Interface Configuration Commands

Use the following commands to configure and monitor the interfaces on the Cisco ONS 15540 ESP.

clock rate

To configure the signal clock rate without an associated protocol on a transparent interface, use the **clock rate** command. To disable the clock rate, use the **no** form of this command.

clock rate *value*

no clock rate

Syntax Description

value	Specifies the signal rate. The range is 16000 to 2500000 kHz.

Defaults   Disabled

Command Modes   Interface configuration

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.

E-Release	Modification
12.1(11b)E	This command was integrated in this release.

EV-Release	Modification
12.1(10)EV	This command was integrated in this release.

SV-Release	Modification
12.2(18)SV	This command was integrated in this release.

S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   You can configure either the signal clock rate with either the **encapsulation** command or the **clock rate** command, but not both. Protocol monitoring cannot be enabled on the interface when the **clock rate** command is configured because no protocol is specified.

Table 3-1 lists the clock rates for well-known protocols supported by the 2.5-Gbps transponder module:

Table 3-1   Supported Clock Rates for Well-Known Protocols

Well-Known Protocol	Clock Rate (in kbps)
DS3	44,736
DV1[1] in ADI[2] mode	270,000
E3	34,368
ESCON	200,000
Fibre Channel (1 Gbps)	1,062,500
Fibre Channel (2 Gbps)	2,125,000
FICON (1 Gbps)	1,062,500
FICON (2 Gbps)	2,125,000
Gigabit Ethernet	1,250,000
ISC compatibility mode (ISC-1)	1,062,500
ISC peer mode (ISC3)	2,125,000
SONET OC-1	51,840
SONET OC-3/SDH STM-1	155,520
SONET OC-12/SDH STM-4	622,080
SONET OC-24/SDH STM-8	933,120
SONET OC-48SDH STM-16	2,488,320

1. DV = digital video

2. ADI = Asynchronous Digital Interface

The following ranges are not supported by the transponder module hardware:

- 851,000 kbps to 999,999 kbps
- 1,601,000 kbps to 1,999,999 kbps

For clock rates outside of these unsupported ranges and not listed in Table 3-1, contact your SE (systems engineer) at Cisco Systems.

Examples

The following example shows how to configure the signal clock rate on an interface.

```
Switch# configure terminal
Switch(config)# interface transparent 10/0/0
Switch(config-if)# clock rate 125000
```

Related Commands

Command	Description
encapsulation	Specifies the protocol encapsulation for a transparent interface.
show interfaces	Displays interface information.

clear performance history

To clear and reset the performance history counters, use the **clear performance history** command.

clear performance history [*interface*]

Syntax Description

interface	Specifies the interface on which the command is to be executed.

Defaults

Clears all the performance history counters (the current counter, all 15-minute history counters, and the 24-hour counter) for all Cisco ONS 15540 ESP interfaces.

Command Modes

EXEC and privileged EXEC.

Command History

This table includes the following release-specific history entries:

SV-Release	Modification
12.2(29)SV	This command was introduced.

Usage Guidelines

Use this command to clear and reset the performance history counters.

Examples

The following example shows how to clear the performance history counters for a transparent interface.

```
Switch# clear performance history transparent 8/0/0
Reset performance history on interface?[confirm]y
Switch#
```

Related Commands

Command	Description
show performance	Displays the performance history counters for the specified interface.
clear counters	Clears all the interface counters.
auto-sync counters interface	Enables the automatic synchronization of the performance history counters and interface counters.

encapsulation

To configure the protocol encapsulation for the client signal on a transparent interface, use the **encapsulation** command. To disable the encapsulation for the client signal, use the **no** form of this command.

> **encapsulation** {**fastethernet** |
>   **fddi** |
>   **gigabitethernet** |
>   **escon** |
>   **sysplex** {**clo** | **etr** | **isc** {**compatibility** | **peer** [**1g** | **2g**]}}
>   **ficon** {**1g** | **2g**} |
>   **sonet** {**oc3** | **oc12** | **oc48**} |
>   **sdh** {**stm-1** | **stm-4**| **stm-16**} |
>   **fibrechannel** {**1g** | **2g**} [**ofc** {**enable** | **disable**}]}
>   **no encapsulation**

Syntax Description	
fastethernet	Specifies Fast Ethernet encapsulation. The OFC (open fiber control) safety protocol is disabled.
fddi	Specifies FDDI encapsulation. OFC is disabled.
gigabitethernet	Specifies Gigabit Ethernet encapsulation. OFC is disabled.
escon	Specifies ESCON encapsulation. OFC is disabled.
sysplex	Specifies Sysplex encapsulation. **Note** This encapsulation is only supported on the multimode transponder modules.
clo	Specifies CLO (control link oscillator) timing. OFC is disabled. Forward laser control is enabled on both the transparent and wave interfaces.
etr	Specifies ETR (external time reference) timing. OFC is disabled.
isc	Specifies ISC (intersystem channel) encapsulation.
compatibility	Specifies ISC compatibility mode (ISC1) with rate of 1.0625 Gbps. OFC is enabled.
peer	Specifies ISC peer mode (ISC3). OFC is disabled.
1g	Specifies 1 Gbps rate.
2g	Specifies 2 Gbps rate.
ficon	Specifies FICON encapsulation. OFC is disabled.
sonet {**oc3**	**oc12**	**oc48**}	Specifies SONET encapsulation and rate. OFC is disabled.
sdh {**stm-1**	**stm-4**	**stm-16**}	Specifies SDH encapsulation and rate. OFC is disabled.
fibrechannel rate 1g	Specifies Fibre Channel encapsulation and rate.
ofc {**enable**	**disable**}	Enables or disables OFC. The default OFC state is disabled. (Optional)

Defaults   Encapsulation is disabled. See the "Syntax Description" section for the default OFC state.

1g is the default rate for ISC links peer mode.

■ encapsulation

Command Modes   Interface configuration

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for 1 Gbps ISC links peer mode.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to provide clocking for the client signal for specific protocols. The protocol encapsulation must be configured for the transparent interface to allow signal monitoring to be enabled with the **monitor enable** command. The following protocol encapsulation types are supported in 3R mode plus protocol monitoring:

- ESCON (200 Mbps) SM and MM
- Fibre Channel (1 Gbps and 2 Gbps) SM
- FICON (Fiber Connection) (1 Gbps and 2 Gbps) SM
- Gigabit Ethernet (1250 Mbps) SM
- ISC (InterSystem Channel) links compatibility mode
- ISC links peer mode (1 Gbps and 2 Gbps) SM
- SDH (Synchronous Digital Hierarchy) STM-1 SM and MM
- SDH STM-4 SM and MM
- SDH STM-16 SM
- SONET OC-3 SM and MM
- SONET OC-12 SM and MM
- SONET OC-48 SM

The following protocol encapsulation types are supported in 3R mode without protocol monitoring:

- Fast Ethernet

- FDDI
- Sysplex CLO (control link oscillator)
- Sysplex ETR (external timer reference)

To specify the signal clock rate without specifying a protocol, use the **clock rate** command.

Sysplex CLO and Sysplex ETR are supported outside the nominal range of the clock rates for the Cisco ONS 15540 ESP because of the nature of the traffic type.

Note   Encapsulation cannot be changed without first disabling monitoring using the **no monitor enable** command.

Removing the encapsulation on a transparent interface with the **no encapsulation** command does not turn off the laser. To turn off the transmit laser to the client equipment, use the **shutdown** command.

