1/0
 shutdown
!
interface MgmtEth0/RP0/OSC2/0
 shutdown
!
interface MgmtEth0/RP0/OSC3/0
 shutdown
!
```

Configure OTS OCH Controller

The Optical Transport Section OCH (OTS OCH) controller represents the OCM device available on the OTS optical interface. This controller is created to have channel granularity over the OTS interface. The OTS OCH controller contains the wavelength information. The controller number starts from 1 and matches with the ITU channel identifier.

Several OTS OCH controllers are created for each OTS Controller depending on the grid configuration (ITU 100GHz or 50GHz Grid). 48 OTS OCH controllers are created for a 100GHz grid and 96 OTS OCH controllers are created for a 50GHz grid.

You can configure the parameters such as RX low power threshold and TX low power threshold for the OTS OCH controller. To configure the OTS OCH controller, use the following commands.

configure

controller *controllertype Rack/Slot/Instance/Port*

rx-low-threshold *value*

tx-low-threshold *value*

commit

end

Example

```
configure
    controller ots-och 0/1/0/0
    rx-low-threshold  -30
    tx-low-threshold  -35
    commit
end
```

OTS OCH Controller Configuration Parameters

Table 2: OTS OCH Controller Configuration Parameters

Parameter	Description	Hardware Capability	Range	Default
rx-low-threshold (0.1 dBm)	Low receive power threshold	OCM	-500 to +300	-25.0
tx-low-threshold (0.1 dBm)	Low transmit power threshold	OCM	-500 to +300	-25.0

Display Parameters of OTS OCH Controllers

Use this procedure to display the parameters of OTS OCH controllers.

show controllers *controllertype Rack/Slot/Instance/Port/Channel-number* [**summary**]

- The **show controllers** command displays all the configuration parameters, PM thresholds and alarms when keywords are not provided.
- The **show controllers** command displays the rx/tx power value and wavelength when **summary** keyword is provided.
- A * wild card can be used to display all the OTS OCH controllers associated with a OTS controller. For example, **show controllers ots-och 0/1/0/* summary**

Example

RP/0/RP0/CPU0:ios#**show controllers ots-och 0/3/0/1/1**

```
Fri Feb 24 13:20:18.456 CET

 Controller State: Up

 Transport Admin State: Maintenance
```

```
Port Type: Line

Laser State: On

Optics Status::


        Alarm Status:
        -------------
        Detected Alarms:
                LOW-RX-PWR

        Alarm Statistics:
        -----------------
         LOW-RX-PWR = 219
         LOW-TX-PWR = 5
         RX-LOS-P = 0
         RX-LOC = 0
         AMPLI-GAIN-DEG-LOW = 0
         AMPLI-GAIN-DEG-HIGH = 0
         AUTO-LASER-SHUT = 0
         AUTO-POW-RED = 0
         AUTO-AMPLI-CTRL-DISABLED = 0
         AUTO-AMPLI-CFG-MISMATCH = 0
         SWITCH-TO-PROTECT = 0

        Parameter Statistics:
        ---------------------
        TX Power = 4.10 dBm
        RX Power = -30.70 dBm


        Configured Parameters:
        -------------
        Rx Low Threshold = -25.0 dBm
        Tx Low Threshold = -25.0 dBm
```