



Cisco ONS 15530 Command Reference Guide

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Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

Text Part Number: OL-8366-01



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Preface

This section explains the objectives, intended audience, and organization of this publication and describes the conventions that convey instructions and other information.

This section provides the following information:

- Document Objectives
- Audience
- Document Organization
- Related Documentation
- About the CLI
- About Cisco IOS Command Modes
- Document Conventions
- Where to Find Safety and Warning Information
- Obtaining Documentation
- Documentation Feedback
- Cisco Product Security Overview
- Obtaining Technical Assistance
- Obtaining Additional Publications and Information

Document Objectives

This guide explains the commands to configure and manage the Cisco ONS 15530 system. Use this guide in conjunction with the appropriate publications listed in the Related Documentation section.

Audience

To use this publication, you should be familiar with Cisco or equivalent optical transmission hardware and cabling, telecommunications hardware and cabling, electronic circuitry and wiring practices, and preferably have experience as a telecommunications technician.

Document Organization

This Cisco ONS 15530 Command Reference Guide is organized into the following chapters:

- Chapter 1, “APS Commands,” lists the commands to configure and monitor APS operations.
- Chapter 2, “Debug Commands,” lists the commands to debug the Cisco ONS 15530.
- Chapter 3, “Interface Configuration Commands,” lists the commands to configure and monitor the interfaces on the Cisco ONS 15530.
- Chapter 4, “Online Diagnostics Commands,” lists the commands to configure and monitor online diagnostic operations.
- Chapter 6, “Power-On Diagnostics Commands,” lists the commands to test the accessibility and basic functionality of the components and isolate the faults to the component level on the Cisco ONS 15530.
- Chapter 5, “OSCP Commands,” lists the commands to configure and monitor OSCP operations.
- Chapter 7, “Redundancy Commands,” lists the commands to configure and monitor processor card redundancy operations.
- Chapter 8, “SNMP Commands,” lists the Cisco ONS 15530-specific SNMP commands.
- Chapter 9, “System Management Commands,” lists the commands to manage your Cisco ONS 15530.
- Chapter 10, “Threshold Commands,” lists the commands to configure and monitor interface alarm threshold operations.
- Chapter 11, “Topology Neighbor Commands,” lists commands to configure and monitor network topology neighbors.

Related Documentation

Use this Cisco ONS 15530 Command Reference Guide in conjunction with the following referenced publications:

- *Regulatory Compliance and Safety Information for the Cisco ONS 15500 Series*
Provides the regulatory compliance and safety information for the Cisco ONS 15500 Series.
- *Cisco ONS 15530 Planning Guide*
Provides detailed information on the Cisco ONS 15530 architecture and functionality.
- *Cisco ONS 15530 Hardware Installation Guide*
Provides detailed information about installing the Cisco ONS 15530.
- *Cisco ONS 15530 Optical Transport Turn-Up and Test Guide*
Provides acceptance testing procedures for Cisco ONS 15530 nodes and networks.
- *Cisco ONS 15530 Cleaning Procedures for Fiber Optic Connections*
Provides processes and procedures for cleaning the fiber optic connectors and component interfaces of the Cisco ONS 15530.
- *Cisco ONS 15530 Configuration Guide*
Describes how to configure the Cisco ONS 15530.
- *Cisco ONS 15530 System Alarms and Error Messages*

- Describes the system alarms and error messages for the Cisco ONS 15530.
- *Cisco ONS 15530 Troubleshooting Guide*
Describes how to identify and resolve problems with the Cisco ONS 15530.
- *Network Management for the Cisco ONS 15530*
Provides information on the network management systems that support the Cisco ONS 15530.
- *Cisco ONS 15530 TL1 Commands*
Provides a full TL1 command and autonomous message set including parameters, AIDs, conditions and modifiers for the Cisco ONS 15530.
- *MIB Quick Reference for the Cisco ONS 15500 Series*
Describes the Management Information Base (MIB) objects and explains how to access Cisco public MIBs for the Cisco ONS 15500 Series.
- *Cisco ONS 15530 Software Upgrade Guide*
Describes how to upgrade system images and functional images on the Cisco ONS 15530.
- *Introduction to DWDM Technology*
Provides background information on the dense wavelength division multiplexing (DWDM) technology.
- *Cisco IOS Configuration Fundamentals Configuration Guide*
Provides useful information on the CLI (command-line interface) and basic shelf management.

About the CLI

You can configure the Cisco ONS 15530 from the CLI (command-line interface) that runs on the system console or terminal, or by using remote access.

To use the CLI, your terminal must be connected to the Cisco ONS 15530 through the console port or one of the TTY lines. By default, the terminal is configured to a basic configuration, which should work for most terminal sessions.

About Cisco IOS Command Modes

The Cisco IOS user interface is divided into many different modes. The commands available to you depend on which mode you are currently in. To get a list of the commands available in a given mode, type a question mark (?) at the system prompt.

When you start a session on the system, you begin in user mode, also called EXEC mode. Only a limited subset of the commands are available in EXEC mode. To have access to all commands, you must enter privileged EXEC mode. Normally, you must type in a password to access privileged EXEC mode. From privileged mode, you can type in any EXEC command or access global configuration mode. Most of the EXEC commands are one-time commands, such as **show** commands, which show the current configuration status, and **clear** commands, which clear counters or interfaces. The EXEC commands are not saved across system reboots or across processor switchovers.

You can monitor and control the standby processor with commands entered on the active processor. A subset of EXEC and privileged EXEC commands are available through the standby processor console.

**Note**

You can easily determine if you are accessing the active or the standby processor: The standby processor has “sby-” prefixed to the command prompt.

The configuration modes allow you to make changes to the running configuration. If you later save the configuration, these commands are stored across system reboots. You must start at global configuration mode. From global configuration mode, you can enter interface configuration mode, subinterface configuration mode, and a variety submodes.

ROM (Read-only memory) monitor mode is a separate mode used when the system cannot boot properly. For example, your system or access server might enter ROM monitor mode if it does not find a valid system image when it is booting, or if its configuration file is corrupted at startup.

Table 1 lists and describes the most commonly used modes, how to enter the modes, and the resulting system prompts. The system prompt helps you identify which mode you are in and, therefore, which commands are available to you.

Table 1 Frequently Used IOS Command Modes

Mode	Description of Use	How to Access	Prompt
User EXEC	To connect to remote devices, change terminal settings on a temporary basis, perform basic tests, and display system information.	Log in.	Switch>
Privileged EXEC (Enable)	To set operating parameters. The privileged command set includes the commands in user EXEC mode, as well as the configure command. Use this command to access the other command modes.	From the user EXEC mode, enter the enable command and the enable password.	Switch#
Global configuration	To configure features that affect the system as a whole.	From the privileged EXEC mode, enter the configure terminal command.	Switch(config)#
Interface configuration	To enable features for a particular interface. Interface commands enable or modify the operation of a port.	From global configuration mode, enter the interface type location command. For example, enter interface fastethernet 0	Switch(config-if)#
Line configuration	To configure the console port or VTY line from the directly connected console or the virtual terminal used with Telnet.	From global configuration mode, enter the line console 0 command to configure the console port, or the line vty line-number command to configure a VTY line.	Switch(config-line)#
Redundancy configuration	To configure system redundancy.	From global configuration mode, enter the redundancy command.	Switch(config-red)#

Table 1 Frequently Used IOS Command Modes (continued)

Mode	Description of Use	How to Access	Prompt
APS ¹ configuration	To configure APS redundancy features.	From redundancy configuration mode, enter the associate group command.	Switch(config-aps)#
Threshold list configuration	To configure alarm threshold list attributes and thresholds.	From the global configuration mode, enter the threshold-list command.	Switch(config-t-list)#
Threshold configuration	To configure alarm threshold attributes.	From threshold list configuration mode, enter the threshold command.	Switch(config-threshold)#

1. Automatic Protection Switching

The Cisco IOS command interpreter, called the EXEC, interprets and executes the commands you enter. You can abbreviate commands and keywords by entering just enough characters to make the command unique from other commands. For example, you can abbreviate the **show** command to **sh** and the **configure terminal** command to **conf t**.

When you type **exit**, the CLI backs out one command mode level. In general, typing **exit** returns you to global configuration mode. To exit configuration mode completely and return to privileged EXEC mode, press **Ctrl-Z** or **end**.

Listing Cisco IOS Commands and Syntax

In any command mode, you can get a list of available commands by entering a question mark (?).

```
Switch> ?
```

To obtain a list of commands that begin with a particular character sequence, type in those characters followed immediately by the question mark (?). Do not include a space. This form of help is called word help, because it lists the words for you.

```
Switch# c?
calendar cd clear clock configure
connect copy
```

To list keywords or arguments, enter a question mark in place of a keyword or argument. Include a space before the question mark. This form of help is called command syntax help, because it reminds you which keywords or arguments are applicable based on the command, keywords, and arguments you have already entered.

```
Switch# configure ?
memory          Configure from NV memory
network         Configure from a TFTP network host
overwrite-network Overwrite NV memory from TFTP network host
terminal        Configure from the terminal
<cr>
```

To redisplay a command you previously entered, press the Up-arrow key. You can continue to press the Up-arrow key to see more previously issued commands.

**Tip**

If you are having trouble entering a command, check the system prompt and enter the question mark (?) for a list of available commands. You might be in the wrong command mode or using incorrect syntax.

You can press **Ctrl-Z** or **end** in any mode to immediately return to privileged EXEC (enable) mode, instead of entering **exit**, which returns you to the previous mode.

Document Conventions

This publication uses the following conventions:

Convention	Application
boldface	Commands and keywords in body text.
<i>italic</i>	Command input that is supplied by the user.
[]	Keywords or arguments that appear within square brackets are optional.
{ x x x }	A choice of keywords (represented by x) appears in braces separated by vertical bars. The user must select one.
Ctrl	The control key. For example, where Ctrl + D is written, hold down the Control key while pressing the D key.
screen font	Examples of information displayed on the screen.
boldface screen font	Examples of information that the user must enter.
< >	Command parameters that must be replaced by module-specific codes.

**Note**

Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.

**Caution**

Means *reader be careful*. In this situation, the user might do something that could result in equipment damage or loss of data.

**Warning****IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Where to Find Safety and Warning Information

For safety and warning information, refer to the *Cisco Optical Transport Products Safety and Compliance Information* document that accompanied the product. This publication describes the international agency compliance and safety information for the Cisco ONS 15xxx systems. It also includes translations of the safety warnings that appear in the ONS 15xxx system documentation.

Obtaining Documentation

Cisco documentation and additional literature are available on Cisco.com. Cisco also provides several ways to obtain technical assistance and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

Cisco.com

You can access the most current Cisco documentation at this URL:

<http://www.cisco.com/techsupport>

You can access the Cisco website at this URL:

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You can access international Cisco websites at this URL:

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APS Commands

APS (Automatic Protection Switching) provides protection against signal failure. Use the following commands to configure and monitor APS operations.

aps clear

To clear an APS switchover request or an APS lockout request, use the **aps clear** command.

```
aps clear group-name
```

Syntax Description	group-name	Specifies the name of the associated pair of interfaces.
---------------------------	------------	--

Defaults	None
-----------------	------

Command Modes	Privileged EXEC
----------------------	-----------------

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

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

EV-Release	Modification
12.1(10)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	The Cisco ONS 15530 supports APS signal switchover requests from the CLI (command-line interface). These requests have priorities based on the condition of the protection signal and the existence of another switchover or lockout request. Three types of requests exist:
-------------------------	--

- Lockout requests—Have the highest priority and take effect regardless of the condition of the protection signal. A lockout prevents the signal from switching over from the working interface to the protection interface.
- Forced switchover requests—Have the next highest priority and are only prevented when an existing lockout on the protection interface or the protection signal has failed.
- Manual switchover requests—Have the lowest priority and only occur if there is no protection path lockout, a forced switchover, or the signal has failed or degraded.

Examples	The following example shows how to clear an APS request on an associated interface pair named blue.
-----------------	---

```
Switch# aps clear blue
```

The following example shows how to clear an APS request for an associated interface pair with the default group name.

```
Switch# aps clear Wavepatch2/0/0
```

Related Commands

Command	Description
aps lockout	Prevents switchovers to the protection path.
aps switch	Requests an APS switchover.
show aps	Displays APS configuration information and status.

aps direction

To specify unidirectional or bidirectional path switching, use the **aps direction** command. To revert to the default behavior, use the **no** form of this command.

aps direction { **unidirectional** | **bidirectional** }

no aps direction

Syntax Description	unidirectional	Specifies unidirectional path switching.
	bidirectional	Specifies bidirectional path switching.

Defaults Unidirectional

Command Modes APS configuration

Usage Guidelines In unidirectional path switching, only the node that detects a signal failure switches over to the standby signal. The other node continues to receive its signal on the original path. In bidirectional path switching, when a node detects a signal failure it sends a message to the other node about the failure causing that node switches over. Both nodes then use the same path through the network.

Use the **aps direction** command only with splitter and y-cable line card protection configurations. Client line card protection handles switchovers in the client equipment, not in the Cisco ONS 15530.

When using bidirectional path switching, always configure the nodes so that they communicate over the same working path and the same protection path. Also, configure both nodes that support the channel with the same APS features, such as y-cable support, revertive behavior, and path switching.

Before changing the type of path switching, disable the standby interface with the **shutdown** command. After changing the type of path switching, reenable the standby interface with the **no shutdown** command.



Note Bidirectional path switching only operates on networks that support the OSC (Optical Supervisory Channel).



Note Configure bidirectional path switching on interfaces configured with Sysplex ETR or Sysplex CLO protocol encapsulation.

Examples

The following example shows how to configure bidirectional path switching in a y-cable protection configuration.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group alpha
Switch(config-red-aps)# working transparent 2/0/0
```

```
Switch(config-red-aps)# protection transparent 4/0/0
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps direction bidirectional
Switch(config-red-aps)# aps enable
```

The following example shows how to configure bidirectional path switching in a splitter protection configuration.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group chicago
Switch(config-red-aps)# working wavepatch 10/0/0
Switch(config-red-aps)# protection wavepatch 10/0/1
Switch(config-red-aps)# aps direction bidirectional
Switch(config-red-aps)# aps enable
```

The following example shows how to change the path switching operation for a y-cable APS group from unidirectional to bidirectional.

```
Switch# show aps group alpha
```

```
APS Group alpha :
```

```
architecture.: 1+1, remote prov: 1+1
span.....: end-to-end (client side y-cable)
direction...: prov: uni, current: uni, remote prov: uni
revertive...: no
created.....: 14 hours, 53 minutes
aps state...: associated (enabled)
request timer: holddown: 5000 ms, max: 15000 ms, count 2
switched chan: 0
channel ( 0): Transparent4/0/0 (STANDBY - UP), Wave4/0 (UP)
               : channel request: no-request
               : transmit request: no-request
               : receive request: no-request
channel ( 1): Transparent2/0/0 (ACTIVE - UP), Wave2/0 (UP)
               : channel request: no-request
               : switchover count: 0
               : last switchover: never
```

```
Switch# configure terminal
Switch(config)# interface transparent 4/0/0
Switch(config-if)# shutdown
Switch(config-if)# exit
Switch(config)# redundancy
Switch(config-red)# associate group Denver
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps direction bidirectional
Switch(config-red-aps)# aps enable
Switch(config-red-aps)# exit
Switch(config-red)# exit
Switch(config)# interface transparent 4/0/0
Switch(config-if)# no shutdown
Switch(config-if)# end
Switch#
```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.

Command	Description
aps revertive	Configures revertive APS for y-cable line card protection.
aps timer message holddown	Modifies the APS Channel Protocol message holddown timer interval and message count value.
aps timer message max-interval	Modifies the APS Channel Protocol maximum inactivity interval timer value.
aps timer search-for-up	Modifies the minimum and maximum timer intervals on an APS timer. The system must wait for a splitter protection connection to come up when both connections are down.
aps timer switchover-enable min-interval	Modifies the minimum timer interval before reenabling APS switchover.
aps timer wait-to-restore	Modifies the number of seconds an APS timer must wait before switching back to the preferred working signal.
aps working	Configures the working interface of an associated interface pair.
aps y-cable	Enables y-cable protection.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration information and status.

aps disable

To disable APS activity between an associated interface pair, use the **aps disable** command. To reenables APS activity, use the **aps enable** command.

aps disable

Syntax Description

This command has no other arguments or keywords.