Examples   The following example shows how to configure SONET encapsulation at a rate of OC-3 on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# encapsulation sonet oc3
```

Related Commands

Command	Description
clock rate	Configures a clock rate on a transparent interface.
monitor enable	Enables signal monitoring for certain protocol encapsulations.
show interfaces	Displays interface information.
shutdown	Disables an interface.

laser control forward enable

To enable forward laser control, which automatically shuts down transponder lasers when a loss of light failure occurs, use the **laser control forward enable** command. To disable this feature, use the **no** form of this command.

laser control forward enable

no laser control forward

Syntax Description   This command has no other arguments or keywords.

Defaults   Disabled

Command Modes   Interface configuration

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.

E-Release	Modification
12.1(11b)E	This command was integrated in this release.

EV-Release	Modification
12.1(10)EV	This command was integrated in this release.

SV-Release	Modification
12.2(18)SV	This command was integrated in this release.

S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to enable forward laser control on both the client side and trunk side interfaces of a transponder module and on the OSC wave interfaces. If configured on a transparent interface, the client side laser of the transponder shuts down when the trunk side receiver detects a loss of light. If configured on the wave interface, the trunk side laser of the transponder shuts down when client side receiver detects a loss of light.

Note To function correctly, configure forward laser control on both the client side and trunk side interfaces on a transponder module. For y-cable protection, configure forward laser control on both interfaces on both transponder modules.

Automatically shutting down the laser prevents the transmission of unreliable data. However, when the laser is shut down, fault isolation is more difficult.

This feature is convenient for configurations, such as Sysplex, where signal protection is performed in the client hardware and quick laser shutdown causes quick path switchover.

Caution Do not configure forward laser control when OFC is enabled. Combining these features interferes with the OFC protocol.

Examples The following example shows how to enable forward laser control on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 3/2/0
Switch(config-if)# laser control forward enable
```

The following example shows how to enable forward laser control on a wave interface.

```
Switch# configure terminal
Switch(config)# interface wave 2/0
Switch(config-if)# laser control forward enable
```

Related Commands

Command	Description
show interfaces	Displays interface information.

laser control safety enable

To enable laser safety control on a wave interface, use the **laser control safety enable** command. To disable laser safety control, use the **no** form of this command.

> **laser control safety enable**

> **no laser control safety**

Syntax Description   This command has no other arguments or keywords.

Defaults   Disabled

Command Modes   Interface configuration

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to automatically shut down the lasers transmitting to the trunk fiber when a loss of light failure occurs, such as a trunk fiber cut. Enable laser safety control on all wave interfaces in the shelf, including the OSC wave interface.

Laser safety control uses the same protocol state machine as OFC, but not the same timing. Laser safety control uses the pulse interval and pulse durations timers compliant with the ALS (automatic laser shutdown) standard (ITU-T G.664).

⚠

Caution   Do not configure laser safety control when OFC is enabled. Combining these features interferes with the OFC safety protocol operation.

⚠

Caution   Use this command only with line card protected configurations or unprotected configurations.

Examples   The following example shows how to enable laser safety control on a wave interface.

```
Switch# configure terminal
Switch(config)# interface wave 2/0
Switch(config-if)# laser control safety enable
```

Related Commands

Command	Description
show interfaces	Displays interface information.

loopback

To configure a signal loopback on a transponder module interfaces, use the **loopback** command. To disable interface loopback, use the **no** form of this command.

loopback

no loopback

Syntax Description   This command has no other arguments or keywords.

Defaults   Disabled

Command Modes   Interface configuration

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to configure internal loopbacks on transparent or wave interfaces. For any given transponder module, you can configure an internal loopback on either the client side interface or the trunk side interface, but not both simultaneously.

An internal loopback differs from an external loopback where you simply run a cable from the output of a given interface to its input. Using the **loopback** command, you can set loopbacks *without* the need to change the cabling. This is useful for remote testing, configuration, and troubleshooting.

Note If you enable loopback on an interface and save the configuration to NVRAM, the interface comes up with loopback enabled when the system boots.

Examples The following example shows how to enable loopback on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# loopback
```

The following example shows how to enable loopback on a wave interface.

```
Switch# configure terminal
Switch(config)# interface wave 10/0
Switch(config-if)# loopback
```

Related Commands	Command	Description
	show interfaces	Displays interface information.

monitor enable

To monitor signal quality and protocol error statistics in the transponder module, use the **monitor enable** command. To disable monitoring, use the **no** form of this command.

monitor enable

no monitor

Syntax Description   This command has no other arguments or keywords.

Defaults   Disabled

Command Modes   Interface configuration

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release and added monitoring support for 2-Gbps FICON and FC.
12.2(22)SV	Added monitoring support for 2-Gbps ISC links peer mode.
12.2(23)SV	Added monitoring support for 1-Gbps ISC links peer mode.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to collect error statistics on signal quality in the transponder module. The following protocols can be monitored:

- ESCON (200 Mbps) SM and MM

- Fibre Channel (1 Gbps and 2 Gbps) SM
- FICON (Fiber Connection) (1 Gbps and 2 Gbps) SM
- Gigabit Ethernet (1250 Mbps) SM
- ISC (InterSystem Channel) links compatibility mode SM
- ISC links peer mode (1 Gbps and 2Gbps) SM
- SDH (Synchronous Digital Hierarchy) STM-1 SM and MM
- SDH STM-4 SM and MM
- SDH STM-16 SM
- SONET OC-3 SM and MM
- SONET OC-12 SM and MM
- SONET OC-48 SM

When monitoring is enabled on the transparent interface, it is automatically enabled on the corresponding wave interface.

For GE, FC, and FICON traffic, the Cisco ONS 15540 ESP monitors the following conditions:

- CVRD (code violation running disparity) error counts
- Loss of Sync
- Loss of Lock
- Loss of Light

For SONET errors, the Cisco ONS 15540 ESP monitors the SONET section overhead only, not the SONET line overhead. Specifically, the Cisco ONS 15540 ESP monitors the B1 byte and the framing bytes. The system can detect the following defect conditions:

- Loss of Light
- Loss of Lock (when the clock cannot be recovered from the received data stream)
- Severely Errored Frame
- Loss of Frame

For SONET performance, the system monitors the B1 byte, which is used to compute the four SONET section layer performance monitor parameters:

- SEFS-S (section severely errored framing seconds)
- CV-S (section code violations)
- ES-S (section errored seconds)
- SES-S (section severely errored seconds)

For ISC traffic, the system monitors the following conditions:

- CVRD error counts
- Loss of CDR (clock data recovery) Lock
- Loss of Light

Note   Before monitoring can be enabled, you must configure protocol encapsulation for the interface using the **encapsulation** command.

■ monitor enable

Monitoring signal error statistics is useful for isolating system and network faults.

Examples The following example shows how to monitor error counters on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# monitor enable
```

Related Commands

Command	Description
encapsulation	Configures the encapsulation of the client signal on the transparent interface.
show interfaces	Displays interface information.

optical threshold power receive

To set the optical threshold power for alarms on wavepatch interfaces, use the **optical threshold power receive** command.To revert to the default values, use the **no** form of the command.

> **optical threshold power receive** {**low** | **high**} {**alarm** | **warning**} *value* [**severity** {**critical** | **major** | **minor** | **not alarmed** | **not reported**}]

> **no optical threshold power receive** {**low** | **high**} {**alarm** | **warning**}

Syntax Description		
	low	Specifies a low threshold value.
	high	Specifies a high threshold value.
	alarm	Indicates that an alarm will be raised when the threshold is exceeded.
	warning	Indicates that a warning indication will be reported when the threshold is exceeded. The severity of a warning threshold must be less than the severity of the corresponding alarm threshold.
	value	The threshold value in tenths of a dBm. The range is –80 to –280 for 2.5-Gbps transponder modules.
	severity	Specifies the severity for the threshold.
	critical	Indicates the threshold level for service-affecting conditions that require immediate corrective action.
	major	Indicates the threshold level for hardware or software conditions that cause serious service disruption, or malfunctioning or failure of important hardware. These problems require the immediate attention and response of a technician to restore or maintain system capability. The urgency is less than in critical situations because of a lesser immediate or impending effect on service or system performance. This is the default value for alarms.
	minor	Indicates the threshold level for problems that do not have a serious effect on service, or for problems in hardware that do not affect the essential operation of the system.
	not alarmed	Indicates the threshold level for negligible discrepancies, and that do not cause alarm notifications to be generated. The information for these events is retrievable from the network element. This is the default value for warnings.
	not reported	Indicates the threshold level for negligible discrepancies, and that do not cause notifications to be generated. The information for these events is retrievable from the network element.

Defaults

Interface Type	Low Alarm	Low Warning	High Warning	High Alarm
Wavepatch on a 2.5-Gbps transponder module	–28 dBm	–24 dBm	–10 dBm	–8 dBm

Alarm severity: **major**

Warning severity: **not alarmed**

Command Modes	Interface configuration

Command History This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines The default value for high alarm threshold corresponds to the receiver saturation level for the transponder module.

The default value for low alarm threshold corresponds to the Loss of Light condition. Exceeding the low alarm threshold on the active wavepatch interface causes a protection switchover to the standby wavepatch interface, provided that the standby interface is up and operating normally prior to the protection switchover.

The default values cover most network configurations. However, when optical amplifiers are used in the network in the receive direction as preamplifiers, the low alarm threshold value should be reconfigured, since the amplified noise level might be higher than the sensitivity of the receiver and the protection switchover might not be triggered. In such cases, we recommend setting the low alarm threshold to 10 dB below the power level measured at the interface when a signal exists or to –28 dB, whichever value is higher.

Note For this command to function correctly, the functional image version must be 1.A0 (or later) for multimode 2.5-Gbps transponder modules and 1.A1 (or later) for single-mode 2.5-Gbps transponder modules. Use the **show hardware detail** command to verify the functional image version.

Examples The following example shows how to set the optical power low alarm threshold.

```
Switch(config)# interface wavepatch 8/0/0
Switch(config-if)# optical threshold power receive after-attenuation low alarm -210
```

Related Commands	Command	Description
	show interfaces	Displays interface information.

patch

To configure the patch connections within a shelf, use the **patch** command. To remove the patch connection configuration, use the **no** form of the command.

> **patch** *interface1 [***transmit** / **receive***] interface2*

> **no patch** *interface1 [***transmit** / **receive***] interface2*

Syntax Description

interface1 [transmit / receive] interface2	Specifies the interfaces to be patched. See the "Usage Guidelines" section for valid interface types.
transmit	Specifies the patch is for the transmit direction only.
receive	Specifies the patch is for the receive direction only.

Defaults   None

Command Modes   Global configuration

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
12.1(10)EV2	Exgtended to accept an optional directional parameter (**transmit** or **receive**).
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to describe the patch connections between the mux/demux modules.

Valid patch connections between modules within the same slot are:

- Wdm interface to thru interface between mux/demux modules

  wdm *slot*/*subcard1* **thru** *slot*/*subcard2*

- Thru interface to wdm interface between mux/demux modules

  thru *slot*/*subcard1* **wdm** *slot*/*subcard2*

- Filterband interface to filtergroup interface

  filterband *slot*/*subcard1*/*port1* **filtergroup** *slot*/*subcard2*/*port2*

- Filtergroup interface to filterband interface

  filtergroup *slot*/*subcard1*/*port1* **filterband** *slot*/*subcard2*/*port2*

- OSC wave interface to OSC oscfilter interface

  wave *slot* **oscfilter** *slot*/*subcard*

- OSC oscfilter interface to OSC wave interface

  oscfilter *slot*/*subcard* **wave** *slot*

Valid patch connection between modules in the different slots are:

- Thru interface to thru interface between mux/demux modules

  thru *slot1*/*subcard1* **thru** *slot2*/*subcard2*

- Filterband interface to filtergroup interface

  filterband *slot1*/*subcard1*/*port1* **filtergroup** *slot2*/*subcard2*/*port2*

- Filtergroup interface to filterband interface

  filtergroup *slot1*/*subcard1*/*port1* **filterband** *slot2*/*subcard2*/*port2*

You cannot preconfigure a patch connection. The interfaces must exist on the shelf before configuring them.

The order of the interfaces in the command does not affect the patch connect configuration. For example, configuring **patch wdm 0/1 thru 0/0** is equivalent to configuring **patch thru 0/0 wdm 0/1**.

When one interface in a patch connection is physically removed from the shelf, the patch connection configuration persists but does not appear in the **show running-config** output. A subsequent **patch** command that includes the remaining interface overwrites the previous patch connection configuration.

Examples

The following example shows how to describe the patch connection between two mux/demux modules in the same slot.

```
Switch# configure terminal
Switch(config)# patch wdm 1/0 thru 1/1
```

Related Commands

Command	Description
debug ports	Enables debugging of optical port activity.
show optical filter	Displays the channels supported by the mux/demux modules.
show patch	Displays optical patch connection configuration.
snmp-server enable traps patch	Enables SNMP trap notifications for patch connection activity.

show connect

To display the connection relationships between the interfaces in the shelf, use the **show connect** command.

show connect {**edges** | **intermediate** [**sort-channel** | **interface** *interface*]}

Syntax Description

edges	Displays the connections between the client-side interfaces and trunk-side interfaces of the shelf.
intermediate	Displays the complete connections between the client-side interfaces and trunk-side interfaces of the shelf, including all the intermediate internal interfaces.
sort-channel	Sorts the display by channel number.
interface *interface*	Displays the intermediate connection information for a specific interface.

Defaults   None

Command Modes   EXEC and privileged EXEC

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   This command shows the relationships between the interfaces in the shelf. Use this command to trace a single channel from the client side interface to the trunk side mux/demux interface.

Examples   The following example shows how to display edge connection information. (See Table 3-2 for field descriptions.)

```
Switch# show connect edges
client/
wave       wdm  channel
---------- ---  -----
Trans3/0/0 1/0    26
Trans3/1/0 1/0    27
Trans3/2/0 1/0    28
Trans3/3/0 1/0    29
```

Table 3-2   show connect edges Field Descriptions

Field	Description
client/wave	Shows the client side interface identifier.
wdm	Shows the wdm interface identifier.
channel	Shows the ITU wavelength number supported by this connection.

The following example shows how to display intermediate connection information. (See Table 3-3 for field descriptions.)

```
Switch# show connect intermediate
client/        wave          wave            wdm
wave           client        patch   filter  trk  channel
------------   ------------  -------  ------  ---  -------
Trans3/0/0     Wave3/0       3/0/0*   0/0/4   0/0     5
                             3/0/1
Trans3/1/0     Wave3/1       3/1/0*   0/0/5   0/0     6
                             3/1/1
Trans3/2/0     Wave3/2       3/2/0*   0/0/6   0/0     7
                             3/2/1
Trans3/3/0     Wave3/3       3/3/0*   0/0/7   0/0     8
                             3/3/1
```

Table 3-3   show connect intermediate Field Descriptions

Field	Description
client/wave	Shows the client side interface identifier.
wave client	Shows the wave interface identifier.
wave patch	Shows the wavepatch interface identifier. The interface with the asterisk (*) carries the active signal.
filter	Shows the filter interface identifier.
wdm trk	Shows the wdm interface identifier.
channel	Shows the channel number supported by this connection.