Defaults

None

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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

Before changing the APS configuration of an associated interface pair, use this command to disable APS activity between the interfaces. When an interface pair is initially associated, APS activity is disabled.

Examples

The following example shows how to disable APS activity between associated transparent interfaces.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group newyork
Switch(config-red-aps)# aps disable
```

Related Commands

Command	Description
aps enable	Enables APS activity between associated interfaces.
associate group	Creates an APS group and enters APS configuration mode.

aps enable

To enable APS activity between an associated interface pair, use the **aps enable** command. To disable APS activity, use the **aps disable** command.

aps enable

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes APS configuration

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

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

EV-Release	Modification
12.1(10)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 After changing the APS configuration of an associated interface pair, use this command to enable APS activity between the interfaces.

Examples The following example shows how to enable APS activity between associated transparent interfaces.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group london
Switch(config-red-aps)# aps working transparent 2/0/0
Switch(config-red-aps)# aps protection transparent 4/0/0
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
associate group	Creates an APS group and enters APS configuration mode.

aps lockout

To lock out an APS switchover to the protection path, thus preventing any further APS switchovers for any reason, including manual or forced switchovers and signal failures, use the **aps lockout** command. To remove an APS lockout request, use the **aps clear** command.

aps lockout *group-name*

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 configure APS signal switchover lockout on the protection path. This is useful when you want to prevent a switchover during shelf maintenance, or when the protection signal has degraded or failed.

A lockout only succeeds when the protection path interface is also acting as the standby interface. If the protection path interface is the active interface, use the **aps switch** command to switch the active interface role back to the working interface.



Note

The APS lockout does not persist across system reloads or CPU switch module switchovers.

Examples The following example shows how to lock out switchover to the protection path on an associated group named group1.

```
Switch# aps lockout group1
```

Related Commands

Command	Description
aps clear	Clears the APS switchover or lockout.
aps switch	Requests an APS switchover.
aps working	Configures the working interface of an associated interface pair.
show aps	Displays APS configuration information and status.

aps message-channel

To configure message channel for the Cisco ONS 15530 to send APS channel protocol messages, use the **aps message-channel** command. To revert to the default behavior, use the **no** form of this command.

```
aps message-channel { auto-select [far-end group-name name] |
  inband dcc [far-end group-name name] | ip far-end group-name name ip-address ip-address
  | osc [far-end group-name name] }
```

```
no aps message-channel
```

Syntax Description		
auto-select		APS automatically selects a transport mechanism to send APS messages.
far-end group-name <i>name</i>		Specifies the APS group name for the channel at the remote node.
inband dcc		Specifies APS to use the in-band message channel ethernetdcc interface or sdcc interface for sending APS messages.
ip		Specifies APS messages are sent over IP. APS addresses the messages to a specified group name on the remote node identified by this ip address. Use this option for APS groups that terminate on a shelf in a multiple shelf node that does not support the OSC or in-band message channel.
ip-address <i>ip-address</i>		Specifies the IP address of the remote node used to send the APS channel protocol messages.
osc		APS messages are sent on the OSC.

Defaults auto-select with no APS group name

Command Modes APS configuration

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

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

EV-Release	Modification
12.1(10)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

The APS channel protocol communicates between nodes over the OSC or over the in-band message channel ethernetdcc interface.

The **auto-select** option automatically selects the transport channel to send the APS protocol messages attempting to use the in-band message channel first and then the OSC if the in-band message channel is not available. If neither the in-band message channel nor the OSC is available for the APS group, you must configure the message channel using the **ip** option.

**Note**

We recommend that you configure the name for the APS group on the remote node. The APS channel protocol lookup process functions more efficiently when the group name is provided. For trunk fiber based protection, the far-end group name is required

Examples

The following example shows how to create an APS group and configure the message channel:

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group aps_group1
Switch(config-red-aps)# aps message-channel osc far-end group-name aps_group1
```

Related Commands

Command	Description
aps lockout	Prevents switchover to the protection path.
aps working	Configures the working interface for an APS interface pair.
aps y-cable	Enables y-cable protection.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration and operation information.

aps protection

To configure the protection path interface of an APS group, use the **aps protection** command. To remove the protection path interface, use the **no** form of this command.

```
aps protection { transparent slot/subcard/port | wavepatch slot/subcard/port |
waveethernetphy slot/subcard | tengigethernetphy slot/subcard | wdmsplit slot/subcard/port
| gigabitphy slot/subcard/port | twogigabitphy slot/subcard/port }
```

```
no aps protection { transparent slot/subcard/port | wavepatch slot/subcard/port |
waveethernetphy slot/subcard | tengigethernetphy slot/subcard | wdmsplit slot/subcard/port
| gigabitphy slot/subcard/port | twogigabitphy slot/subcard/port }
```

Syntax Description		
transparent <i>slot/subcard/port</i>		Specifies the transparent interface to use as the protection path in y-cable line card protection.
wavepatch <i>slot/subcard/port</i>		Specifies the wavepatch interface to use as the protection path in splitter protection.
waveethernetphy <i>slot/subcard</i>		Specifies the waveethernetphy interface to use as the protection path in switch fabric based protection.
tengigethernetphy <i>slot/subcard</i>		Specifies the tengigethernetphy interface to use as the protection path in switch fabric based protection.
wdmsplit <i>slot/subcard/port</i>		Specifies the wdmsplit interface to use as the protection path in trunk fiber based protection.
<i>gigabitphy slot/subcard/port</i>		Specifies the gigabitphy interface to use as the protection path in line card based protection.
<i>twogigabitphy slot/subcard/port</i>		Specifies the twogigabitphy interface to use as the protection path in line card based protection.

Defaults None

Command Modes APS configuration

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

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV3	Added support for wdmsplit and gigabitphy interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.

12.2(23)SV	Added support for twogigabitphy interfaces.
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

Each interface in an associated pair has a configured role to perform: one is the *working* interface and the other is the *protection* interface. However, at any given instant, the interfaces also have a current mode of operation: *active* and *standby*. The interface that is in active mode and receives the signal may or may not be the working interface. The working interface is the *preferred* interface to receive the active signal. The protection interface is the *preferred* interface for the standby signal.

When a pair of interfaces is associated for APS protection using the **associate interface** command, the interface with the higher interface number is the protection interface by default. To override this default configuration, use the **aps protection** command.

Examples

The following example shows how to create an APS group and configure an APS protection interface:

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group denver
Switch(config-red-aps)# aps working transparent 2/0/0
Switch(config-red-aps)# aps protection transparent 4/0/0
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps lockout	Prevents switchover to the protection path.
aps working	Configures the working interface for an APS interface pair.
aps y-cable	Enables y-cable protection.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration and operation information.

aps revertive

To configure revertive APS, use the **aps revertive** command. To disable revertive APS, use the **no** form of this command.

aps revertive

no aps revertive

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes APS configuration

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

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

EV-Release	Modification
12.1(10)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 When revertive APS is configured and a switchover to the protection signal has occurred, the system automatically switches back to the preferred working signal when it becomes operational. Use the **aps timer wait-to-restore** command to control how quickly the signal reverts back to the working path.

Examples The following example shows how to configure revertive APS on an associated transparent interface pair.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group dallas
Switch(config-red-aps)# aps working transparent 2/0/0
Switch(config-red-aps)# aps protection transparent 4/0/0
Switch(config-red-aps)# aps revertive
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps timer switchover-enable min-interval	Modifies the minimum timer interval before reenabling APS switchover.
aps timer wait-to-restore	Modifies the wait-to-restore timer interval.
associate group	Creates an APS group and enters APS configuration mode.
show aps	Displays APS configuration and operation information.

aps switch

To request an APS switchover from the working path to the protection path, or from the protection path to the working path, use the **aps switch** command. To clear an APS switchover request, use the **aps clear** command.

```
aps switch group-name {force | manual} {protection-to-working | working-to-protection}
```

Syntax Description		
group-name		Specifies the name of the associated pair of interfaces.
force		Causes a switchover if no lockout is in effect.
manual		Causes a switchover if the signal is good and no lockout is in effect.
protection-to-working		Causes a manual signal switchover from the protection path to the working path if the protection path signal has not failed.
working-to-protection		Causes a manual signal switchover from the working path to the protection path whether the working path signal is active or not.

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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

The Cisco ONS 15530 supports APS switchover requests from the CLI (command-line interface). These requests have priorities based on the condition of the protection signal and the existence of other switchover requests. Three types of requests exist:

- Lockout requests—Have the highest priority and take effect regardless of the condition of the protection signal. A lockout prevents the signal from switching over from the working interface to the protection interface.
- Forced switchover requests—Have the next highest priority and are only prevented when an existing lockout on the protection interface or the protection signal has failed.

- Manual switchover requests—Have the lowest priority and only occur if there is no protection interface lockout, a forced switchover, or the signal has failed or degraded.

In summary, the priority order is:

1. Lockout
2. Signal failure on the protection path
3. Forced signal switchover
4. Signal failure on the working path
5. Signal degrade on the working or protection path
6. Manual signal switchover

If a request or condition of a higher priority is in effect, a lower priority request is rejected.



Note

The associated group names are case sensitive and must be entered exactly as they are shown in the **show aps** command output.

Examples

The following example shows how to make a manual switchover request from the working path to the protection path for an associated interface pair named blue.

```
Switch# aps switch blue manual working-to-protection
```

The following example shows how to make a force switchover request from the working to the protection path for an associated interface pair with the default group name.

```
Switch# aps switch Wavepatch2/0/0 force protection-to-working
```

Related Commands

Command	Description
aps clear	Clears APS switchover or lockout.
aps lockout	Prevents switchover to the protection interface.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration and operation information.

aps timer message holddown

To modify the APS Channel Protocol holddown timer, use the **aps timer message holddown** command. To revert to the default values, use the **no** form of this command.

aps timer message holddown *milliseconds* [*count number*]

no aps timer message holddown

Syntax Description

<i>milliseconds</i>	Specifies the number of seconds to wait before sending an APS Channel Protocol message. The range is 100 to 10,000 milliseconds. The default timer interval is 5000 milliseconds (5 seconds).
count number	Specifies the number of messages to send to the destination node before starting the hold-down timer. The range is 2 to 10. The default message count is 2.

Defaults

See the “Syntax Description” section.

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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

The holddown timer prevents APS Channel Protocol message flooding over the OSC. The holddown message count allows a specified number of messages to exchange between the nodes before the holddown timer starts. For example, if the holddown message count is set to 2, the node sends and receives two messages before the timer starts. This allows the protocol to operate efficiently without affecting system performance.



Note

The default values for the holddown timer and message count are sufficient for most network configurations.

Examples

The following example shows how to modify the holddown timer and count values.

```
Switch(config)# redundancy
Switch(config-red)# associate group denver
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer message holddown 4000 count 4
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps timer message max-interval	Modifies the APS Channel Protocol maximum interval timer value.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration and operation information.

aps timer message max-interval

To modify the maximum interval for the APS Channel Protocol inactivity timer, use the **aps timer message max-interval** command. To revert to the default value, use the **no** form of this command.

aps timer message max-interval *seconds*

no aps timer message max-interval

Syntax Description	seconds	Specifies the maximum number of seconds to wait before sending an APS Channel Protocol inactivity message. The range is 1 to 120 seconds.
---------------------------	---------	---

Defaults	15 seconds
-----------------	------------

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

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

EV-Release	Modification
12.1(10)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 To ensure that the APS Channel Protocol is still functioning between the nodes, periodic messages are sent during periods of inactivity. The maximum interval of the inactivity timer determines how often to send the inactivity messages.



Note

The default value for the inactivity timer maximum interval is sufficient for most network configurations.

Examples The following example shows how to modify the maximum interval for the inactivity timer.

```
Switch(config)# redundancy
Switch(config-red)# associate group dallas
Switch(config-red-aps)# aps disable
```



```
Switch(config-red-aps)# aps timer message max-interval 30  
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps timer message holddown	Modifies the APS Channel Protocol holddown timer and message count values.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration and operation information.

aps timer search-for-up

To modify the minimum and maximum timer intervals on an APS timer for the length of time the system waits for a splitter protection connection to come up when both connections are down, use the **aps timer search-for-up** command. To revert to the default values, use the **no** form of this command.

```
aps timer search-for-up min-interval max-interval
```

```
no aps timer search-for-up
```

Syntax Description

min-interval	Specifies the minimum time interval to wait for a splitter protection connection to come up before checking the other signal. The range is 1 to 120 seconds.
max-interval	Specifies the maximum timer interval to wait for a splitter protection connection to come up before checking the other signal. The range is 1 to 120 seconds.

Defaults

Minimum interval: 2 seconds
Maximum interval: 32 seconds

Command Modes

APS configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 modify the minimum and maximum timer intervals on an APS timer that causes the system to wait for a splitter protection connection to come up before checking the other splitter protection connection.

When both members of a splitter pair are down, the system first checks one signal for the minimum time interval. If the splitter protection connection does not come up, the system checks the other connection and doubles the time interval. This process repeats until the maximum timer interval is reached or exceeded. Checking continues at the maximum timer interval until one of the splitter protection connections becomes active.

**Note**

The default values for the search-for-up timer are sufficient for most network configurations.

Examples

The following example shows how to modify the minimum and maximum timer intervals for how often the system switches to check the other splitter protection connection.

```
Switch(config)# redundancy
Switch(config-red)# associate group newyork
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer search-for-up 4 16
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps timer switchover-enable min-interval	Modifies the minimum timer interval before reenabling APS switchover.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration and operation information.

aps timer switchover-enable min-interval

To modify the minimum time interval between successive APS switchovers, use the **aps timer switchover min-interval** command. To revert to the default value, use the **no** form of this command.

aps timer switchover-enable min-interval *seconds*

no aps timer switchover-enable min-interval

Syntax Description	seconds	Specifies the minimum number of seconds between successive switchovers. The range is 1 to 120 seconds.
---------------------------	---------	--

Defaults	3 seconds
-----------------	-----------

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

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV2	Default value changed from 2 seconds to 3 seconds.
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 Hardware-assisted automatic switchovers when the active signal fails are controlled by the software. An automatic switchover occurs when the system detects a signal failure or signal degradation. Automatic switchovers are disabled until the switchover timer expires. The switchover timer starts upon completion of the automatic switchover. When the timer expires, the system will allow automatic switchovers only under favorable conditions. Conditions that would prevent the system from enabling automatic switchovers include:

- Loss of Light on the protection signal
- Lockout request on the protection interface, either locally or on the remote system supporting the channel
- Forced protection-to-working request in effect, either locally or on the remote system supporting the channel

- Poor quality of the protection signal

When the condition is resolved, hardware-assisted automatic switchovers are enabled.

The switchover timer prevents successive automatic switchovers from occurring too quickly and risk the loss of data.

**Note**

The default value for the switchover timer is sufficient for most network configurations.

Examples

The following example shows how to modify the minimum interval between successive signal switchovers.

```
Switch(config)# redundancy
Switch(config-red)# associate group sanfrancisco
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer switchover-enable min-interval 4
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps timer wait-to-restore	Modifies the wait-to-restore timer interval.
associate group	Creates an APS group and enters APS configuration mode.
show aps	Displays APS configuration and operation information.

aps timer wait-to-restore

To modify the number of seconds on the APS wait-to-restore timer before reverting to the preferred working signal in a y-cable protection configuration, use the **aps timer wait-to-restore** command. To return to the default value, use the **no** form of this command.

aps timer wait-to-restore *seconds*

no aps timer wait-to-restore

Syntax Description	seconds	Specifies the number of seconds the system must wait before switching to the preferred working signal. The range is 0 to 720 seconds.
---------------------------	---------	---

Defaults	300 seconds
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Command Modes	APS configuration
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Command History This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 This command prevents oscillations when revertive switching is configured for y-cable protected and splitter protected configurations. If the preferred working signal is unstable, the wait-to-restore timer prevents possible data loss that could result from frequent switchovers.