The following example shows how to display interface connection information. (See Table 3-4 for field descriptions.)

```
Switch# show connect interface transparent 2/0/0
Client    :Transparent2/0/0
 Wave     :Wave2/0
 Wavepatch :Wavepatch2/0/0 (active)   Wavepatch :Wavepatch2/1/0
```

```
Filter    :Filter0/0/0              Filter    :Filter1/0/0
Wdm       :Wdm0/0                   Wdm       :Wdm1/0
Thru      :Thru0/1                  Thru      :Thru1/1
Wdm       :Wdm0/1                   Wdm       :Wdm1/1
Thru      :Thru0/2                  Thru      :Thru1/2
Wdm (trnk):Wdm0/2                   Wdm       :Wdm1/2
```

Table 3-4   show connect interface Field Descriptions

Field	Description
Client	Shows the client side interface identifier.
Wave	Shows the wave interface identifier.
Wavepatch	Shows the wavepatch interface identifier.
Filter	Shows the filter interface identifier.
Wdm	Shows the wdm interface identifier.
Thru	Shows the thru interface identifier.
Wdm (trnk)	Shows the identifier of the wdm interface attached to the trunk fiber.

Related Commands

Command	Description
debug ports	Enables debugging of optical port activity.
show optical filter	Displays information about the channels supported by the mux/demux modules.
show optical wavelength mapping	Displays the mapping of the Cisco ONS 15540 ESP channels to the ITU grid wavelengths and frequencies.

show controllers

To display hardware register information for an interface, use the **show controllers** command.

show controllers [*type slot*[*/subcard*[*/port*]]]

Syntax Description

type	Specifies one of the interface types listed in Table 3-5.
slot	Specifies a chassis slot.
subcard	Specifies a subcard position in a motherboard.
port	Specifies a port.

Defaults

Displays controller information for all interfaces on the system.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

The **show controllers** command displays the contents of hardware registers for the interfaces. This information is useful for troubleshooting system problems.

Table 3-5 shows the interface types for the **show controller** command.

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Table 3-5   Interface Types for the show controller Command

Type	Description
fastethernet 0	Shows the NME interface information.
filter *slot*/*subcard*/*port*	Shows the filter interface information.
filterband *slot*/*subcard*/*port*	Shows the filterband interface information.
filtergroup *slot*/*subcard*/*port*	Shows the filtergroup interface information.
oscfilter *slot*/*subcard*	Shows the OSC oscfilter interface information.
thru *slot*/*subcard*	Shows the thru interface information.
transparent *slot*/*subcard*/**0**	Shows the transparent interface information.
wave *slot*[/*subcard*]	Shows the wave interface information.
wavepatch *slot*/*subcard*/*port*	Shows the wavepatch interface information.
wdm *slot*/*subcard*	Shows the wdm interface information.

Examples   The following example shows how to display hardware register information about a transparent interface. (See Table 3-6 for field descriptions.)

```
Switch# show controllers transparent 3/0/0
Controller info for Transparent interface Transparent3/0/0
  LRC start addr = 0x200000
  hardware port = 1
    RCI0 monitor................:enabled
    port 1 intr SRC/CPU.........:enabled
    CPU0 MSB MAC................:0x0
    CPU0 LSB MAC................:0x0
    CPU1 MSB MAC................:0x0
    CPU1 LSB MAC................:0x0
    port error register.........:0x10000
    port ctrl msg intf mask.....:0x0
    port APS port fail mask.....:0x0
  HuJr start addr = 0x240000
  Optics control and status:
    LSC indication..............:ok
    trunk laser failure alarm...:clear
    LSC indication enable.......:disabled
    trunk laser alarm enable....:disabled
    line transceiver mode.......:non pluggable
    loss of light...............:yes
    trunk laser deviation alarm.:clear
    LSC.........................:disabled
    quick shutdown (FLC)........:disabled
    wavelength select...........:n-1 [lo wlen]
  CDR control and status:
    loss of lock................:yes
    loss of lock enable.........:disabled
  SerDes control and status:
    diags loop back.............:disabled
    line loop back..............:disabled
  GE handler control and status:
    loss of sync................:no
    loss of sync enable.........:disabled
  FC/ESCON handler control and status:
    loss of sync................:no
    loss of sync enable.........:disabled
```

```
SONET handler control and status:
  loss of frame...............:yes
  severely errored frame......:yes
  LOF enable..................:disabled
  SEF enable..................:disabled
```

Table 3-6   show controllers Field Descriptions for transponder interfaces

Field	Description
Optics control and status:	Shows control and status information for the optical components in the interface.
LSC indication	Shows laser safety control status (valid only on wave interfaces).
trunk laser failure alarm	Shows the status of the trunk laser alarm. The values are: • clear—no failure • indicated—failure
LSC indication enable	Indicates whether laser safety control has been enabled (valid only on wave interfaces).
trunk laser alarm enable	Shows the status of the trunk laser alarm. If enabled, the system will signal when laser failure occurs.
loss of light	Indicate whether there is a loss of light condition.
trunk laser deviation alarm	Shows the status of the wavelength deviation alarm. If enabled, the system will signal when there is a deviation in the functioning of the laser.
LSC	Indicates whether laser safety control is enabled from the CLI (valid only on wave interfaces).
quick shutdown (FLC)	Indicates whether forward laser control is enabled on the interface (valid only on wave interfaces).
wavelength select	Indicates whether a transponder module is transmitting the lower wavelength (lo wlen) or the higher wavelength (hi wlen).
CDR control and status:	Shows the CDR (clock and data recovery) control and status information.
loss of lock	Indicated whether there is a loss of lock condition.
loss of lock enable	Indicates whether loss of lock monitoring is enabled on the interface via the **monitor enable** command.
SerDes control and status:	Shows the SerDes (serializer/deserializer) information.
GE handler control and status:	Shows Gigabit Ethernet control and status information.
loss of sync	Indicates whether there is a loss of synchronization for the signal. This field is only valid if protocol encapsulation is Gigabit Ethernet, and monitoring is enabled.
loss of sync enable	Indicates whether loss of synchronization monitoring is enabled via the **monitor enable** command.
FC/ESCON handler control and status:	Shows Fiber Channel and ESCON control and status information.

Table 3-6   show controllers Field Descriptions for transponder interfaces (continued)

Field	Description
loss of sync	Indicates whether there is a loss of synchronization for the signal. This field is only valid if protocol encapsulation is Fibre Channel or ESCON, and monitoring is enabled.
loss of sync enable	Indicates whether loss of synchronization monitoring is enabled via the **monitor enable** command.
SONET handler control and status:	Shows SONET control and status information.
loss of frame	Indicates whether there is a loss of frame for the signal. This field is only valid if protocol encapsulation is SONET, and monitoring is enabled.
severely errored frame	Indicates whether there is a severely errored frame in the signal. This field is only valid if protocol encapsulation is SONET, and monitoring is enabled.
LOF enable	Indicates whether loss of frame monitoring is enabled via the **monitor enable** command.
SEF enable	Indicates whether severely errored frame monitoring is enabled via the **monitor enable** command.