Caution

Setting the wait-to-restore timer interval to 0 seconds disables the timer.



Note

The default value for the wait-to-restore timer is sufficient for most network configurations.

Examples The following example shows how to modify the APS wait-to-restore timer.

```

Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group newyork
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps timer wait-to-restore 180
Switch(config-red-aps)# aps enable

```

Related Commands

Command	Description
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps revertive	Enables revertive behavior for line card protection.
aps timer switchover-enable min-interval	Modifies the minimum timer interval before reenabling APS switchover.
associate group	Creates an APS group and enters APS configuration mode.
show aps	Displays APS configuration and operation information.

aps working

To configure the working interface of an APS group, use the **aps working** command. To remove the working interface, use the **no** form of this command.

```
aps working { transparent slot/subcard/port | wavepatch slot/subcard/port |
waveethernetphy slot/subcard | tengigethernetphy slot/subcard | wdmsplit slot/subcard/port
| gigabitphy slot/subcard/port | twogigabitphy slot/subcard/port }
```

```
no aps working { transparent slot/subcard/port | wavepatch slot/subcard/port |
waveethernetphy slot/subcard | tengigethernetphy slot/subcard | wdmsplit slot/subcard/port
| gigabitphy slot/subcard/port | twogigabitphy slot/subcard/port }
```

Syntax Description		
transparent <i>slot/subcard/port</i>		Specifies the transparent interface to use as the working interface in y-cable line card protection.
wavepatch <i>slot/subcard/port</i>		Specifies the wavepatch interface to use as the working interface in splitter protection.
waveethernetphy <i>slot/subcard</i>		Specifies the waveethernetphy interface to use as the working path in switch fabric based protection.
tengigethernetphy <i>slot/subcard</i>		Specifies the tengigethernetphy interface to use as the working path in switch fabric based protection.
wdmsplit <i>slot/subcard/port</i>		Specifies the wdmsplit interface to use as the working path in trunk fiber based protection.
<i>gigabitphy slot/subcard/port</i>		Specifies the gigabitphy interface to use as the protection path in line card based protection.
<i>twogigabitphy slot/subcard/port</i>		Specifies the twogigabitphy interface to use as the protection path in line card based protection.

Defaults None

Command Modes APS configuration

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

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV3	Added support for wdmsplit and gigabitphy interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.

12.2(23)SV	Added support for twogigabitphy interfaces.
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

Each interface in an associated pair has a configured role to perform: one is the *working* interface and the other is the *protection* interface. However, at any given instant, the interfaces also have a current mode of operation: *active* and *standby*. The interface that is in active mode, and is receiving the signal, may or may not be the working interface. The working interface is the *preferred* interface to receive the active signal. The protection interface is the *preferred* interface for the standby signal.

This command persists across system reloads.

When a pair of interfaces is associated for APS protection, the interface with the lower interface number is the working interface by default. To override this default configuration, use the **aps working** command. If there is an **aps lockout** command in effect on the protection interface, it cannot become the working interface.

Examples

The following example shows how to configure a working interface on an existing APS group:

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate group denver
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps working transparent 4/0/0
Switch(config-red-aps)# aps protection transparent 2/0/0
Switch(config-red-aps)# aps enable
```

Related Commands

Command	Description
aps lockout	Prevents switchover to the protection interface.
aps y-cable	Enables y-cable protection.
associate group	Creates an APS group and enters APS configuration mode.
associate interface	Associates multiple wavepatch interface pairs for APS protection.
show aps	Displays APS configuration and operation information.

aps y-cable

To configure y-cable line card protection, use the **aps y-cable** command. To disable y-cable line card protection, use the **no** form of this command.

aps y-cable

no aps y-cable

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes APS configuration

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

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

EV-Release	Modification
12.1(10)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 ensure that only one interface of an associated transparent, gigabitphy, or twogigabitphy interface pair transmits to the client. Signal corruption occurs when both interfaces in the pair transmit to the client over the y-cable.



Caution

Do not configure y-cable protection with Sysplex CLO, Sysplex ETR, or ISC compatibility protocol encapsulation, or with the OFC safety protocol.

Examples The following example shows how to configure y-cable line card protection.

```
Switch(config)# redundancy
Switch(config-red)# associate group seattle
Switch(config-red-aps)# aps disable
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps enable
```

Related Commands	Command	Description
	aps direction	Modifies path switching behavior.
	aps disable	Disables APS activity between associated interfaces.
	aps enable	Enables APS activity between associated interfaces.
	aps revertive	Enables revertive behavior for line card protection.
	aps timer switchover-enable min-interval	Modifies the minimum timer interval before reenabling APS switchover.
	aps timer wait-to-restore	Modifies the wait-to-restore timer interval.
	associate group	Creates or specifies an APS interface group and enters APS configuration mode.
	show aps	Displays APS configuration and operation information.

associate group

To enter APS configuration subcommand mode and to associate interfaces for APS protection, or to modify the attributes of an existing APS group, use the **associate group** command. To remove the group, use the **no** form of this command.

aps group *group-name*

no aps group *group-name*

Syntax Description	group-name	Specifies a group name for the interface pair. Group names are case sensitive and cannot have embedded blanks.
---------------------------	------------	--

Defaults	None
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Command Modes	Redundancy configuration
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Command History This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 create an APS group, or specify an existing group, and enter APS configuration mode. You can specify group names created with this command or with the associate interface command.
-------------------------	--

Examples The following example shows how to select an APS group and enter APS configuration mode.

```
Switch# configure terminal
Switch#(config)# redundancy
Switch#(config-red)# associate group blue
Switch#(config-red-aps)#
```

Related Commands

Command	Description
aps clear	Clears APS switchover or lockout.
aps direction	Modifies path switching behavior.
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps lockout	Prevents switchover to the protection interface.
aps revertive	Enables revertive behavior for line card protection.
aps switch	Requests an APS switchover.
aps timer message holddown	Modifies the hold-down timer for APS Channel Protocol messages.
aps timer message max-interval	Modifies the maximum interval timer for APS Channel Protocol messages.
aps timer search-for-up	Modifies the search-for-up timer interval.
aps timer switchover-enable min-interval	Modifies the minimum timer interval before reenabling APS switchover.
aps timer wait-to-restore	Modifies the wait-to-restore timer interval.
aps working	Configures the working interface of an associated interface pair.
aps y-cable	Enables y-cable protection.
associate interface	Associates wavepatch interfaces for APS splitter protection.
debug aps	Enables debugging of APS and APS Channel Protocol.
redundancy	Enters redundancy configuration mode.
show aps	Displays APS configuration and operation information.
show aps trace	Displays APS and APS Channel Protocol activity information.
snmp-server enable traps aps	Enables SNMP trap notifications for APS.

associate interface

To associate the wavepatch interface pairs in a slot, or in the entire shelf, for APS splitter protection using one command, use the **associate interface** command. To disable APS protection for the interfaces, use the **no** form of this command.

associate interface wavepatch */*/working-port wavepatch */*/protection-port [enable | disable]

associate interface wavepatch slot*/working-port wavepatch slot*/protection-port [enable | disable]

no associate interface wavepatch */*/working-port wavepatch */*/protection-port

no associate interface wavepatch slot*/working-port wavepatch slot*/protection-port

Syntax Description

<code>wavepatch */*/working-port</code>	Specifies all wavepatch interfaces on the shelf to configure as working interfaces.
<code>wavepatch */*/protection-port</code>	Specifies all wavepatch interfaces in the shelf to configure as protection interfaces.
<code>enable</code>	Enables activity on the associated interface pairs. (Optional)
<code>disable</code>	Disables activity on the associated interface pairs. This is the default state. (Optional)
<code>wavepatch slot*/working-port</code>	Specifies all wavepatch interfaces in a slot to configure as working interfaces.
<code>wavepatch slot*/protection-port</code>	Specifies all wavepatch interfaces in a slot to configure as protection interfaces.

Defaults

The default working interface for each of the interface pairs is the first interface in the command. APS activity between the interfaces is disabled when the interface pairs are first associated. The default group name for each of the interface pairs is the lower interface number.

Command Modes

Redundancy configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 associate the interfaces for APS protection, and then enter APS configuration mode, or to change the configuration of associated pairs. Also use this command to change the association of one interface to another interface.

When associating wavepatch interfaces with wildcards, the command mode does not enter APS configuration mode as it does when associating a pair of interfaces. Changes to the default APS attribute values must be entered for interface pairs individually. See the “Examples” section.

Associating wavepatch interfaces with wildcards does not overwrite attributes configured for a specific interface pair. For example, if you configure attributes for interface pair wavepatch 3/0/0 and wavepatch 3/0/1 with the **associate group** command, a subsequent **associate interface wavepatch 3/*/0 wavepatch 3/*/1** command does not change the attributes for the specific interface pair.

When a pair of interfaces is associated for APS protection with the **associate interface** command, the interface entered first in the command is the working interface by default.

Interfaces can be associated without being physically present in the shelf.

Examples

The following example shows how to associate all the wavepatch interfaces in the shelf for splitter protection while leaving APS activity between the interfaces disabled.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate interface wavepatch */*/0 wavepatch */*/1
Switch(config-red)#
```

The following example shows how to associate all the wavepatch interfaces in slot 2 for splitter protection, while enabling APS activity between the interfaces.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# associate interface wavepatch 2/*/0 wavepatch 2/*/1 enable
Switch(config-red)#
```

Related Commands

Command	Description
aps clear	Clears APS switchover or lockout.
aps direction	Modifies path switching behavior.
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps lockout	Prevents switchover to the protection interface.
aps switch	Requests an APS switchover.
aps timer message holddown	Modifies the hold-down timer for APS Channel Protocol messages.
aps timer message max-interval	Modifies the maximum interval timer for APS Channel Protocol messages.
aps timer search-for-up	Modifies the search-for-up timer interval.
aps working	Configures the working interface of an associated interface pair.

Command	Description
associate group	Creates or specifies an APS interface group and enters APS configuration mode.
debug aps	Enables debugging of APS and APS Channel Protocol.
redundancy	Enters redundancy configuration mode.
show aps	Displays APS configuration and operation information.
show aps trace	Displays APS and APS Channel Protocol activity information.
snmp-server enable traps aps	Enables SNMP trap notifications for APS.

show aps

To display APS configuration and status information for the system, use the **show aps** command.

show aps [**detail** | **group name** | **interface** *interface*]

Syntax Description		
detail		Displays detailed APS information for all APS groups.
interface <i>interface</i>		Displays detailed APS information for an interface.
group <i>name</i>		Displays detailed APS information for an APS group.

Defaults Displays summary APS information

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(10)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 display APS information for an interface, an APS group, or the entire shelf.

At least one interface in an associated interface pair must be present on the system to use the **show aps interface** command. Otherwise, use the **show aps detail** command or the **show aps group** command to display APS information for the associated interface pair.



Note

The associated group names are case sensitive. To see all the group names, use the **show aps** command.

Examples The following example shows how to display detailed APS information for all APS groups. (See Table 1-1 for field descriptions.)

```
Switch# show aps detail

APS Group blue :
```

```

architecture.: 1+1, remote prov: 1+1
span.....: end-to-end
prot. mode...: client side y-cable
direction...: prov: uni, current: uni, remote prov: uni
revertive....: no
aps state....: enabled (associated)
request timer: holddown: 5000 ms, max: 15000 ms, count 2
msg-channel..: auto (up on osc)
created.....: 5 minutes
auto-failover: disabled
transmit k1k2: sf-lp, 0, 0, 1+1, uni
receive k1k2: sf-lp, 0, 0, 1+1, uni
switched chan: 0
channel ( 0): Transparent4/0/0 (STANDBY - UP), Wave4/0 (UP)
               : channel request: no-request
               : transmit request: no-request
               : receive request: no-request
channel ( 1): Transparent3/0/0 (ACTIVE - UP), Wave3/0 (UP)
               : channel request: no-request
               : switchover count: 0
               : last switchover: never

```

Table 1-1 *show aps group and show aps interface Field Descriptions*

Field	Description
architecture	Shows APS architecture. Only 1+1 is supported.
remote prov:	Shows the architecture provisioning for the remote node that supports the same channel. Only 1+1 is supported.
span	Shows the APS span. Only end-to-end is supported. Also indicates if y-cable is configured.
direction	Shows signal switching behavior, either unidirectional or bidirectional.
prov:	Shows the direction provisioning for the local node.
current:	Shows the current direction status for the local node.
remote prov:	Shows the direction provisioning for the remote node that supports the same channel.
revertive	Indicates whether the group is APS revertive. Only y-cable line card protection supports revertive behavior.
wtr:	Shows the wait-to-restore timer value and its current running status.
created	Shows how long ago the group was created.
aps state	Indicates whether the working and protection channels have been associated and if APS activity is enabled.
request timer	Shows attribute values for the APS Channel Protocol timers.
holddown:	Shows the APS Channel Protocol message holddown timer value.
max:	Shows the APS Channel Protocol maximum inactivity interval timer
count:	Shows the APS Channel Protocol message count value.
switched chan:	Shows the switched channel number.
channel (0)	Shows the configured protection channel in the group and its current status.

Table 1-1 *show aps group and show aps interface Field Descriptions (continued)*

Field	Description
channel request:	Shows the current lockout or switchover request in effect, if any. Valid values are: <ul style="list-style-type: none"> no-request manual-switch forced-switch lockout-of-protection
transmit request:	Shows the APS Channel Protocol message being transmitted to the remote node. Valid values are: <ul style="list-style-type: none"> no-request (No request pending) do-not-revert (Revertive behavior not enabled) reverse-request (Response to a do-not-revert or wait-to-restore request) wait-to-restore (Wait-to-restore timer active) sd-lp (Signal degrade) sf-lp (Signal failure)
receive request:	Shows the APS Channel Protocol message being received from the remote node. Values are the same as the transmit request field.
channel (1)	Shows the configured working channel in the group and its current status.
switchover count:	Shows the number of times a switchover has occurred for this pair of interfaces. Zero (0) indicates that no switchover has occurred since the system was booted.
last switchover:	Shows the elapsed time since the last switchover occurred. "Never" means that no switchover has occurred since the system was booted.

The following example shows how to display APS information for an APS group with the default group name (the default working interface). (See Table 1-1 for field descriptions.)

```
Switch# show aps group Wavepatch8/0/0

APS Group Wavepatch8/0/0 :

architecture.: 1+1, remote prov: 1+1
span.....: end-to-end
prot. mode...: network side splitter
direction....: prov: uni, current: uni, remote prov: uni
revertive....: no
aps state....: enabled (associated)
request timer: holddown: 5000 ms, max: 15000 ms, count 2
msg-channel...: auto (up on osc)
created.....: 5 minutes
auto-failover: disabled
transmit k1k2: sf-lp, 0, 0, 1+1, uni
receive k1k2: sf-lp, 0, 0, 1+1, uni
switched chan: 0
channel ( 0): Wavepatch8/0/1 (STANDBY - UP)
           : channel request: no-request
           : transmit request: no-request
           : receive request: no-request
```

```
channel ( 1): Wavepatch8/0/0 (ACTIVE - UP)
      : channel request: no-request
      : switchover count: 1
      : last switchover: 1 hour, 0 minutes
```

The following example shows how to display APS information for a transparent interface. (See Table 1-1 for field descriptions.)

```
Switch# show aps interface transparent 8/0/0

APS Group blue :

architecture.: 1+1, remote prov: 1+1
span.....: end-to-end
prot. mode...: client side y-cable
direction....: prov: uni, current: uni, remote prov: uni
revertive....: no
aps state....: enabled (associated)
request timer: holddown: 5000 ms, max: 15000 ms, count 2
msg-channel...: auto (up on osc)
created.....: 5 minutes
auto-failover: disabled
transmit k1k2: sf-lp, 0, 0, 1+1, uni
receive k1k2: sf-lp, 0, 0, 1+1, uni
switched chan: 0
channel ( 0): Transparent10/0/0 (STANDBY - UP)
      : external request: no-request
      : transmit request: no-request
      : receive request: no-request
channel ( 1): Transparent8/0/0 (STANDBY - UP)
      : external request: no-request
      : switchover count: 0
      : last switchover.: never
```

The following example shows how to display APS summary information. (See Table 1-2 for field descriptions.)