The following example shows how to display hardware register information about a transponder wave interface. (See Table 3-6 for field descriptions.)

```
Switch# show controllers wave 3/1
Controller info for Wave interface Wave3/1
  LRC start addr = 0x200000
  hardware port = 2
    RCI1 monitor................:enabled
    port 2 intr SRC/CPU.........:enabled
    CPU0 MSB MAC................:0x0
    CPU0 LSB MAC................:0x0
    CPU1 MSB MAC................:0x0
    CPU1 LSB MAC................:0x0
    port error register.........:0x10000
    port ctrl msg intf mask.....:0xF00FC00A
    port APS port fail mask.....:0x0
  HuJr start addr = 0x250000
  Optics control and status:
    auto fail-over indication...:normal
    optical switch alarm........:clear
    line laser degrade alarm....:clear
    optical switch position.....:Mux 1
    loss of light...............:no
    BLC and LAS.................:disabled
    LSC.........................:disabled
    quick shutdown (FLC)........:disabled
  CDR control and status:
    loss of lock................:yes
    loss of lock enable.........:enabled
  SerDes control and status:
    diags loop back.............:disabled
    line loop back..............:disabled
  GE handler control and status:
    loss of sync................:no
    loss of sync enable.........:disabled
```

```
FC/ESCON handler control and status:
  loss of sync................:no
  loss of sync enable.........:disabled
SONET handler control and status:
  loss of frame...............:yes
  severely errored frame......:yes
  LOF enable..................:disabled
  SEF enable..................:disabled
```

The following example shows how to display hardware register information about an OSC wave interface. (See Table 3-6 for field descriptions.)

```
Switch# show controllers wave 0
Controller info for OSC wave interface Wave0
  LRC start addr = 0x900000
  hardware port = 0
    RCI0 monitor................:enabled
    port 0 intr SRC/CPU.........:enabled
    CPU0 MSB MAC................:0x0
    CPU0 LSB MAC................:0x1060000
    CPU1 MSB MAC................:0x0
    CPU1 LSB MAC................:0x1070000
    port error register.........:0x8002
    port ctrl msg intf mask.....:0x0
    port APS port fail mask.....:0x0
  HuJr start addr = 0x940000
  CDL add/drop control and status:
    FIFO overflow indication....:clear
    HEC error threshold exceeded:indicate
    FIFO overflow enable........:disabled
    HEC error threshold enable..:disabled
    CDL alarm status............:true alarm
    CDL add enable..............:enabled
    CDL drop enable.............:enabled
  Optics control and status:
    LSC indication..............:ok
    trunk laser failure alarm...:indicated
    LSC indication enable.......:disabled
    trunk laser alarm enable....:disabled
    loss of light...............:yes
    wavelength deviation alarm..:clear
    LSC.........................:disabled
    wavelength select...........:n [hi wlen]
  CDR control and status:
    loss of lock................:yes
    loss of lock enable.........:disabled
  SerDes control and status:
    diags loop back.............:disabled
    network loop back...........:disabled
  GE handler control and status:
    loss of sync................:yes
    loss of sync enable.........:disabled
```

Related Commands	Command	Description
	encapsulation	Specifies the protocol encapsulation for a transparent interface.
	laser control forward enable	Configures forward laser control, which automatically shuts down transponder lasers.
	laser control safety enable	Configures laser safety control on a wave interface.

■ **show controllers**

Command	Description
loopback	Configures signal loopback on an interface.
monitor enable	Enables signal monitoring for certain protocol encapsulations.
show interfaces	Displays interface information.

show interfaces

To display interface information, use the **show interfaces** command.

show interfaces [*type slot*[*/subcard*[*/port*]]]

Syntax Description

type	Specifies one of the interface types listed in Table 3-7.
slot	Specifies a chassis slot.
subcard	Specifies a subcard position in a motherboard.
port	Specifies a port.

Defaults   Displays information for all interfaces on the system.

Command Modes   EXEC and privileged EXEC

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Table 3-7 shows the interface types for the **show interfaces** command.

Table 3-7   Interface Types for the show interfaces Command

Type	Description
fastethernet 0	Shows the NME interface information.
fastethernet-sby 0	Shows the NME interface information for the standby processor card.
filter *slot*/*subcard*/*port*	Shows the filter interface information.
filterband *slot*/*subcard*/*port*	Shows the filterband interface information.
filtergroup *slot*/*subcard*/*port*	Shows the filtergroup interface information.
oscfilter *slot*/*subcard*	Shows the OSC oscfilter interface information.
thru *slot*/*subcard*	Shows the thru interface information.
transparent *slot*/*subcard*/**0**	Shows the transparent interface information.
wave *slot*[/*subcard*]	Shows the wave interface information.
wavepatch *slot*/*subcard*/*port*	Shows the wavepatch interface information.
wdm *slot*/*subcard*	Shows the wdm interface information.

Examples   The following example shows how to display transparent interface information. (See Table 3-8 for field descriptions.)

```
Switch# show interfaces transparent 3/1/0
Transparent3/1/0 is administratively up, line protocol is up
  Signal quality: Loss of lock
  Encapsulation: Sonet     Rate: oc3
  Signal monitoring: on
  Forward laser control: Off
  Configured threshold Group: None
  Threshold monitored for: BIP1 error
  Set threshold SF:10e-5  SD:10e-7
  Section code violation error count(bip1): 61286
  Number of errored seconds(es): 2
  Number of severely errored seconds(ses): 2
  Number of severely errored framing seconds(sefs): 273
  Number of times SEF alarm raised: 0
  Number of times SF threshold exceeded: 0
  Number of times SD threshold exceeded: 2
  Loopback not set
  Last clearing of "show interface" counters never
Hardware is transparent
```

Table 3-8   show interfaces transparent Field Descriptions

Field	Description
Transparent3/1/0 is administratively up	Shows the interface state, either up or down.
line protocol is up	Shows the state of the line protocol, either up or down.
Signal quality	Shows signal quality.
Encapsulation	Shows the encapsulation for the interface.

Table 3-8   show interfaces transparent Field Descriptions (continued)

Field	Description
Rate	Shows the encapsulation rate—either the configured clock rate or the protocol clock rate, if the protocol supports multiple rates.
Signal monitoring	Shows whether signal monitoring is enabled.
Forward laser control	Shows whether forward laser control is enabled.
Configured threshold group	Shows whether a threshold group has been configured for the interface.
Threshold monitored for	Shows what the threshold group is monitored for.
Set threshold	Shows alarm thresholds. The output example shows the alarm thresholds for signal failure (SF) and signal degrade (SD).
Section code violation error count (bip1)	Shows the number of BIP1 errors.
Number of errored seconds (es)	Shows the number of errored seconds.
Number of severely errored seconds (ses)	Shows the number of severely errored seconds.
Number of severely errored framing seconds (sefs)	Shows the number of severely errored framing seconds.
Number of times SEF alarm raised	Shows the number of times the SEF alarm was raised.
Number of times SF threshold exceeded	Shows the number of times the signal failure (SF) threshold was exceeded.
Number of times SD threshold exceeded	Shows the number of times the signal degrade (SD) threshold was exceeded.
Loopback not set	Shows whether loopback is enabled.
Last clearing of "show interface" counters	Shows the last time "show interface" counters were cleared.
Hardware is transparent	Shows the hardware type.