```
Switch# show aps

AR :APS Role, Wk:Working, Pr:Protection
AS :APS State, Ac:Active, St:Standby
IS :Interface State, Up:Up, Dn:Down
MPL:Minimum Protection Level, SD:Signal Degrade, SF:Signal Failure
      LOL:Loss of Light, - not currently protected

Interface          AR AS IS MPL Redundant Intf      Group Name
~~~~~
Wavepatch8/0/0     Wk Ac Up LOL Wavepatch8/0/1      w
Wavepatch8/0/1     Pr St Up -  Wavepatch8/0/0      w
```

Table 1-2 *show aps summary Field Descriptions*

Field	Description
Interface	Shows the name of the interface.
AR (APS Role)	Shows the configured role for the interface, either Wk (working) or Pr (protection). Working and protection are preferred roles configured by the associate interface command and the associate group command.

Table 1-2 *show aps summary Field Descriptions (continued)*

Field	Description
AS (APS State)	Shows the APS state, either Ac (active) or St (standby). The interface currently chosen by the system to receive the channel signal is the active interface; the other interface in the associated pair is the standby.
IS (Interface State)	Shows the interface state, either Up (up) or Dn (down).
MPL (Minimum Protection Level)	Shows the minimum protection level for signal switchover. Valid values are: <ul style="list-style-type: none"> • SD (signal degrade) • SF (signal failure) • LOL (Loss of Light) • - (not currently protected)
Redundant Intf (Interface)	Shows the other interface in the APS group.
Group Name	Shows the APS group name for the interface.

Related Commands

Command	Description
aps direction	Specifies unidirectional or bidirectional path switching.
aps disable	Disables APS activity between associated interfaces.
aps enable	Enables APS activity between associated interfaces.
aps lockout	Configures APS lockout on a protection interface.
aps revertive	Configures revertive APS for y-cable line card protection.
aps switch	Causes a manual switchover from the working interface to the protection interface or vice versa.
aps timer message holddown	Modifies the APS Channel Protocol message holddown timer interval and message count value.
aps timer message max-interval	Modifies the APS Channel Protocol maximum inactivity interval timer value.
aps timer search-for-up	Modifies the minimum and maximum timer intervals on an APS timer that the system must wait for a splitter protection connection to come up when both connections are down.
aps timer switchover-enable min-interval	Modifies the minimum timer interval before reenabling APS switchover.
aps timer wait-to-restore	Modifies the number of seconds an APS timer must wait before switching back to the preferred working signal.
aps working	Explicitly configures the working interface of an associated interface pair.
aps y-cable	Configures y-cable line card protection.
associate group	Creates or specifies an APS interface group and enters APS configuration mode.
associate interface	Associates wavepatch interfaces for APS splitter protection.
show aps trace	Shows APS and APS Channel Protocol activity information.

show aps trace

To display APS and APS Channel Protocol activity information in the system memory, use the **show aps trace** command.

```
show aps trace [clear | stop | resume | filter value | last number | detail {on | off}]
```

Syntax Description

clear	Clears the APS activity trace table in memory.
stop	Stops the collection of APS activity information.
resume	Resumes the collection of APS activity information.
filter <i>value</i>	Displays only those entries that match the <i>value</i> argument.
last <i>number</i>	Displays the last number of entries indicated in the <i>number</i> argument.
detail {on off}	Enables and disables the generation of detailed output.

Defaults

Displays all APS and APS Channel Protocol activity information in memory.
Trace is active.
Detailed output generation is disabled.

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(10)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

APS trace information is similar to **show aps** command output except that it is stored in processor memory. The trace buffer contains activity information for APS and for the APS Channel Protocol.

The trace collection status and information are not saved across system or CPU switch module reloads. After the reload, the trace status returns to the default active state and the trace buffer in memory is cleared.

Examples

The following example shows how to clear the APS trace buffer:

```
Switch# show aps trace clear
```

The following example shows how to stop the APS trace activity information collection:

```
Switch# show aps trace stop
```

The following example shows how to resume the APS trace activity information collection:

```
Switch# show aps trace resume
```

The following example shows how to display detailed APS information for all APS groups. (See Table 1-3 for field descriptions.)

```
Switch# show aps trace
3163.496 APS: Portgroup1/0/0: if_active
3163.496 APS: Portgroup3/0/0: if_active
3163.504 APS: Portgroup9/0/0: if_active
3164.140 ACP: lc: transmit request: (SF-LP, 0, 0, 1+1, B, 216) on DCC
3175.600 APS: WaveEthernetPhy10/0: state change (4): systeminit_flag TRUE
3175.600 APS: lc: xconnect ACTIVE for channel 1
3175.600 APS: lc: xconnect DORMANT for channel 0
3175.600 APS: lc: state W_UP_P_UP
3175.600 APS: lc: active_red_standby
3175.600 APS: lc: work_active_red_prot_standby
3175.604 APS: lc: notify CM: assn state 3: activate channel 1
3175.604 APS: WaveEthernetPhy10/0: if_standby
3175.604 APS: WaveEthernetPhy8/0: if_active
3175.604 APS: WaveEthernetPhy8/0: lcp line active action
3175.604 APS: lc: sync state with hw, W active, P standby, caller 604E8960
3175.604 APS: lc: start hwfov_enable timer
3175.604 ACP: lc: local request: (NR, 0), caller 604EF3D4
3175.604 ACP: lc: transmit request: (NR, 0, 0, 1+1, B, 217) on DCC
3177.604 APS: lc: hwfov_enable timer expired
3177.604 APS: lc: enable auto-failover
3204.832 ACP: lc: transmit request: (NR, 0, 0, 1+1, B, 218) on DCC
3233.616 ACP: lc: transmit request: (NR, 0, 0, 1+1, B, 219) on DCC
3263.552 ACP: lc: transmit request: (NR, 0, 0, 1+1, B, 220) on DCC
```

Table 1-3 show aps trace Field Descriptions

Field	Description
APS:	Specifies APS activity.
ACP:	Specifies APS Channel Protocol activity.

Related Commands

Command	Description
associate interface	Associates two interfaces for APS protection.
debug aps	Enables debugging of APS and APS Channel Protocol.
show aps	Shows APS configuration and status information.



Debug Commands

Use the following commands to debug the Cisco ONS 15530. For information on other debug commands refer to the *Cisco IOS Debug Command Reference* document.

debug aps

To debug APS operation, use the **debug aps** command. To disable APS debugging, use the **no** form of this command.

debug aps

no debug aps

Syntax Description This command has no other arguments or keywords.

Defaults Disabled.

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 To turn off all debugging, use the **undebug all** command.

Examples The following example shows how to enable debugging of APS operations.

```
Switch# debug aps
```

Related Commands	Command	Description
	associate group	Creates or specifies an APS interface group and enters APS configuration mode.
	associate interface	Associates wavepatch interfaces for APS splitter protection.
	undebug all	Disables all debugging.

debug cdl defect-indication

To enable debugging for the in-band message channel defect indications, use the **debug cdl defect-indication** command. To disable debugging for in-band message channel defect indications, use the **no** form of this command.

```
debug cdl defect-indication { error | events | periodic }
```

```
no debug cdl defect-indication { error | events | periodic }
```

Syntax Description

error	Enables debugging for in-band message channel error conditions.
events	Enables debugging for in-band message channel internal software event conditions.
periodic	Enables debugging for in-band message channel periodic events.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable debugging for the message channel.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to enable debugging for the in-band message channel.

```
Switch# debug cdl defect-indication errors
```

Related Commands

Command	Description
diag online	Enables online diagnostics for the system.
diag online slot	Enables online diagnostics for a specified slot number.
undebug all	Disables all debugging.

debug cm

To enable debugging for the connection manager, use the **debug cm** command. To disable debugging for the connection manager, use the **no** form of this command.

```
debug cm {errors | events | sync {errors | events}}
```

```
no debug cm {errors | events | sync {errors | events}}
```

Syntax Description

errors	Enables debugging for message channel error conditions.
events	Enables debugging for internal software event conditions.
sync {errors events}	Enables debugging for synchronization errors and events.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable debugging for the connection manager.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to enable debugging of the connection manager.

```
Switch# debug cm events
```

Related Commands

Command	Description
undebug all	Disables all debugging.

debug cpu

To debug IPC (interprocess communication) initialization and switchover events, use the **debug cpu** command. To disable debugging IPC initialization and switchover events, use the **no** form of this command.

```
debug cpu {ipc | redundancy | ehsa | sub-ipc}
```

```
no debug cpu {ipc | redundancy | ehsa | sub-ipc}
```

Syntax Description

ipc	Enables debugging for processor IPC (interprocessor communications) initialization and switchover events.
redundancy	Enables debugging for CPU switch module redundancy initialization and operation.
ehsa	Enables debugging for processor EHSA (enhanced high system availability) services such as host name, config register, and calendar synchronizing to the standby CPU switch module.
sub-ipc	Enables debugging for the IPC channel layer below the IPC level.

Defaults

Disabled.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable debugging of IPC initialization and switchover events. To debug redundancy software operations, use the **debug redundancy** command.

To turn off all debugging, use the **undebbug all** command.

Examples

The following example shows how to enable redundancy state debugging.

```
Switch# debug cpu redundancy
```

Related Commands

Command	Description
debug redundancy	Enables debugging of redundancy software operation.
undebug all	Disables all debugging.

debug diag online

To enable debugging for online diagnostics, use the **debug diag online** command. To disable debugging for online diagnostics, use the **no** form of this command.

debug diag online [**online-insertion-removal** | **background** | **redundancy**]

no debug diag online [**online-insertion-removal** | **background** | **redundancy**]

Syntax Description

online-insertion-removal	Enables debugging of OIR (online insertion and removal) tests for online diagnostics.
background	Enables debugging of background tests for online diagnostics.
redundancy	Enables debugging of redundancy tests for online diagnostics.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable debugging for online diagnostics.

To turn off all debugging, use the **undebbug all** command.

Examples

The following example shows how to enable debugging of background tests for online diagnostics.

```
Switch# debug diag online background
```

debug diag online**Related Commands**

Command	Description
undebug all	Disables all debugging.

debug driver 2gfc

To enable 4-port 1-Gbps/2-Gbps FC aggregation card driver debugging, use the **debug driver 2gfc** command. To disable 4-port 1-Gbps/2-Gbps FC aggregation card driver debugging operations, use the **no** form of this command.

```
debug driver 2gfc {errors | events | fpga | periodic}
```

```
no debug driver 2gfc {errors | events | fpga | periodic}
```

Syntax Description

errors	Enables debugging for 4-port 1-Gbps/2-Gbps FC aggregation card driver error conditions.
events	Enables debugging for internal software events.
fpga	Enables debugging 4-port 1-Gbps/2-Gbps FC aggregation card FPGA operations.
periodic	Enables periodic debugging for the 4-port 1-Gbps/2-Gbps FC aggregation card.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- SV-Release

SV-Release	Modification
12.2(23)SV	This command was integrated in this release.

Usage Guidelines

Use this command to enable 4-port 1-Gbps/2-Gbps FC aggregation card driver debugging. To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate 4-port 1-Gbps/2-Gbps FC aggregation card driver debugging.

```
Switch# debug driver 2gfc errors
```

Related Commands

Command	Description
debug ports	Enables debugging of optical port activity.
undebug all	Disables all debugging.

debug driver control ethernet

To enable backplane Ethernet driver debugging, use the **debug driver control ethernet** command. To disable backplane ethernet driver debugging operations, use the **no** form of this command.

```
debug driver control ethernet {errors | events | packets}
```

```
no debug driver control ethernet {errors | events | packets}
```

Syntax Description		
	errors	Enables debugging for SRC driver error conditions.
	events	Enables debugging for internal software error conditions.
	packets	Enables debugging of the backplane Ethernet driver packets.

Defaults Disabled

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 activate backplane Ethernet driver debugging.
To turn off all debugging, use the **undebug all** command.

Examples The following example shows how to activate backplane Ethernet driver error debugging.

```
Switch# debug driver control ethernet errors
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug ports	Enables debugging of optical port activity.
debug redundancy	Enables debugging of redundancy software operation.
undebug all	Disables all debugging.

debug driver escon

To enable ESCON aggregation card driver debugging, use the **debug driver escon** command. To disable ESCON aggregation card driver debugging operations, use the **no** form of this command.

```
debug driver escon { errors | events | fpga }
```

```
no debug driver escon { errors | events | fpga }
```

Syntax Description		
	errors	Enables debugging for ESCON aggregation card driver error conditions.
	events	Enables debugging for internal software events.
	fpga	Enables debugging FPGA operations.

Defaults Disabled

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 enable ESCON aggregation card driver debugging.
To turn off all debugging, use the **undebug all** command.

Examples The following example shows how to activate ESCON aggregation card driver debugging.

```
Switch# debug driver escon errors
```

Related Commands

Command	Description
debug ports	Enables debugging of optical port activity.
undebug all	Disables all debugging.

debug driver gefc

To enable 8-port FC/GE aggregation card driver debugging, use the **debug driver gefc** command. To disable 8-port FC/GE aggregation card driver debugging operations, use the **no** form of this command.

```
debug driver gefc {errors | events | fpga | periodic}
```

```
no debug driver gefc {errors | events | fpga | periodic}
```

Syntax Description

errors	Enables debugging for 8-port FC/GE aggregation card driver error conditions.
events	Enables debugging for internal software events.
fpga	Enables debugging 8-port FC/GE aggregation card driver FPGA operations.
periodic	Enables periodic debugging for the 8-port FC/GE aggregation card.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable 8-port FC/GE aggregation card driver debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate 8-port FC/GE aggregation card driver debugging.

```
Switch# debug driver gefc errors
```


Related Commands

Command	Description
debug ports	Enables debugging of optical port activity.
undebug all	Disables all debugging.

debug driver multirate

To enable 8-port multi-service muxponder driver debugging, use the **debug driver multirate** command. To disable 8-port multi-service muxponder driver debugging operations, use the **no** form of this command.

```
debug driver multirate {errors | events | fpga | periodic | stop | tle1 | tsi {errors | events |
messages} | xcrv}
```

```
no debug driver multirate {errors | events | fpga | periodic | stop | tle1 | tsi {errors | events |
messages} | xcrv}
```

Syntax Description

errors	Enables debugging for driver error conditions.
events	Enables debugging for internal software events.
fpga	Enables debugging FPGA settings.
periodic	Enables debugging periodic processing events.
stop	Stops periodic processing for copper Gigabit Ethernet and Fast Ethernet.
tle1	Enables debugging T1 and E1 protocol processing.
tsi	Enables debugging TSI protocol processing.
messages	Enables debugging for TSI messages.
xcrv	Enables debugging transceivers.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

- SV-Release

SV-Release	Modification
12.2(25)SV	This command was integrated in this release.

Usage Guidelines

Use this command to enable 8-port multi-service muxponder driver debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate 8-port multi-service muxponder driver debugging.

```
Switch# debug driver multirate errors
```

Related Commands

Command	Description
undebug all	Disables all debugging.

debug driver nvram

To enable NVRAM file system debugging, use the **debug driver nvram** command. To disable NVRAM file system debugging operations, use the **no** form of this command.

```
debug driver nvram {errors | events}
```

```
no debug driver nvram {errors | events}
```

Syntax Description

errors	Enables debugging for NVRAM driver error conditions.
events	Enables debugging for internal software events.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable NVRAM file system platform specific debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate NVRAM file system platform specific debugging.

```
Switch# debug driver nvram errors
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug driver voa	Enables debugging of OSCP activity.
debug ports	Enables debugging of optical port activity.
debug redundancy	Enables debugging of redundancy software operation.
undebg all	Disables all debugging.

debug driver osc

To enable the OSC driver debugging, use the **debug driver osc** command. To disable the OSC driver debugging, use the **no** form of this command.

```
debug driver osc { events | fpga }
```

```
no debug driver osc { events | fpga }
```

Syntax Description

events	Enables debugging for internal software error conditions.
fpga	Enables debugging of the FPGA.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 activate the OSC driver debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate the OSC driver error debugging.

```
Switch# debug driver osc errors
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug driver voa	Enables debugging of VOA driver activity.
debug ports	Enables debugging of optical port activity.
debug redundancy	Enables debugging of redundancy software operation.
undebg all	Disables all debugging.

debug driver psm

To enable the PSM driver debugging, use the **debug driver psm** command. To disable PSM driver debugging, use the **no** form of this command.

```
debug driver psm {errors | events}
```

```
no debug driver psm {errors | events}
```

Syntax Description

errors	Enables debugging for PSM driver error conditions.
events	Enables debugging for internal software events.

Defaults

Disabled

Command Modes

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)EV	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 activate the PSM driver debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate the PSM driver error debugging.

```
Switch# debug driver psm errors
```


Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug ports	Enables debugging of optical port activity.
undebug all	Disables all debugging.

debug driver src

To enable SRC driver debugging, use the **debug driver src** command. To disable SRC driver debugging operations, use the **no** form of this command.

```
debug driver src { errors | events | poll-errors | portfail | defect-indication { errors | events |
periodic } }
```

```
no debug driver src { error | events | poll-errors | portfail | defect-indication { errors | events |
periodic } }
```

Syntax Description

errors	Enables debugging for NVRAM driver error conditions.
events	Enables debugging for SRC driver events.
poll-errors	Enables debugging for internal software error conditions.
portfail	Enables debugging for port failures.
defect-indication { errors events periodic }	Enables debugging for defect indications

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 activate SRC driver debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate SRC driver debugging.

```
Switch# debug driver src
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug driver voa	Enables debugging of OSCP activity.
debug ports	Enables debugging of optical port activity.
debug redundancy	Enables debugging of redundancy software operation.
undebug all	Disables all debugging.

debug driver ten-gigabit trunk

To enable 10-Gbps ITU tunable and non tunable trunk card driver debugging, use the **debug driver ten-gigabit trunk** command. To disable 10-Gbps ITU tunable and non tunable trunk card driver debugging operations, use the **no** form of this command.

```
debug driver ten-gigabit trunk {errors | events}
```

```
no debug driver ten-gigabit trunk {error | events}
```

Syntax Description	errors	Enables debugging for driver error conditions.
	events	Enables debugging for driver events.

Defaults Disabled

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(26)SV	Added support for the 10-Gbps ITU tunable trunk card.
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 activate 10-Gbps ITU tunable and non tunable trunk card driver debugging. To turn off all debugging, use the **undebug all** command.

Examples The following example shows how to activate 10-Gbps ITU tunable and non tunable trunk card driver debugging.

```
Switch# debug driver ten-gigabit trunk events
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug ports	Enables debugging of optical port activity.
undebg all	Disables all debugging.

debug driver transponder events

To enable transponder line card driver events debugging, use the **debug driver transponder** command. To disable transponder line card driver events debugging operations, use the **no** form of this command.

debug driver transponder events

no debug driver transponder events

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 activate transponder line card driver events debugging.

To turn off all debugging, use the **undebug all** command.

Examples The following example shows how to activate transponder line card events driver debugging.

```
Switch# debug driver transponder events
```

Related Commands	Command	Description
	undebug all	Disables all debugging.

debug driver two-five-gigabit trunk

To enable 2.5-Gbps ITU trunk card driver debugging, use the **debug driver two-five-gigabit trunk** command. To disable 2.5-Gbps ITU trunk card driver debugging operations, use the **no** form of this command.

```
debug driver two-five-gigabit trunk {errors | events}
```

```
no debug driver two-five-gigabit trunk {error | events}
```

Syntax Description

errors	Enables debugging for driver error conditions.
events	Enables debugging for driver events.

Defaults

Disabled

Command Modes

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)EV	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 activate 2.5-Gbps ITU trunk card driver debugging.
To turn off all debugging, use the **undebg all** command.

Examples

The following example shows how to activate 2.5-Gbps ITU trunk card driver debugging.

```
Switch# debug driver two-five-gigabit trunk events
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug ports	Enables debugging of optical port activity.
undebug all	Disables all debugging.

debug driver voa

To enable VOA (variable optical attenuator) module driver debugging, use the **debug driver voa** command. To disable VOA module driver debugging operations, use the **no** form of this command.

debug driver voa

no debug driver voa

Syntax Description

This command has no other arguments or keywords.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 activate VOA module driver debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to activate VOA module driver debugging.

```
Switch# debug driver voa
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.

Command	Description
debug ports	Enables debugging of optical port activity.
debug redundancy	Enables debugging of redundancy software operation.
undebug all	Disables all debugging.

debug oscp

To debug OSCP operations, use the **debug oscp** command. To disable debugging for OSCP operations, use the **no** form of this command.

```
debug oscp { events | hello-packet | transport } [wave slot/subcard]
```

```
no debug oscp { events | hello-packet | transport } [wave slot/subcard]
```

Syntax Description

events	Enables debugging for OSCP events.
hello-packet	Enables printing of the information contained in the OSCP Hello packets.
transport	Enables debugging for OSCP transport services.
wave slot	Specifies the OSC interface on which to enable debugging. (Optional)

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable debugging for OSCP activity.

To disable all debugging, use the **undebug all** command.



Caution

This command can generate a significant amount of output and may interfere with other activity on the system once the command is invoked.

Examples

The following example shows how to enable debugging for OSCP events.

```
Switch# debug oscp events
```

```
01:53:59:Control interface Wave1 is going up
01:54:00:OSCP:Adding neighbor on wave Wave1
```

The following example shows how to display information contained in the OSCP Hello packets.

```
Switch# debug oscp hello-packet wave 0
01:53:08:OSCP:Hello at Wave1 Tx, state 2way
01:53:08:  NodeId:0202.0304.0506  Port:10000
01:53:08:  Remote:NodeId:0202.0304.0506  Port:10000
01:53:08:OSCP:Hello at Wave1 Rx, state 2way
01:53:08:  NodeId:0202.0304.0506  Port:10000
01:53:08:  Remote:NodeId:0202.0304.0506  Port:10000
01:53:08:OSCP:Hello event 2wayd
```

Related Commands

Command	Description
show oscp info	Displays OSCP configuration information.
show oscp neighbor	Displays OSCP neighbor information.
show oscp statistics	Displays OSCP activity statistics.
show oscp traffic	Displays OSCP message traffic information.
undebug all	Disables all debugging.

debug ports

To debug port operations, use the **debug ports** command. To disable debugging for port operations, use the **no** form of this command.

```
debug ports { errors [type slot[/subcard[/port]]] | events [type slot[/subcard[/port]]] | patch }
```

```
no debug ports { errors [type slot[/subcard[/port]]] | events [type slot[/subcard[/port]]] | patch }
```

Syntax Description

errors	Enables debugging for internal software error conditions.
<i>type slot[/subcard[/port]]</i>	Specifies an interface on which debugging is enabled. Valid <i>type</i> values are filter , tengigthernethy , thru , transparent , wave , waveethernetphy , wavepatch , wdm , and wdmsplit . (Optional)
events	Enables debugging for internal software event conditions.
patch	Enables debugging for patch connections.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 debug common software errors and events, patch connection activity, and cross connection activity. If the interface option is not specified, debugging is enabled for all interfaces.

To disable all debugging, use the **undebug all** command.

Examples

The following example shows how to enable error debugging for transparent interface 2/0/0.

```
Switch# debug ports errors transparent 2/0/0
```

Related Commands

Command	Description
clock rate	Configures a clock rate on a transparent interface.
encapsulation	Configures the encapsulation of the client signal on the transparent interface.
monitor enable	Enables signal monitoring for certain protocol encapsulations.
monitor enable	Configures patch connections for a shelf.
show connect	Displays optical connection information.
show interfaces	Displays interface information.
show patch	Displays optical patch connection configuration.
undebg all	Disables all debugging.

debug redundancy

To debug redundancy operations, use the **debug redundancy** command. To disable debugging for redundancy operations, use the **no** form of this command.

debug redundancy { **ehsa** | **errors** | **fsm** | **kpa** | **msg** | **progression** | **status** | **timer** }

no debug redundancy { **ehsa** | **errors** | **fsm** | **kpa** | **msg** | **progression** | **status** | **timer** }

Syntax Description

ehsa	Enables debugging for early software initialization suspend points associated with EHSA (enhanced high system availability).
errors	Enables debugging for redundancy internal software error conditions.
fsm	Enables debugging for redundancy finite state machine transition events.
kpa	Enables debugging for redundancy keepalive messaging events.
msg	Enables debugging for general redundancy messaging software.
progression	Enables debugging for redundancy internal state progression software.
status	Enables debugging for redundancy internal status notification software.
timer	Enables debugging for redundancy internal timers.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 debug redundancy software operations. Use the **debug cpu** command to debug CPU switch module redundancy.

To disable all debugging, use the **undebug all** command.

**Caution**

This command can generate a significant amount of output and may interfere with other activity on the system once the command is invoked.

Examples

The following example shows how to debug finite state machine transition events.

```
Switch# debug redundancy fsm
```

Related Commands

Command	Description
debug cpu	Enables debugging of CPU switch module redundancy.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.
undebg all	Disables all debugging.

debug switch

To enable switch driver debugging, use the **debug switch** command. To disable debugging switch driver operations, use the **no** form of this command.

```
debug switch { errors | events | sync }
```

```
no debug switch { errors | events | sync }
```

Syntax Description

errors	Enables debugging for switch driver error conditions.
events	Enables debugging for switch driver event conditions.
sync	Enables debugging for switch driver connections.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 activate switch driver debugging.

To turn off all debugging, use the **undebug all** command.

Examples

The following example shows how to enable switch fabric error debugging.

```
Switch# debug switch errors
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug driver voa	Enables debugging of OSCP activity.
debug ports	Enables debugging of optical port activity.
debug redundancy	Enables debugging of redundancy software operation.
undebug all	Disables all debugging.

debug topology

To enable topology neighbor debugging, use the **debug topology** command.

To disable debugging for redundancy operations, use the **no** form of this command.

```
debug topology {ehsa | errors | fsm | kpa | msg | progression | status | timer}
```

```
no debug topology {ehsa | errors | fsm | kpa | msg | progression | status | timer}
```

Syntax Description

ehsa	Enables debugging for early software initialization suspend points associated with EHSAs (enhanced high system availability).
errors	Enables debugging for redundancy internal software error conditions.
fsm	Enables debugging for redundancy finite state machine transition events.
kpa	Enables debugging for redundancy keepalive messaging events.
msg	Enables debugging for general redundancy messaging software.
progression	Enables debugging for redundancy internal state progression software.
status	Enables debugging for redundancy internal status notification software.
timer	Enables debugging for redundancy internal timers.

Defaults

Disabled

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 activate topology neighbor debugging.

To turn off all debugging, use the **undebbug all** command.

Examples

The following example shows how to enable topology debugging.

```
Switch# debug topology errors
```

Related Commands

Command	Description
debug aps	Enables debugging of APS and APS Channel Protocol activity.
debug cpu	Enables debugging of IPC initialization and switchover events.
debug diag online	Enables debugging of the online diagnostics.
debug driver voa	Enables debugging of OSCP activity.
debug ports	Enables debugging of optical port activity.
debug redundancy	Enables debugging of redundancy software operation.
undebg all	Disables all debugging.

undebg all

To disable all debugging, use the **undebg all** command.

undebg all

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 turn off all debugging.

Examples The following example shows how to turn off all debugging.

```
Switch# undebg all
```

Related Commands	Command	Description
	debug aps	Enables debugging of APS and APS Channel Protocol activity.
	debug cpu	Enables debugging of IPC initialization and switchover events.
	debug diag online	Enables debugging of the online diagnostics.
	debug driver voa	Enables debugging of OSCP activity.
	debug ports	Enables debugging of optical port activity.
	debug redundancy	Enables debugging of redundancy software operation.

■ `undebg all`



Interface Configuration Commands

Use the following commands to configure and monitor the interfaces on the Cisco ONS 15530.

cdl defect-indication force hop-endpoint

To configure an interface as an end-of-hop, use the **cdl defect-indication force hop-endpoint** command. To disable end-of-hop configuration on an interface, use the **no** form of this command.

cdl defect-indication force hop-endpoint

no cdl defect-indication force hop-endpoint

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:

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

EV-Release	Modification
12.1(10)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 configure the interface as a hop endpoint for in-band message channel defect indications.

A node acting as an end-of-hop terminates hop-by-hop defect indications for the in-band message channel. If you use the **cdl defect-indication force hop-endpoint** command, it is only in effect when APS is not configured on the interface. When APS is configured, the node always acts as end-of-hop. If APS is not configured, we recommend forcing end-of-hop at administrative boundaries. This ensures that FDI-H (forward defect indication hop) and BDI-H (backward defect indication hop) between two administrative domains reflect only errors that occur between the domains.

Examples The following example shows how to enable hop endpoint on an interface.

```
Switch# configure terminal
Switch(config)# interface waveethernetphy 8/0
Switch(config-if)# cdl defect-indication force hop-endpoint
```


Related Commands

Command	Description
debug cdl defect-indication	Initiates debugging of defect indication on in-band message channel capable interfaces.
show cdl defect-indication	Displays defect indication information on in-band message channel capable interfaces.
show interfaces	Displays interface information.

cdl enable

To enable in-band message channel functionality on an interface, use the **cdl enable** command. To disable in-band message channel functionality, use the **no** form of this command.

cdl enable

no cdl enable

Syntax Description *This command has no other arguments or keywords.*

Defaults Enabled

Command Modes Interface configuration

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

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

EV-Release	Modification
12.1(10)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 Enable the in-band message channel on both interfaces supporting the signal.

Examples The following example shows how to enable in-band message channel on an interface.

```
Switch# configure terminal
Switch(config)# interface esconphy 10/0/0
Switch(config-if)# cdl enable
```

Related Commands	Command	Description
	cdl defect-indication force hop-endpoint	Configures an interface as an end-of-hop.
	cdl flow identifier	Specifies the in-band message channel flow identifier value.

Command	Description
debug cdl defect-indication	Initiates debugging of the defect indication on in-band message channel capable interfaces.
show cdl defect-indication	Displays defect indication information on in-band message channel capable interfaces.
show interfaces	Displays interface information.

cdl flow identifier

To configure the in-band message channel flow identifier on an esconphy, gigabitphy, or twogigabitphy interface, use the **cdl flow identifier** command.

To remove the flow identifier, use the **no** form of this command.

cdl flow identifier *number*

no cdl flow identifier

Syntax Description	<i>number</i>	Specifies the flow identifier for the signal. The range is 0 to 174.
Defaults	255	
Command Modes	Interface configuration	
Command History	This table includes the following release-specific history entries:	
	<ul style="list-style-type: none"> • EV-Release • SV-Release • S-Release 	
	EV-Release	Modification
	12.1(10)EV2	This command was introduced.
	12.1(12c)EV	Added support for gigabitphy interfaces.
	12.1(12c)EV1	Changed the highest flow identifier value available from 254 to 174.
	SV-Release	Modification
	12.2(18)SV	This command was integrated in this release.
	12.2(23)SV	Added support for twogigabitphy interfaces.
	S-Release	Modification
	12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines Configure the same in-band message channel flow identifier on both interfaces supporting the signal.



Note

If traffic from an ESCON aggregation card mixes with GE traffic from a 4-port 1-Gbps/2-Gbps FC aggregation card or an 8-port FC/GE aggregation card on the same 10-Gbps ITU trunk card, all the esconphy interfaces must have flow control identifiers assigned (using this command or the **cdl flow identifier reserve** command if the ESCON SFPs are not fully populated) and enabled with a **no shutdown** command if the SFPs are present.