The following example shows how to display wave interface information. (See Table 3-9 for field descriptions.)

```
Switch# show interfaces wave 10/0
Wave10/0 is administratively up, line protocol is up
  Channel: 25   Frequency: 195.1 Thz    Wavelength: 1536.61 nm
  Splitter Protected: Yes
  Receiver power level: -37.30 dBm
  Laser safety control: Off
  Forward laser control: Off
  Osc physical port: No
  Wavelength used for inband management: No
  Configured threshold Group: None
  Section code violation error count(bip1): 0
  Number of errored seconds(es): 29
  Number of severely errored seconds(ses): 29
  Number of severely errored framing seconds(sefs): 0
  Number of times SEF alarm raised: 0
  Number of times SF threshold exceeded: 0
  Number of times SD threshold exceeded: 0
  Loopback not set
```

```
Last clearing of "show interface" counters 4d03h
Hardware is data_only_port
```

Table 3-9   *show interfaces wave Field Descriptions*

Field	Description
Wave10/0 is administratively up	Shows the interface state, either up or down.
line protocol is up	Shows the state of the line protocol, either up or down.
Channel Frequency Wavelength	Shows the channel number, frequency, and wavelength of the wave interface.
Splitter Protected	Shows whether the interface is splitter protected.
Receiver power level	Shows the receiver power level. **Note** This field is not present in the OSC wave interface output.
Laser safety control	Shows whether laser safety control is enabled.
Forward laser control	Shows whether forward laser control is enabled.
Osc physical port	Shows whether the interface is an OSC physical port.
Wavelength used for inband management	Shows whether the interface is used for inband management.
Configured threshold group	Shows whether a threshold group has been configured for the interface.
Threshold monitored for	Shows what the threshold group is monitored for. In the output example, a configured threshold group would be monitored for BIP1 errors.
Set threshold	Shows alarm thresholds. The output example shows the alarm thresholds for signal failure (SF) and signal degrade (SD).
Section code violation error count (bip1)	Shows the number of BIP1 errors.
Number of errored seconds (es)	Shows the number of errored seconds.
Number of severely errored seconds (ses)	Shows the number of severely errored seconds.
Number of severely errored framing seconds (sefs)	Shows the number of severely errored framing seconds.
Number of times SEF alarm raised	Shows the number of times the SEF alarm was raised.
Number of times SF threshold exceeded	Shows the number of times the signal failure (SF) threshold was exceeded.
Number of times SD threshold exceeded	Shows the number of times the signal degrade (SD) threshold was exceeded.
Loopback not set	Shows whether loopback is enabled.

Table 3-9   show interfaces wave Field Descriptions (continued)

Field	Description
Last clearing of "show interface" counters	Shows the last time "show interface" counters were cleared.
Hardware is data_only_port	Shows the interface type.

The following example shows how to display wave interface information. (See Table 3-9 for field descriptions.)

```
Switch# show interfaces wave 0
Wave0 is administratively up, line protocol is up
  Channel: 0    Frequency: 191.9 Thz    Wavelength: 1562.23 nm
  Splitter Protected: No
  Laser safety control: Off
  Forward laser control: Off
  Osc physical port: Yes
  Wavelength used for inband management: No
  Configured threshold Group: None
  Loopback not set
  Last clearing of "show interface" counters never
  Hardware is OSC_phy_port
  MTU 1492 bytes, BW 10000000 Kbit, DLY 0 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SNAP, loopback not set
    CDL receive header error count: 0
  Last input 00:00:02, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     3447 packets input, 269630 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

The following example shows how to display wdm interface information. (See Table 3-10 for field descriptions.)

```
Switch# show interfaces wdm 0/0
Wdm0/0 is up, line protocol is up
 Patched Interface: Thru0/1
 Wdm Hw capability: N/A
 Num of Wavelengths Add/Dropped: 8
 List of Wavelengths: 1, 2, 3, 4, 5, 6, 7, 8,
  Hardware is wavelength_add_drop
```

Table 3-10   show interfaces wdm Field Descriptions

Field	Description
Wdm0/0 is up	Shows the interface state, either up or down.
line protocol is up	Shows the state of the line protocol, either up or down.
Patched Interface:	Shows how the mux/demux modules is optically patched.

Table 3-10   show interfaces wdm Field Descriptions (continued)

Field	Description
Num of wavelengths Add/Dropped:	Shows the number of wavelengths added and dropped.
List of Wavelengths:	Shows list of wavelength channel numbers.
Hardware is wavelength_add_drop	Shows the hardware type.

Related Commands

Command	Description
laser control forward enable	Configures forward laser control on an interface.
laser control safety enable	Configures laser safety control on wave interfaces.
loopback	Configures loopback on an interface.
show controllers	Displays interface controller information.

show optical filter

To display information about the channels supported by the mux/demux modules, use the **show optical filter** command.

show optical filter [**detail**]

Syntax Description	**detail**	Shows optical patch connections between the mux/demux modules in addition to the channels supported. This information displays only if the patch connection have been configured with the **patch** command.

Defaults   Displays only the channels supported by the mux/demux modules.

Command Modes   EXEC and privileged EXEC

Command History   This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to verify the system configuration.

Examples   The following example shows how to display optical filter information. (See Table 3-11 for field descriptions.)

```
Switch# show optical filter
```

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```
aggregate                         filtered
interface         channel(s)      interface
----------------  -----------     ------------
Wdm0/0                0           Oscfilter0/0
Wdm0/0                1           Filter0/0/0
Wdm0/0                2           Filter0/0/1
Wdm0/0                3           Filter0/0/2
Wdm0/0                4           Filter0/0/3
Wdm0/0                5           Filter0/0/4
Wdm0/0                6           Filter0/0/5
Wdm0/0                7           Filter0/0/6
Wdm0/0                8           Filter0/0/7
Wdm0/2               17           Filter0/2/0
Wdm0/2               18           Filter0/2/1
Wdm0/2               19           Filter0/2/2
Wdm0/2               20           Filter0/2/3
Wdm0/2               21           Filter0/2/4
Wdm0/2               22           Filter0/2/5
Wdm0/2               23           Filter0/2/6
Wdm0/2               24           Filter0/2/7
Wdm1/0                0           Oscfilter1/0
Wdm1/0                1           Filter1/0/0
Wdm1/0                2           Filter1/0/1
Wdm1/0                3           Filter1/0/2
Wdm1/0                4           Filter1/0/3
Wdm1/0                5           Filter1/0/4
Wdm1/0                6           Filter1/0/5
Wdm1/0                7           Filter1/0/6
Wdm1/0                8           Filter1/0/7
```

Table 3-11   *show optical filter Field Descriptions*

Field	Description
aggregate interface	Shows the aggregate wdm interface.
channels	Shows the channels in the aggregate interface. In the output example, "remaining" indicates that whichever channels have not been dropped are passed to the thru interface.
filtered interface	Shows the filtered interface, which connects to the transponder through the backplane.
remaining	Indicates that the channels not supported on the mux/demux modules are passed thru to the next mux/demux module.
patched mux/demux interface	Shows the patch connection to another mux/demux module.

The following example shows how to display optical filter information on a shelf with add/drop mux/demux modules. (See Table 3-12 for field descriptions.)

```
Swtich# show optical filter detail
aggregate                         filtered              patched mux/demux
interface         channel(s)      interface             interface
----------------  -----------     ----------------      -----------------
Wdm0/3                0           Oscfilter0/3
Wdm0/3               25           Filter0/3/0
Wdm0/3               26           Filter0/3/1
Wdm0/3               27           Filter0/3/2
Wdm0/3               28           Filter0/3/3
Wdm0/3               29           Filter0/3/4
```

```
Wdm0/3                 30          Filter0/3/5
Wdm0/3                 31          Filter0/3/6
Wdm0/3                 32          Filter0/3/7
Wdm0/3              remaining      Thru0/3                 Thru1/3
Wdm1/3                 0           Oscfilter1/3
Wdm1/3                 25          Filter1/3/0
Wdm1/3                 26          Filter1/3/1
Wdm1/3                 27          Filter1/3/2
Wdm1/3                 28          Filter1/3/3
Wdm1/3                 29          Filter1/3/4
Wdm1/3                 30          Filter1/3/5
Wdm1/3                 31          Filter1/3/6
Wdm1/3                 32          Filter1/3/7
Wdm1/3              remaining      Thru1/3                 Thru0/3
```

Table 3-12   show optical filter detail Field Descriptions

Field	Description
aggregate interface	Shows the aggregate wdm interface.
channels	Shows the channels in the aggregate interface. In the output example, "remaining" indicates that whichever channels have not been dropped are passed to the thru interface.
filtered interface	Shows the filtered interface, which connects to the transponder through the backplane.
remaining	Indicates that the channels not supported on the mux/demux modules are passed thru to the next mux/demux module.
patched mux/demux interface	Shows the patch connection to another mux/demux module.

The following example shows how to display detailed optical filter information on shelf with terminal mux/demux modules. (See Table 3-13 for field descriptions.)

```
Switch# show optical filter detail
aggregate                          filtered            patched mux/demux
interface          channel(s)      interface           interface
-----------------  -----------     ----------------    -----------------
Wdm0/0                 0           Oscfilter0/0
Wdm0/0                 1           Filter0/0/0
Wdm0/0                 2           Filter0/0/1
Wdm0/0                 3           Filter0/0/2
Wdm0/0                 4           Filter0/0/3
Wdm0/0                 5           Filter0/0/4
Wdm0/0                 6           Filter0/0/5
Wdm0/0                 7           Filter0/0/6
Wdm0/0                 8           Filter0/0/7
Wdm0/0                 9           Filter0/0/8
Wdm0/0                 10          Filter0/0/9
Wdm0/0                 11          Filter0/0/10
Wdm0/0                 12          Filter0/0/11
Wdm0/0                 13          Filter0/0/12
Wdm0/0                 14          Filter0/0/13
Wdm0/0                 15          Filter0/0/14
Wdm0/0                 16          Filter0/0/15
Wdm0/0               band 0        Filterband0/0/0     Filtergroup0/2/0
Wdm0/0               band 1        Filterband0/0/1     Filtergroup0/2/1
Filtergroup0/2/0       17          Filter0/2/0
Filtergroup0/2/1       18          Filter0/2/1
```

```
Filtergroup0/2/0        19        Filter0/2/2
Filtergroup0/2/1        20        Filter0/2/3
Filtergroup0/2/1        21        Filter0/2/4
Filtergroup0/2/0        22        Filter0/2/5
Filtergroup0/2/1        23        Filter0/2/6
Filtergroup0/2/0        24        Filter0/2/7
Filtergroup0/2/0        25        Filter0/2/8
Filtergroup0/2/1        26        Filter0/2/9
Filtergroup0/2/0        27        Filter0/2/10
Filtergroup0/2/1        28        Filter0/2/11
Filtergroup0/2/1        29        Filter0/2/12
Filtergroup0/2/0        30        Filter0/2/13
Filtergroup0/2/1        31        Filter0/2/14
Filtergroup0/2/0        32        Filter0/2/15

band 0 :17 19 22 24 25 27 30 32
band 1 :18 20 21 23 26 28 29 31
```

Table 3-13   show optical filter detail Field Descriptions

Field	Description
aggregate interface	Shows the aggregate wdm interface.
channels	Shows the channels in the aggregate interface. In the output example, "remaining" indicates that whichever wavelengths have not been dropped are forwarded to the thru interface.
filtered interface	Shows the filtered interface, which connects to the transponder through the backplane.
patched mux/demux interface	Shows the patch connection to another mux/demux module.
band 0	Shows the channels carried in band 0.
band 1	Shows the channels carried in band 1.

Related Commands

Command	Description
patch	Configures patch connections for a shelf.
show connect	Displays optical connection information.
show patch	Displays optical patch connection configuration.

show optical interface brief

To display the optical characteristics of all the transponders in the system, use the **show optical interface brief** command.

show optical filter brief

Syntax Description   This command has no other arguments or keywords.

Defaults   None

Command Modes   EXEC and privileged EXEC

Command History   This table includes the following release-specific history entries:

- EV-Release
- SV-Release
- S-Release

EV-Release	Modification
12.1(12c)EV2	This command was introduced.

SV-Release	Modification
12.2(18)SV	This command was integrated in this release.

S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines   Use this command to quickly verify the status of the optical signals on the transponder module interfaces. For more detailed information about the interface, use the **show interfaces** command.

Examples   The following example shows how to display optical interface signal information. (See Table 3-11 for field descriptions.)

```
Switch# show optical interface brief

I Interface    Status/Prot  Laser  Signal Quality  Rx Power     Speed/Encap
-----------    -----------  -----  --------------  -----------  ---------------
Wave0          down/down    on     Loss of light   n/a          SNAP
Wave1          up/up        on     Good            n/a          SNAP
WdmS0/2/0*     down/down    n/a    Loss of light   < -32.00 dBm  n/a
WdmS0/2/1      down/down    n/a    Loss of light   < -32.00 dBm  n/a
Trans2/2/0     up/up        on     Good            n/a          GigbitEthernet
Wave2/2        up/up        on     Good            -16.78 dBm   n/a
Wavep2/2/0     admin/down   n/a    n/a             Unknown      n/a
Wavep2/2/1*    up/up        n/a    n/a             -16.76 dBm   n/a
```

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```
TenGE3/1        up/up       on    Good           n/a          10G Ethernet
Ether3/1/1      up/up       n/a   Good           n/a          SNAP
WaveE3/1        up/up       on    Good           -12.45 dBm   n/a
Ether3/1/0      up/up       n/a   Good           n/a          SNAP
Wavep3/1/0*     up/up       n/a   n/a            -12.45 dBm   n/a
Wavep3/1/1      up/up       n/a   n/a            Unknown      n/a
Trans4/0/0      down/down   on    Loss of light  n/a          916000 KHz
Wave4/0         down/down   on    Loss of light  < -33.00 dBm n/a
Wavep4/0/0*     down/down   n/a   n/a            < -33.00 dBm n/a
Trans9/0/0      admin/down  off   n/a            n/a          SONET  oc48
Wave9/0         admin/down  off   n/a            < -35.00 dBm n/a
Wavep9/0/0*     down/down   n/a   n/a            < -35.00 dBm n/a
Wavep9/0/1      down/down   n/a   n/a            Unknown      n/a
```

Table 3-14   *show optical interface brief Field Descriptions*

Field	Description
Interface	Shows the interface identifier.
Status/Prot	Shows the interface status and the protocol status.
Laser	Shows the laser status.
Signal Quality	Shows the current signal quality.
Rx Power	Shows the receiver power.
Speed/Encap	Shows the signal speed or protocol encapsulation for the interface.

Related Commands

Command	Description
show interfaces	Displays system interfaces.

show patch

To display the patch connections, use the **show patch** command.

> **show patch** [**detail**]

Syntax Description

| detail | Displays both the user and automatic local path connections. |

Defaults

Displays summary patch connection information.

Command Modes

EXEC and privileged EXEC

Command History

This table includes the following release-specific history entries:

- EY-Release
- E-Release
- EV-Release
- SV-Release
- S-Release

EY-Release	Modification
12.1(7a)EY2	This command was introduced.
E-Release	**Modification**
12.1(11b)E	This command was integrated in this release.
EV-Release	**Modification**
12.1(10)EV	This command was integrated in this release.
SV-Release	**Modification**
12.2(18)SV	This command was integrated in this release.
S-Release	**Modification**
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

Use this command to display the patch connections on the mux/demux modules configured with the **patch** command. The automatic patch connections are those provided with the fixed backplane.

The error field in the **show patch** command output helps troubleshoot shelf misconfigurations. When there is a channel mismatch between a transponder module and a mux/demux module, "Channel Mismatch" appears for the patch connection. When more than one mux/demux module drops the same channels, "Channel Mismatch" appears for all patch connections.

Examples   The following example shows how to display patch connection information. (See Table 3-15 for field descriptions.)