Examples

The following example shows how to configure the flow identifier on an interface.

```
Switch# configure terminal
Switch(config)# interface esconphy 10/0/0
Switch(config-if)# cdl flow identifier 100
```

Related Commands

Command	Description
<code>cdl flow identifier reserve</code>	Specifies the in-band message channel flow identifier values for all esconphy interfaces on an ESCON aggregation card.
<code>show interfaces</code>	Displays interface information.

cdl flow identifier reserve

To configure the in-band message channel flow identifiers on all esconphy interfaces on an ESCON aggregation card, use the **cdl flow identifier reserve** command. To remove the flow identifiers, use the **no** form of this command.

cdl flow identifier reserve *group-name*

no cdl flow identifier reserve

Syntax Description	<i>group-name</i>	Specifies the group of reserved identifiers to assign to the esconphy interfaces on a 10-port ESCON aggregation card. Valid values are group-1 (175 to 184), group-2 (185 to 194), group-3 (195 to 204), group-4 (205 to 214), group-5 (215 to 224), group-6 (225 to 234), group-7 (235 to 244), and group-8 (245 to 254).
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Defaults	255
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Command Modes	Interface configuration
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Command History This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 when the traffic from an ESCON aggregation card is mixed with GE traffic on a 10-Gbps ITU trunk card. This command ensures that all ten interfaces have flow identifiers, even when the card is not fully populated with SFPs. The command is supported on the portgroup interface.

Configure the same in-band message channel flow identifiers on both interfaces supporting the signal.

If the **cdl flow identifier** command is used to configure a flow identifier on an esconphy interface, that flow identifier takes precedence over a reserved flow identifier.

**Note**

If ESCON traffic mixes with GE traffic on the same 10-Gbps ITU trunk card, all the esconphy interfaces must have flow control identifiers configured and must be enabled with a **no shutdown** command, if the SFP is present.

Examples

The following example shows how to configure the flow identifiers for all esconphy interfaces on an ESCON aggregation card.

```
Switch# configure terminal
Switch(config)# interface portgroup 10/0/0
Switch(config-if)# cdl flow identifier reserve group-1
```

Related Commands

Command	Description
cdl flow identifier	Specifies the in-band message channel flow identifier value.
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	<i>interface</i>	Specifies the interface on which the command is to be executed.
---------------------------	------------------	---

Defaults	Clears all performance history counters (the current counter, all 15-minute history counters, and the 24-hour counter) for all Cisco ONS 15530 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]
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 the interface counters.

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	<i>value</i>	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:

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

EV-Release	Modification
12.1(10)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 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.



Note

Use the **encapsulation** command for clock rates supported by protocol monitoring rather than the **clock rate** command.

Table 3-1 lists the clock rates for well-known protocols supported by the transponder line card:

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 (ISC-3)	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	933,120
SONET OC-48/SDH STM-16	2,488,320

1. DV = digital video
2. ADI = Asynchronous Digital Interface

**Note**

Error-free transmission of some D1 video signals (defined by the SMPTE 259M standard) and test patterns (such as Matrix SDI) cannot be guaranteed by the Cisco ONS 15500 Series because of the pathological pattern in D1 video. This well-known limitation is usually overcome by the D1 video equipment vendor, who uses a proprietary, second level of scrambling. No standards exist at this time for the second level of scrambling.

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.

connect

To configure the signal cross connections through the switch fabric, use the **connect** command. To remove the cross connection configuration, use the **no** form of the command.

```
connect interface1 interface2 [override]
```

```
no connect interface1 interface2
```

Syntax Description

<i>interface1 interface2</i>	Specifies the interfaces to be cross connected. See the “Usage Guidelines” section for valid interface types.
override	Changes the cross connect state from protection to provisioned.

Defaults

None

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 configure cross connections through the switch fabric.

To change the cross-connect state from protection to provisioned, use the **override** option with the **connect** command. When one of the interfaces specified in the connect command is APS protected, only one of the interfaces is specified in the connect command, but both are automatically included in the cross-connect installed in the switch fabric.

This option is useful for migration scenarios, when moving the APS protection to different interfaces without taking a data hit.

Valid cross connections between modules are:

- Portgroup interface on an ESCON aggregation card, 4-port 1-Gbps/2-Gbps FC aggregation card, or 8-port FC/GE aggregation card to waveethernetphy subinterface on a 2.5-Gbps ITU trunk card
portgroup *slot1/subcard1/port* **waveethernetphy** *slot2/subcard2*

- Portgroup interface on an ESCON aggregation card, 4-port 1-Gbps/2-Gbps FC aggregation card, or 8-port FC/GE aggregation card to waveethernetphy subinterface on a 10-Gbps ITU trunk card

portgroup slot1/subcard1/port waveethernetphy slot2/subcard2.subinterface

- Portgroup interface on an ESCON aggregation card, 4-port 1-Gbps/2-Gbps FC aggregation card, or 8-port FC/GE aggregation card to tengigethernetphy subinterface on a 10-Gbps uplink card

portgroup slot1/subcard1/port tengigethernetphy slot2/subcard2.subinterface

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

The order of the interfaces in the command does not affect the cross connect configuration. For example, configuring a cross connect with the command **connect portgroup 1/0/0 waveethernetphy 2/0.1** is equivalent to configuring a cross connect with **connect waveethernetphy 2/0.1 portgroup 1/0/0**.

Examples

The following example shows how to cross connect an ESCON aggregation card and a 10-Gbps ITU trunk card.

```
Switch# configure terminal
Switch(config)# connect portgroup 1/0/0 waveethernetphy 3/0.0 override
```

Related Commands

Command	Description
show connect	Displays the cross connections in the system.

encapsulation

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

Transparent Interfaces

```
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
```

Twogigabitphy Interfaces

```
encapsulation {fibrechannel {1g | 2g | auto} [ofc {enable | disable}] |
  ficon {1g | 2g | auto} [ofc {enable | disable}] |
  sysplex isc {compatibility | peer {1g | 2g}}}
```

```
no encapsulation
```

Gigabitphy Interfaces

```
encapsulation {fibrechannel [ofc {enable | disable}] |
  ficon [ofc {enable | disable}] |
  gigabitethernet |
  sysplex isc {compatibility | peer}}
```

```
no encapsulation
```

Multirate Interfaces

```
encapsulation {t1 | e1 | dvb | sdi | its | escon |
  fibrechannel |
  ficon |
  gigabitethernet {optical | copper} |
  fastethernet {optical | copper} |
  sdh stm-1 | sonet oc3}
```

Syntax Description

fastethernet	Specifies Fast Ethernet encapsulation. The OFC ¹ 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 line card.
clo	Specifies CLO ² timing. OFC is disabled. Forward laser control is enabled on both the transparent and wave interfaces.
etr	Specifies ETR ³ timing. OFC is disabled.
isc	Specifies ISC ⁴ encapsulation.
compatibility	Specifies ISC links compatibility mode (ISC-1) with rate of 1.0625 Gbps. OFC is enabled on all interface types except multirate interfaces where OFC is not supported.
peer	Specifies ISC links peer mode (ISC-3). OFC is disabled.
1g	Specifies 1 Gbps for the protocol rate.
2g	Specifies 2 Gbps for the protocol rate.
auto	Enables automatic end-to-end speed negotiation on twogigabitphy interfaces encapsulated for FC or FICON traffic.
ficon	Specifies FICON encapsulation. OFC is disabled.
sonet	Specifies SONET encapsulation. OFC is disabled.
oc3	Specifies SONET rate of OC-3.
oc12	Specifies SONET rate of OC-12.
oc48	Specifies SONET rate of OC-48.
sdh	Specifies SDH encapsulation. OFC is disabled.
stm-1	Specifies SDH rate of STM-1.
stm-4	Specifies SDH rate of STM-4.
stm-16	Specifies SDH rate of STM-16.
fibrenchannel	Specifies Fibre Channel encapsulation.
ofc {enable disable}	Enables or disables OFC. The default OFC state is disabled. (Optional)
t1	Specifies T1 encapsulation.
e1	Specifies E1 encapsulation.
dvb	Specifies DVB-ASI ⁵ encapsulation.
sdi	Specifies SDI ⁶ encapsulation.
its	Specifies ITS ⁷ encapsulation.
{optical copper}	Specifies the type of SFP.

1. OFC = open fiber control
2. CLO = Control Link Oscillator
3. ETR = external time reference
4. ISC = InterSystem Channel
5. DVB-ASI = Digital Video Broadcasting Asynchronous Serial Interface
6. SDI = Serial Digital Interface
7. ITS = Integrated Trading System

Defaults

The default rate on twogigabitphy interfaces **fibrenchannel 1g**.

Encapsulation disabled is on all other interfaces.

The default rate for Sysplex ISC peer mode on transparent interfaces is 2-Gbps. See the “Syntax Description” section for the default OFC state.

Command Modes Interface configuration

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

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for gigabitphy interfaces.
12.1(12c)EV1	Added support for 2-Gbps FC and FICON on transparent interfaces.
SV-Release	Modification
12.2(29)SV	Added support for end-to-end speed negotiation on twogigabitphy interfaces encapsulated for FC or FICON traffic.
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces.
12.2(24)SV	Added support for 1-Gbps ISC links peer mode on transparent and gigabitphy interfaces.
12.2(25)SV	Added support for multirate interfaces and new keywords t1 , e1 , dvb , sdi , its , copper , and optical .
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.
12.2(25)S	Added support for 1-Gbps ISC links peer mode on transparent interfaces.

Usage Guidelines **Transponder Line Card**

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 (1Gbps and 2 Gbps)
- 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 15530 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 an 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.

Gigabitphy Interfaces

Removing the encapsulation on an 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.

Twogigabitphy Interfaces

Removing the encapsulation on an 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.

**Note**

The 4-port 1-Gbps/2-Gbps FC aggregation card supports oversubscription.

Multirate Interfaces

The 8-port multi-service muxponder does not support FICON bridge.

You must disable a multirate interface with the **shutdown** command before removing or changing the protocol encapsulation. You can then reenable the interface with the **no shutdown** command.

**Note**

The 8-port multi-rate muxponder does not support oversubscription. The cumulative rate of the protocol encapsulations on the multirate interfaces cannot exceed 2.488 Gbps.

**Note**

Multirate interfaces do not support OFC.

**Note**

Auto encapsulation is not supported with OFC.

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.

flow control

To adjust the flow of data and enable buffer credits for FC and FICON on 4-port 1-Gbps/2-Gbps FC aggregation cards and on 8-port FC/GE aggregation cards, use the **flow control** command. To revert to the default value, use the **no** form of this command.

flow control [asymmetric | symmetric]

no flow control

Syntax Description

asymmetric	Specifies asymmetric mode for twogigabitphy interfaces.
symmetric	Specifies symmetric mode for twogigabitphy interfaces.

Defaults

Disabled

When enabled, the default mode is symmetric on twogigabitphy interfaces.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

- SV-Release
- S-Release

SV-Release	Modification
12.2(18)SV	This command was introduced.
12.2(23)SV	Added support for twogigabitphy interfaces and added the asymmetric and symmetric keywords for twogigabitphy interfaces.
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

This command is only available on gigabitphy interfaces and twogigabitphy interfaces encapsulated for Fibre Channel or FICON traffic.

You can use symmetric mode in most configurations. However, use asymmetric mode if the following conditions occur when using symmetric mode:

1. No errors occur when flow control is disabled on the twogigabitphy interface.
2. CRC errors are seen on the FC or FICON client device when flow control is enabled.
3. The **show controller** command output for the twogigabitphy interface shows the following:
 - The QDR CRC errors are larger than the Tx CRC errors. Typically, Tx CRC errors are zero.
 - The QDR CRC errors are larger than the QDR Parity errors. Typically, QDR Parity errors are zero.

Examples

The following example shows how to enable flow control.

```
Switch(config)# configure terminal
Switch(config-if)# interface gigabitphy 3/0/0
Switch(config-if)# encapsulation fibrechannel
Switch(config-if)# flow control
```

The following example shows how to disable flow control.

```
Switch(config)# configure terminal
Switch(config-if)# interface gigabitphy 3/0/0
Switch(config-if)# no flow control
```

Related Commands

Command	Description
encapsulation	Configures the encapsulation of the client signal on the interface.
show interfaces	Displays interface information.
tx-buffer size	Configures the size of the transmit latency buffer.

laser control forward enable

To enable forward laser control, which automatically shuts down line card 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

- Enabled on esconphy interfaces
- Enabled on multirate interfaces when encapsulated for ESCON traffic
- Disabled on all other interfaces

Command Modes Interface configuration

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

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for gigabitphy interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces.
12.2(25)SV	Added support for multirate interfaces.
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

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

Forward laser control is supported on transparent and wave interfaces on transponder line cards, esconphy interfaces on ESCON aggregation cards, twogigabitphy interfaces on 4-port 1-Gbps/2-Gbps FC aggregation cards, gigabitphy interfaces on 8-port FE/GE aggregation cards, and multirate interfaces on 8-port multi-service muxponders:

- Transparent and wave interfaces

Use this command to enable forward laser control on both the transparent and wave interfaces of a transponder line card. If configured on a transparent interface, the client side laser of a transponder line card 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 line card shuts down when the client side receiver detects a Loss of Light.



Note To function correctly, configure forward laser control on both interfaces on a transponder line card. For y-cable protection, configure forward laser control on both the transparent and wave interfaces on both transponder line cards.

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.

- Esconphy interfaces

When forward laser control is enabled on an esconphy interface and a Loss of Light is detected on the port, the transmitter laser on the corresponding port on the remote node is turned off, regardless of the forward laser control configuration on the remote esconphy interface.

- Twogigabitphy interfaces

When forward laser control is enabled on a twogigabitphy interface and a Loss of Light is detected on the port, the transmitter laser on the corresponding port on the remote node is turned off only if forward laser control is configured on the remote twogigabitphy interface.

- Gigabitphy interfaces

When forward laser control is enabled on a twogigabitphy interface and a Loss of Light is detected on the port, the transmitter laser on the corresponding port on the remote node is turned off only if forward laser control is configured on the remote twogigabitphy interface.

- Multirate interfaces

When forward laser control is enabled on a multirate interface and a Loss of Light, Loss of Sync, or Loss of Lock is detected on the port, the transmitter laser on the corresponding port on the remote node is turned off only if forward laser control is configured on the remote multirate interface.



Note Forward laser control is not supported on multirate interface when the configured encapsulation is copper FE, copper GE, DVB-ASI, SDI-SDTI, T1, or E1.

Examples

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

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

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

```
Switch# configure terminal
Switch(config)# interface wave 2/0
```

■ laser control forward enable

```
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, waveethernetphy, wavesonetphy, or tengigethernetphy 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:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(25)SV	Added support for wavesonetphy interfaces.
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
<code>show interfaces</code>	Displays interface information.

laser frequency

To select the desired channel frequency on a transparent transponder line card, 10-Gbps ITU trunk card, 10-Gbps ITU tunable trunk card, 2.5-Gbps ITU trunk card, or 8-port multi service muxponders, use the **laser frequency** command.

To revert to the default value, use the **no** form of the command.

laser frequency *number*

no laser frequency

Syntax Description

number	One of the two channel frequencies supported by the transponder line card, or one of the four channel frequencies supported by a 10-Gbps ITU trunk card.
--------	--

Defaults

The lower frequency for the transponder laser

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for waveethernetphy interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(25)SV	Added support for wavesonetphy interfaces.
12.2(26)SV	Added support for 10-Gbps ITU tunable trunk cards.
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines

The transponder line card can be tuned to support one of two channel frequencies and the 10-Gbps ITU tunable trunk card can be tuned to support one of four channel frequencies.

The change from one frequency to another takes about 10 seconds. Do not expect traffic to transit the system until the frequency selection completes. Also, successive **laser frequency** commands are ignored until after the new channel frequency stabilizes.

**Note**

This interface command is applicable only to tunable lasers that support transmission over multiple frequencies on the ITU grid. The values displayed for selection vary depending on the capabilities of the line card.

Examples

The following example shows how to select the channel frequency on a transponder line card wave interface:

```
Switch(config)# interface wave 9/0
Switch(config-if)# laser frequency 194100
```

The following example shows how to select the channel frequency on a 2.5-Gbps ITU trunk card and 10-Gbps ITU tunable trunk card waveethernetphy interface:

```
Switch(config)# interface waveethernetphy 9/0
Switch(config-if)# laser frequency 194100
```

Related Commands

Command	Description
<code>show interfaces</code>	Displays interface information.

laser shutdown

To turn off the laser on a module supporting the in-band message channel or DCC, use the **laser shutdown** command. To turn the laser on, use the **no** form of this command.

laser shutdown

no laser shutdown

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:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(25)SV	Added support for wavesonetphy interfaces.
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 explicitly shut down the laser. The interface **shutdown** command disables data traffic; however the control traffic carried over in-band message channel or DCC continues to flow. Use this command to turn off the laser and stop all traffic.



Note

The interface **shutdown** command must precede the **laser shutdown** command. To bring the interface administratively up, the **no laser shutdown** must precede the **no shutdown** command.



Note

If you turn off the laser on an interface and save the configuration to the startup configuration, the interface comes up with the laser turned off when the system boots.

**Note**

A 10-Gbps laser on a waveethernetphy interface must warm up for 2 minutes before carrying traffic.

Examples

The following example shows how to turn off the laser on a waveethernetphy interface.

```
Switch(config)# interface waveethernetphy 4/0  
Switch(config-if)# laser shutdown
```

Related Commands

Command	Description
show interfaces	Displays interface information.

loopback

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

loopback [facility | terminal]

no loopback [facility | terminal]

Syntax Description

facility	Enables facility loopback. The signal from the receive input is looped back to the transmit output.
terminal	Enables terminal loopback. The signal sent for transmit output is looped back to the receive input. This is an internal loopback used for hardware debug and diagnostics.

Defaults

Disabled

When neither **facility** or **terminal** is specified in the command, the default is **facility**.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for facility and terminal loopbacks on gigabitphy, waveethernetphy, and tengigethernetphy interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for facility and terminal loopbacks on twogigabitphy interfaces.
12.2(25)SV	Added support for facility and terminal loopbacks for multirate and wavesonetphy interfaces.
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 facility loopbacks on transparent, wave, esconphy, or multirate interfaces, and facility and terminal loopbacks on waveethernetphy, wavesonetphy, or tengigethernetphy interfaces. On a transponder line card, you can configure a loopback on either the wave interface or the transparent interface, but not both simultaneously.

A configured 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.

**Caution**

Loopbacks on waveethernetphy, tengigethernetphy, wavesonetphy, and multirate interfaces disrupt service. Use this feature with care.

**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.

The **facility** and **terminal** options are available only on waveethernetphy and tengigethernetphy interfaces. If neither the **facility** or **terminal** keywords are used, the default is a terminal loopback.

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 line card, 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:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release and added support for 2-Gbps FC and FICON.
12.2(22)SV	Added monitoring support for 2-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.
12.2(25)S	Added monitoring support for 1-Gbps ISC links peer mode.

Usage Guidelines Use this command to collect error statistics on signal quality in the transponder line card. 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
- ISC links peer mode (1 Gbps and 2 Gbps)
- 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

**Note**

To monitor 2-Gbps FC, FICON, and ISC links peer mode, you must upgrade the transponder line card functional image to release 1.A3.

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 15530 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 15530 monitors the SONET section overhead only, not the SONET line overhead. Specifically, the Cisco ONS 15530 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 link compatibility and peer mode 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.

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 interface.
show interfaces	Displays interface information.

negotiation auto

To enable autonegotiation for Gigabit Ethernet on 8-port FC/GE aggregation cards, use the **negotiation auto** command. To revert to the default value, use the **no** form of this command.

negotiation auto

no negotiation auto

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Interface configuration

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

- SV-Release
- S-Release

SV-Release	Modification
12.2(18)SV	This command was introduced.
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines This command is available on gigabitphy interfaces encapsulated for Gigabit Ethernet traffic and on multirate interfaces encapsulate for copper Fast Ethernet or copper Gigabit Ethernet.

Examples The following example shows how to enable autonegotiation on a gigabitphy interface.

```
Switch(config)# configure terminal
Switch(config-if)# interface gigabitphy 3/0/0
Switch(config-if)# encapsulation gigabitethernet
Switch(config-if)# negotiation auto
```

The following example shows how to disable autonegotiation on a multirate interface.

```
Switch(config)# configure terminal
Switch(config-if)# interface multirate 8/0/3
Switch(config-if)# encapsulation gigabitethernet copper
Switch(config-if)# no negotiation auto
```

Related Commands

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

optical attenuation automatic desired-power

To configure automatic attenuation on a voain interface, use the **optical attenuation automatic desired-power** command. To revert to manual attenuation at the previously configured automatic desired power value, use the **no** form of the command.

optical attenuation automatic desired-power *value*

no optical attenuation automatic desired-power

Syntax Description	<i>value</i>	Specifies the attenuation value in 0.1 dB. The range is –400 to 250.
---------------------------	--------------	--

Defaults	None
-----------------	------

Command Modes	Interface configuration
----------------------	-------------------------

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

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

EV-Release	Modification
12.1(12c)EV1	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 automatically set the optical attenuation on a WB-VOA module interface. Once you set a desired signal power and the system checks every second until the signal power comes into attenuable range. Then the system sets the attenuation so that the signal transmits at the desired power value. The system waits 60 seconds before checking the signal power again and adjusting the attenuation if necessary. The system automatically adjusts the attenuation only if it is at least 0.5 dBm out of range.

To determine the desired power setting, use the **show interfaces** command with the **attenuation desired-power** keywords.



Note

Automatic attenuation and manual attenuation are mutually exclusive. Only one method can be active at a given time. If manual attenuation is in effect, the **optical attenuation automatic desired-power** command overrides that configuration.

Examples

The following example shows how to set the optical attenuation on a WB-VOA module interface.

```
Switch# configure terminal
Switch(config)# interface voain 7/0/0
Switch(config-if)# optical attenuation automatic desired-power 100
```

Related Commands

Command	Description
optical attenuation manual	Manually sets the attenuation value for the input interfaces on VOA modules.
show interfaces	Displays interface information.

optical attenuation manual

To manually set the attenuation level on a VOA module interface, use the **optical attenuation manual** command. To revert to the default value, use the **no** form of the command.

optical attenuation manual *value*

no optical attenuation manual

Syntax Description

value Specifies the attenuation value in 0.1 dB. The *value* range for WB-VOA modules is 17 to 300. The *value* range for single band PB-OE modules is 34 to 300. The *value* range for dual band PB-OE modules is 37 to 300.

Defaults

For single and double WB-VOA (wide-band variable optical attenuator) modules the default is 1.7 dB.
For single band PB-OE (per-band optical equalizer) modules the default is 3.4 dB.
For dual band PB-OE modules the default is 3.7 dB.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV1	Changed command to optical attenuation manual .
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 manually set the optical attenuation on a VOA module interface.

To determine the power setting, use the **show interfaces** command with the **attenuation desired-power** keywords.



Note

Automatic attenuation and manual attenuation are mutually exclusive. Only one method can be active at a given time. If automatic attenuation is in effect, the **optical attenuation manual** command overrides that configuration.

Examples

The following example shows how to set the optical attenuation on a WB-VOA module interface.

```
Switch# configure terminal
Switch(config)# interface voain 7/0/0
Switch(config-if)# optical attenuation manual 100
```

The following example shows how to set the optical attenuation on a PB-OE module interface.

```
Switch# configure terminal
Switch(config)# interface voafilterin 7/0/0.1
Switch(config-subif)# optical attenuation manual 100
```

Related Commands

Command	Description
optical attenuation automatic desired-power	Configures automatic attenuation on a WB-VOA module interface.
show interfaces	Displays interface information.

optical threshold power receive

To set the optical threshold power for alarms on a transponder line card, VOA module, 2.5-Gbps ITU trunk card, 10-Gbps ITU tunable and non tunable trunk card, or 8-port multi-service muxponder use the **optical threshold power receive** command. To revert to the default values, use the **no** form of the command.

```
optical threshold power receive [after-attenuation] {low | high} {alarm | warning} value
[severity {critical | major | minor | not alarmed | not reported}]
```

```
no optical threshold power receive [after-attenuation] {low | high} {alarm | warning}
```

Syntax Description

after-attenuation	Indicates that the threshold is measured after passing through a VOA (variable optical attenuator) at this interface. This keyword is not present when there is no VOA at this interface.
low	Specifies a low threshold value.
high	Specifies a high threshold value.
alarm	Indicates that an alarm is raised when the threshold is exceeded.
warning	Indicates that a warning indication is reported when the threshold is exceeded.
<i>value</i>	The threshold value in tenths of a dBm. See the “Usage Guidelines” section for the ranges for each type of interface.
severity	Specifies the severity for the threshold.
critical	Indicates the threshold level for service-affecting conditions that require immediate corrective action. This severity applies only to alarms.
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 severity applies only to 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. This severity applies to both alarms and warnings.
not-alarmed	Indicates the threshold level for negligible discrepancies that do not cause alarm notifications to be generated. The information for these events is retrievable from the network element. This severity applies only to warnings.
not reported	Indicates the threshold level for negligible discrepancies that do not cause notifications to be generated. The information for these events is retrievable from the network element. This severity applies only to warnings.

Defaults

Interface Type	Low Alarm (dBm)	Low Warning (dBm)	High Warning (dBm)	High Alarm (dBm)
Voafilterin subinterface	-29	-27	9	11
Voain	-29	-27	9	11
2.5-Gbps ITU trunk card wavepatch	-28	-26	-10	-8
10-Gbps ITU tunable and non tunable trunk card wavepatch	-22	-20	-10	-8
Transponder line card active wavepatch	-28	-24	-10	-8
Transponder line card standby wavepatch	-28	-24	-15	-13
8-port multi-service muxponder wavepatch	-28	-24	-10	-8

Alarm severity: **major**

Warning severity: **not alarmed**

Command Modes

Interface configuration for WB-VOA modules, transponder line cards, 2.5-Gbps ITU trunk cards, and 10-Gbps ITU tunable and non tunable trunk cards

Subinterface configuration for PB-OE modules

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for the 2.5-Gbps ITU trunk card.
12.1(12c)EV2	Changed the default values for the 10-GE transponder module high warning and high alarm.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(25)SV	Added support for the 8-port multi-service muxponder.
12.2(26)SV	Added support for the 10-Gbps ITU tunable trunk card.
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 set the optical power thresholds for alarms and warning on VOA module interfaces, transponder line card interfaces, 2.5-Gbps ITU trunk card interfaces, 10-Gbps ITU tunable and non tunable trunk card interfaces, or 8-port multi-service muxponder interfaces.

The default value for high alarm threshold corresponds to the receiver saturation level for the transponder line card.

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 apply to 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, because 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 either to 10 dB below the power level measured at the interface when a signal exists or to -28 dB for transponder line cards, 8-port multi-service muxponders, and 2.5-Gbps ITU trunk cards, or to -22 dB for 10-Gbps ITU tunable and non tunable trunk cards, whichever value is higher.

**Note**

The value of a high warning threshold must be less than the value of the high alarm threshold. The value of a low warning threshold must be greater than the value of the low alarm threshold.

Examples

The following example shows how to set the optical power low alarm threshold on a PB-OE module.

```
Switch(config)# interface voafilterin 9/0/0.1
Switch(config-subif)# optical threshold power receive after-attenuation low alarm -210
```

The following example shows how to set the optical power high alarm threshold on a WB-VOA module.

```
Switch(config)# interface voain 8/0/0
Switch(config-if)# optical threshold power receive after-attenuation high alarm -200
```

The following example shows how to set the optical power low warning threshold on a wavepatch interface.

```
Switch(config)# interface wavepatch 4/0/0
Switch(config-if)# optical threshold power receive low warning -200
```

Related Commands

Command	Description
<code>show interfaces</code>	Displays interface information.

over-subscription

To oversubscribe 4-port 1-Gbps/2-Gbps FC aggregation cards, use the **over-subscription** command. To disable oversubscription, use the **no** form of this command.

over-subscription

no over-subscription

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:

- SV-Release

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

Usage Guidelines Oversubscription is supported only in the FC/FICON mode and not in the ISC mode. To maximize throughput, Cisco recommends that you configure oversubscription along with flow control. You can oversubscribe a 4-port 1-Gbps/2-Gbps FC aggregation card only if the following conditions are met:

- The 4-port 1-Gbps/2-Gbps FC aggregation cards at both ends are configured to support oversubscription and the Functional version is 1.20 or later.
- The IOS version is 12.2(29)SV or later.
- 10-Gbps ITU2 cards with Functional version 2.31 or later are installed.
- 2.5-Gbps trunk cards with Functional version 1.70 or later are installed.

Examples The following example shows how to enable oversubscription on a 4-port 1-Gbps/2-Gbps FC aggregation card:

```
Switch(config)# configure terminal
Switch(config-if)# interface portgroup 3/0/0
Switch(config-if)# over-subscription
Switch(config-if)# exit
```

The following example shows how to disable oversubscription on a 4-port 1-Gbps/2-Gbps FC aggregation card:

```
Switch(config)# configure terminal
Switch(config-if)# interface portgroup 3/0/0
Switch(config-if)# no over-subscription
Switch(config-if)# exit
```

Related Commands

Command	Description
sub-rate	Configures the subrate for the twogigabitphy interfaces that are part of an oversubscribed portgroup or a superportgroup.
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	Specifies the first patched interface. See the “Usage Guidelines” section for valid interface types.
transmit	Indicates that <i>interface1</i> is patched to <i>interface2</i> in the transmit direction.
receive	Indicates that <i>interface1</i> is patched to <i>interface2</i> in the receive direction.
interface2	Specifies the second patched interface. See the “Usage Guidelines” section for valid interface types.

Defaults

Both directions

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for wdmrelay interfaces.
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 OADM modules.

Valid patch connections between modules are:

- Thru interface to thru interface between OADM modules

```
thru slot1/subcard1 thru slot/subcard2
```

- OSC wave interface to OSC oscfilter interface