```
Switch# show patch
Patch Interface     Patch Interface     Type          Error
---------------     ---------------     ---------     -------

Wave0               Oscfilter0/0        USER
Wdm0/0              Thru0/1             USER
Wdm0/1              Thru0/2             USER
Wdm0/2              Thru0/3             USER
Thru0/0             Wdm0/3              USER
```

The following example shows how to display detailed patch connection information. (See Table 3-15 for field descriptions.)

```
Switch# show patch detail
Patch Interface     Patch Interface     Type          Error
---------------     ---------------     ---------     -------
Wavepatch10/0/0     Filter0/3/0         AUTOMATIC
Wavepatch10/1/0     Filter0/3/1         AUTOMATIC
Wavepatch10/2/0     Filter0/3/2         AUTOMATIC
Wavepatch10/3/0     Filter0/3/3         AUTOMATIC
Wave0               Oscfilter0/0        USER
Wdm0/0              Thru0/1             USER
Wdm0/1              Thru0/2             USER
Wdm0/2              Thru0/3             USER
Thru0/0             Wdm0/3              USER
```

Table 3-15   show patch detail Field Descriptions

Field	Description
Patch Interface	Shows an interface identifier for the patch connection.
Type	Shows how the patch was configured, either by the system or by the user.
Error	Shows patch errors, such as channel mismatches.

Related Commands

Command	Description
debug ports	Enables debugging of optical port activity.
patch	Configures patch connections within a shelf.

show performance

To display the performance history counters, use the **show performance** command.

show performance {**current** | **history** | **24-hour**} [*interface*] [*interval number*]

<table>
<tr><td>**Syntax Description**</td><td>**current**</td><td>Displays the current counter.</td></tr>
<tr><td></td><td>**history**</td><td>Displays the 15-minute history counter.</td></tr>
<tr><td></td><td>**24-hour**</td><td>Displays the 24-hour counter.</td></tr>
<tr><td></td><td>*interface*</td><td>Displays the performance history counter for the specified interface.</td></tr>
<tr><td></td><td>*interval number*</td><td>Displays the performance history counter with the specified interval number (1 to 96).</td></tr>
</table>

Defaults   Displays all performance history counters (the current counter, all 15-minute history counters, and the 24-hour counter) for all Cisco ONS 15540 ESP interfaces.

Command Modes   EXEC and privileged EXEC

Command History   This table includes the following release-specific history entry:

SV-Release	Modification
12.2(29)SV	This command was introduced.

Usage Guidelines   Use this command to view the performance history counters for the Cisco ONS 15540 ESP interfaces.

Examples   The following example shows how to display the current counter for a transparent interface. (See Table 3-16 for field descriptions.)

```
Switch# show performance current transparent 2/2/0
Current 15 minute performance register
--------------------------------------
Interface       : Transparent2/2/0
Interval Number : 81

Elapsed Time(seconds) : 526
Valid Time(seconds)   : 526

Code violation and running disparity error count : 0
```

Table 3-16   show performance current Field Descriptions

Field	Description
Interface	Shows the interface for which the current counter is displayed.
Interval Number	Shows the current counter's interval number.
Elapsed Time	Shows the elapsed time since the current counter was started.
Valid Time	Shows the time period during which the interface was administratively up. A current counter with zero valid time will not contain any valid data.
Code violation and running disparity error count	Shows the total number of code violation and running disparity (CVRD) errors in the frames that were received from the client device during the elapsed time of the current performance counter.

The following example shows how to display the 15-minute history counter for a tengigethernetphy interface with CDL disabled. (See Table 3-17 for field descriptions.)

```
Switch# show performance history tengigEthernetPhy 10/0 20
15 minute performance history register
------------------------------------
Interface       : TenGigEthernetPhy10/0
Interval Number : 20

Total Time(seconds)   : 900
Valid Time(seconds)   : 900

Code violation and running disparity error count : 0
TenGige Non CDL Pkt count  : 0
```

Table 3-17   show performance history Field Descriptions

Field	Description
Interface	Shows the interface for which the 15-minute history counter is displayed.
Interval Number	Shows the 15-minute history counter's interval number.
Total Time	Shows the duration of the 15-minute history counter in seconds.
Valid Time	Shows the time period during which the 15-minute history counter was in the no shutdown state. A 15-minute history counter with zero valid time will not contain any valid data.
Code violation and running disparity error count	Shows the total number of CVRD errors in the GE frames that were received from the client interface during the 15 minute period.
TenGige Non CDL Pkt count	Shows the total number of non CDL type packets that were received from the client side during the 15 minute period.

The following example shows how to display the 24-hour counter for a tengigethernetphy interface with CDL enabled. (See Table 3-18 for field descriptions.)

```
Switch# show performance 24-hour tenGigEthernetPhy 10/1
24 hour performance register
---------------------------
Interface        : TenGigEthernetPhy10/1

Total Time(seconds)   : 86400
Valid Time(seconds)   : 86400

Code violation and running disparity error count : 0
TenGige Non CDL Pkt count  : 0
CDL HEC error count        : 0
TenGige CDL idle Pkt count : 0
```

Table 3-18   show performance 24-hour Field Descriptions

Field	Description
Interface	Shows the interface for which the 24-hour counter is displayed.
Total Time	Shows the duration of the 24-hour counter in seconds.
Valid Time	Shows the time period during which the 24-hour counter was in the no shutdown state. A 24-hour counter with zero valid time will not contain any valid data.
Code violation and running disparity error count	Shows the total number of CVRD errors in the GE frames that were received from the fabric during the 24 hour period.
TenGige Non CDL Pkt count	Shows the total number of non CDL type packets that were received from the client side during the 24 hour period.
CDL HEC error count	Shows the total number of GE frames that were received with CDL HEC errors during the 24 hour period.
TenGige CDL idle Pkt count	Shows the total number of CDL idle packets that were received from the client during the 24 hour period.

Related Commands

Command	Description
show interfaces	Displays interface information.
auto-sync counters interface	Enables the automatic synchronization of the performance history counters.
clear performance history	Clears the performance history counters.

shutdown

To disable an interface, use the **shutdown** command. To restart a disabled interface, use the **no** form of this command.

shutdown

no shutdown

Syntax Description   This command has no other arguments or keywords.

Defaults   Disabled

Command Modes   Interface configuration

Usage Guidelines   This command disables all functions on the specified interface.

This command also marks the interface as unavailable. To check whether an interface is disabled, use the **show interfaces** command. An interface that has been shut down is shown as administratively down in the **show interfaces** output.

On transparent and wave interfaces, use the **shutdown** command to turn off the transmit lasers. To turn the transmit lasers on, use the **no shutdown** command.

A **shutdown** command issued on a wave interface does not affect administrative status of the corresponding wavepatch interfaces. To administratively shut down the wavepatch interfaces, issue **shutdown** commands directly.

To use splitter protected line card motherboards for line card protection, you must shut down all the wavepatch interfaces connected to one of the mux/demux motherboards. (See the "Examples" section.)

Examples   The following example shows how to shut down a wave interface, which also turns off the laser that transmits to the trunk fiber.

```
Switch# configure terminal
Switch(config)# interface wave0/3
Switch(config-if)# shutdown
```

The following example shows how to reenable a transparent interface and turn on the laser transmitting to the client equipment.

```
Switch# configure terminal
Switch(config)# interface transparent 8/0/0
Switch(config-if)# no shutdown
```

The following example shows how to disable the east (slot 1) side of the wavepatch interface pair on a splitter protected line card motherboard.

```
Switch# configure terminal
Switch(config)# interface wavepatch 3/0/1
Switch(config-if)# shutdown
```

Related Commands	Command	Description
	loopback	Turns lasers on and off.
	show interfaces	Displays system interfaces.

shutdown