```
wave slot/subcard oscfilter slot/subcard
```

- OSC wave interface to WB-VOA voain interface
wave slot/subcard voain slot/subcard/port
- OSC oscfilter interface to WB-VOA voaout interface
oscfilter slot/subcard voaout slot/subcard/port
- Wavepatch interface to OADM filter interface
wavepatch slot/subcard/port filter slot/subcard/port
- Wavepatch interface to PSM wdmrelay interface
wavepatch slot/subcard/port wdmrelay slot/subcard/port
- OADM wdm interface to PSM wdmrelay interface
wdm slot/subcard wdmrelay slot/subcard/port
- OADM wdm interface to WB-VOA voain interface
wdm slot/subcard voain slot/subcard/port
- OADM wdm interface to WB-VOA voaout interface
wdm slot/subcard voaout slot/subcard/port
- OADM wdm interface to PB-OE voafilterin interface
wdm slot/subcard voafilterin slot/subcard/port
- OADM wdm interface to PB-OE voafilterout interface
wdm slot/subcard voafilterout slot/subcard/port
- PB-OE voabypassout interface to WB-VOA voain interface
voabypassout slot/subcard/port voain slot/subcard/port
- WB-VOA voaout interface to PB-OE voabypassin interface
voaout slot/subcard/port voabypassin slot/subcard/port
- PB-OE voabypassout interface to PB-OE voafilterin interface
voabypassout slot/subcard/port voafilterin slot/subcard/port
- PB-OE voafilterout interface to PB-OE voabypassin interface
voafilterout slot/subcard/port voabypassin slot/subcard/port

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**.

In case of an optical interface where the transmitted and received signals travel on two different strands of fiber, it is possible that each fiber is patched to a different interface. The direction keywords **receive** and **transmit** indicate whether *interface1* is patched to the *interface2* in the receive direction or the transmit direction. The absence of the keyword indicates that *interface1* is patched to *interface2* in both directions.

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.

**Note**

When a patch connection between a OADM module and a PSM is configured, topology learning on the wdm interface is disabled.

Examples

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

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

The following example shows how to describe the patch connection in the transmit direction between an OADM module and a PB-OE module.

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

Related Commands

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

portgroup

To map a twogigabitphy interface to a portgroup interface, use the **portgroup** command. To remove the interface mapping configuration, use the **no** form of the command.

portgroup *interface-number*

no portgroup

To map portgroups to a superportgroup on a 4-port 1-Gbps/2-Gbps FC aggregation card, use the **portgroup** command. To remove the interface mapping configuration, use the **no** form of the command.

portgroup *interface-number* {**identifier** *trunk flow identifier*}

no portgroup *interface-number*

Syntax Description

<i>interface-number</i>	Specifies the portgroup interface number to which to map the twogigabitphy interface. The range is 0 to 3.
identifier <i>trunk flow identifier</i>	Specifies the flow identifier of the trunk.

Defaults

None

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

- SV-Release

SV-Release	Modification
12.2(29)SV	Added support for oversubscription configurations.
12.2(23)SV	This command was introduced.

Usage Guidelines

If the portgroup is not oversubscribed, you can map two twogigabitphy interfaces carrying 1-Gbps traffic to a single portgroup interface. If the twogigabitphy interface carries 2-Gbps traffic, it is the only interface you can map to the portgroup interface. If oversubscription is enabled on the portgroup, any number of twogigabitphy interfaces can be mapped to the portgroup. The total subrates of all the clients in a portgroup must not exceed the portgroup bandwidth (250 MBps).

When a portgroup is associated to the superportgroup, oversubscription is automatically enabled on that portgroup. If you disassociate a portgroup from the superportgroup, oversubscription is automatically disabled on that portgroup. Moreover, while superportgroup is configured, oversubscription cannot be enabled on any other portgroup (in the same 4-port 1-Gbps/2-Gbps FC aggregation card) that is not part of the superportgroup. A portgroup that is associated to a superportgroup cannot be connected to any twogigabitphy interfaces.

In a superportgroup, client-to-client mappings are fixed. For instance, port-0 of the 4-port 1-Gbps/2-Gbps FC aggregation card at one end will communicate only with port-0 of the 4-port 1-Gbps/2-Gbps FC aggregation card at the other end.

Examples

The following example shows how to configure the mapping between a twogigabitphy interface and a portgroup interface.

```
Switch(config)# interface twogigabitphy 4/0/0
Switch(config-if)# portgroup 2
```

The following example shows how to configure the mapping between a portgroup interface and the superportgroup interface.

```
Switch# configure terminal
Switch(config)# interface superportgroup 7/0/0
Switch(config-if)# portgroup 0 identifier 16
```

Related Commands

Command	Description
encapsulation	Configures the encapsulation of the client signal on the interface.
superportgroup	Associates twogigabitphy interfaces encapsulated for FC or FICON traffic to a superportgroup.
show interfaces	Displays interface information.

show cdl defect-indication

To display the defect indication information on in-band message channel capable interfaces use the **show cdl defect-indication** command.

show cdl defect-indication [*interface interface* | **detail**]

Syntax Description	detail	Displays the defect indication information for in-band message channel capable interfaces.
	interface <i>interface</i>	Displays the defect indication information for a specific interface.

Defaults Displays a defect indication summary

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(10)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 This command is used to display the defect indication information on in-band message channel capable interfaces.

Examples The following example shows how to display in-band message channel defect indication information. (See Table 3-2 for field descriptions.)

```
Switch# show cdl defect-indication
CDL Defect-Indication Status Summary
Interface      Interface  DI      Defect-Indication      Defect-Indication
Name          Status    Status  Receive                 Transmit
-----
WaveE3/0      up        up      BDI-H                   None
WaveE4/0      up        up      None                    None
WaveE9/0      up        up      None                    None
WaveE10/0     up        up      None                    None
```

Table 3-2 *show cdl defect-indication Field Descriptions*

Field	Description
Interface Name	Shows the interface identifier.
Interface Status	Shows the interface status.
DI Status	Shows the defect indication status.
Defect-Indication Receive	Shows the defect indication on the receive signal.
Defect-Indication Transmit	Shows the defect indication on the transmit signal.

The following example shows how to display the defect indication information for in-band message channel capable interfaces.

```
Switch# show cdl defect-indication detail

Interface WaveEthernetPhy3/0
Operational Status      : up
Administrative Status   : up
CDL Status              : Enabled
Defect Indication state : up
Configured Node Behavior : None
Current Node Behavior   : Path Terminating
Defect Indication Receive : BDI-H
Defect Indication Transmit:      None
```

Related Commands

Command	Description
cdl defect-indication force hop-endpoint	Configures an interface as an end-of-hop.
cdl enable	Enables in-band message channel functionality.
cdl flow identifier	Specifies the in-band message channel flow identifier value.
debug cdl defect-indication	Initiates debugging of defect indication on in-band message channel capable interfaces.

show cdl flow

To display in-band message channel flow identifier and defect indication information on a per-flow basis, use the **show cdl flow** command.

```
show cdl flow [interface interface]
```

Syntax Description

<i>interface interface</i>	Displays flow identifier and defect indication information for a specific interface.
----------------------------	--

Defaults

Shows all flow identifiers and defect indications on the system

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)EV1	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

This command is used to display the flow identifier and defect indication information on in-band message channel capable interfaces.

Examples

The following example shows how to display in-band message channel flow identifier information. (See Table 3-3 for field descriptions.)

```
Switch# show cdl flow
```

```
DI = Defect Indication
```

Interface	Flow Identifier	DI Received from CDL network	DI Transmitted to CDL network
Esco9/0/0	50		
Esco9/0/1	255		
Esco9/0/2	255		
Esco9/0/3	255		

```

Esc09/0/4      255
Esc09/0/5      255
Esc09/0/6      255
Esc09/0/7      255
Esc09/0/8      255
Esc09/0/9      255
Esc010/0/0     255
Esc010/0/1     255
Esc010/0/2     255
Esc010/0/3     255
Esc010/0/4     255
Esc010/0/5     255
Esc010/0/6     255
Esc010/0/7     255
Esc010/0/8     255
Esc010/0/9     255

```

Table 3-3 *show cdl flow Field Descriptions*

Field	Description
Interface	Shows the interface identifier.
Flow Identifier	Shows the flow identifier for the interface. The default value is 255.
DI Received from CDL network	Shows the defect indications received for the flow.
DI Transmitted to CDL network	Shows the defect indications transmitted for the flow.

Related Commands

Command	Description
cdl defect-indication force hop-endpoint	Configures an interface as an end-of-hop.
cdl enable	Enables in-band message channel functionality.
cdl flow identifier	Specifies the in-band message channel flow identifier value.
debug cdl defect-indication	Initiates debugging of defect indication on in-band message channel capable interfaces.

show cdl flow defect-indication

To display in-band message channel defect indication information on a per-flow basis, use the **show cdl flow defect-indication** command.

```
show cdl flow defect-indication [interface interface]
```

Syntax Description	<code>interface <i>interface</i></code>	Displays defect indication information for a specific interface.
---------------------------	---	--

Defaults	Shows defect indications for all flows on the system
-----------------	--

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)EVI	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	This command is used to display the defect indication information on in-band message channel capable interfaces.
-------------------------	--

Examples	The following example shows how to display in-band message channel flow identifier information. (See Table 3-4 for field descriptions.)
-----------------	---

```
Switch# show cdl flow defect-indication
```

```
DI = Defect Indication
```

```
Interface          DI Received          DI Transmitted
                   from CDL network     to CDL network
-----
```

```
Esco10/0/0
Esco10/0/1
Esco10/0/2
Esco10/0/3
Esco10/0/4
```

```

Esc010/0/5
Esc010/0/6
Esc010/0/7
Esc010/0/8
Esc010/0/9

```

Table 3-4 *show cdl flow defect-indication Field Descriptions*

Field	Description
Interface	Shows the interface identifier.
DI Received from CDL network	Shows the defect indications received for the flow.
DI Transmitted to CDL network	Shows the defect indications transmitted for the flow.

Related Commands

Command	Description
cdl defect-indication force hop-endpoint	Configures an interface as an end-of-hop.
cdl enable	Enables in-band message channel functionality.
cdl flow identifier	Specifies the in-band message channel flow identifier value.
debug cdl defect-indication	Initiates debugging of defect indication on in-band message channel capable interfaces.

show cdl flow identifier

To display in-band message channel flow identifier information, use the **show cdl flow identifier** command.

```
show cdl flow identifier [interface interface]
```

Syntax Description	<code>interface <i>interface</i></code>	Displays flow identifier information for a specific interface.
---------------------------	---	--

Defaults Shows all flow identifiers on the system

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)EV1	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 This command is used to display the flow identifier information for in-band message channel capable interfaces.

Examples The following example shows how to display in-band message channel flow identifier information. (See Table 3-5 for field descriptions.)

```
Switch# show cdl flow identifier
Interface      Flow
                Identifier
-----
Escar8/0/0      80
Escar8/0/1      81
Escar8/0/2      82
Escar8/0/3      83
Escar8/0/4      84
Escar8/0/5      85
Escar8/0/6      86
Escar8/0/7      87
```



```

Esc08/0/8      88
Esc08/0/9      89
Esc010/0/0     100
Esc010/0/1     255
Esc010/0/2     255
Esc010/0/3     255
Esc010/0/4     255
Esc010/0/5     255
Esc010/0/6     255
Esc010/0/7     255
Esc010/0/8     255
Esc010/0/9     255

```

Table 3-5 *show cdl flow identifier Field Descriptions*

Field	Description
Interface	Shows the interface identifier.
Flow Identifier	Shows the flow identifier for the interface. The default value is 255.

Related Commands

Command	Description
cdl defect-indication force hop-endpoint	Configures an interface as an end-of-hop.
cdl enable	Enables in-band message channel functionality.
cdl flow identifier	Specifies the in-band message channel flow identifier value.
debug cdl defect-indication	Initiates debugging of defect indication on in-band message channel capable interfaces.

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 (transparent) interfaces and network trunk (wdm) interfaces of the shelf.
intermediate	Displays the complete connections between the client transparent interfaces and network trunk wdm interfaces of the shelf, including all the intermediate internal interfaces.
sort-channel	Sorts the display by channel number.
interface <i>interface</i>	Displays the intermediate connection information for a specific interface.

Defaults

Summary of configured cross connections

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(10)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

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 OADM interface.

Examples

The following example shows how to display configured cross connection information. (See Table 3-6 for field descriptions.)

```
Switch# show connect
Index Client Intf      Trunk Intf      Kind      C2TStatus  T2CliStatus
-----
15     Port3/0/0          WaveE8/0.1      Provisioned Up          Up
```

```
15 Port3/0/0 WaveE10/0.1 Protection Up Dormant
```

Table 3-6 *show connect Field Descriptions*

Field	Description
Index	Shows the index value in the MIB.
Client Intf	Shows the client interface identifier.
Trunk Intf	Shows the trunk interface identifier.
Kind	Indicates the kind of cross connections. The values are: <ul style="list-style-type: none"> Provisioned Protection
C2TStatus	Indicates the status of the signal from the client interface to the trunk interface. The values are: <ul style="list-style-type: none"> Up Down
T2CliStatus	Indicates the status of the signal from the trunk interface to the client interface. The values are: <ul style="list-style-type: none"> Up Dormant

The following example shows how to display edge connection information. (See Table 3-7 for field descriptions.)

```
Switch# show connect edges
client/
wave      wdm  channel
-----  -
Tran4/0/0    0/1    4
```

Table 3-7 *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 3-8 for field descriptions.)

```
Switch# show connect intermediate
client/      wave      wave      wdm
client/      wave      wave      wdm
wave         client    patch    filter    trk  channel
-----  -
Esco3/0/0   WaveE8/0  8/0/0*
              8/0/1
Esco3/0/1   WaveE8/0  8/0/0*
              8/0/1
Esco3/0/2   WaveE8/0  8/0/0*
```

```

      8/0/1
Esco3/0/3   WaveE8/0   8/0/0*
            8/0/1
Esco3/0/4   WaveE8/0   8/0/0*
            8/0/1
Esco3/0/5   WaveE8/0   8/0/0*
            8/0/1
Esco3/0/6   WaveE8/0   8/0/0*
            8/0/1
Esco3/0/7   WaveE8/0   8/0/0*
            8/0/1
Esco3/0/8   WaveE8/0   8/0/0*
            8/0/1
Esco3/0/9   WaveE8/0   8/0/0*
            8/0/1
client/    wave      wave      wdm
wave      client   patch    filter   trk   channel
-----
Tran4/0/0   Wave4/0   4/0/0*  0/1/3   0/1   4
            4/0/1
Tran7/0/0   Wave7/0   7/0/0
            7/0/1*  0/0/2   0/0   3

```

Table 3-8 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 3-9 for field descriptions.)

```

Switch# show connect interface transparent 2/0/0
client/    wave      wave      wdm
wave      client   patch    filter   trk   channel
-----
Esco3/0/0   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2
Esco3/0/1   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2
Esco3/0/2   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2
Esco3/0/3   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2
Esco3/0/4   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2
Esco3/0/5   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2
Esco3/0/6   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2
Esco3/0/7   WaveE8/0.1  8/0/0*  0/0/1   0/0   2
            8/0/1   0/1/1   0/1     2

```

```

Esco3/0/8      WaveE8/0.1    8/0/0* 0/0/1    0/0    2
                8/0/1  0/1/1    0/1    2
Esco3/0/9      WaveE8/0.1    8/0/0* 0/0/1    0/0    2
                8/0/1  0/1/1    0/1    2
client/        wave          wave          wdm
wave          client        patch  filter  trk  channel
-----
Tran4/0/0      Wave4/0        4/0/0* 0/1/3    0/1    4
                4/0/1
Tran7/0/0      Wave7/0        7/0/0
                7/0/1* 0/0/2    0/0    3

```

Table 3-9 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 OADM modules.
show optical wavelength mapping	Displays the mapping of the Cisco ONS 15530 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 3-10.
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:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for gigabitphy and wdmsplit interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces.
12.2(25)SV	Added support for multirate, wavesonetphy, and sdcc interfaces.
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 3-10 shows the interface types for the **show controller** command.

Table 3-10 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.

Table 3-10 Interface Types for the show controller Command (continued)

Type	Description
gigabitphy <i>slot/0/port</i>	Shows the gigabitphy interface information.
multirate <i>slot/0/port</i>	Show the multirate interface information.
oscfiler <i>slot/subcard</i>	Shows the OSC oscfiler interface information.
portgroup <i>slot/0/port</i>	Shows the portgroup interface information.
wavesonetphy <i>slot/0</i>	Shows the wavesonetphy information.
thru <i>slot/subcard</i>	Shows the thru interface information.
transparent <i>slot/0/0</i>	Shows the transparent interface information.
twogigabitphy <i>slot/0/port</i>	Shows the twogigabitphy interface information.
wave <i>slot[/subcard]</i>	Shows the wave interface information.
waveethernetphy <i>slot/0</i>	Shows the waveethernetphy interface information.
wavepatch <i>slot/0/port</i>	Shows the wavepatch interface information.
wdm <i>slot/subcard</i>	Shows the wdm interface information.

Examples

The following example shows how to display hardware register information about a transparent interface. (See Table 3-11 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
    RCIO 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 3-11 *show controllers Command Field Descriptions for Transparent 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: <ul style="list-style-type: none"> 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 line card 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 Fibre Channel and ESCON control and status information.

Table 3-11 *show controllers Command Field Descriptions for Transparent 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 line card wave interface. (See Table 3-11 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 3-11 for field descriptions.)

```

Switch# show controllers wave 3/0
Controller info for OSC wave interface Wave3/0
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 line card lasers.
laser control safety enable	Configures laser safety control on a wave, waveethernetphy, or tengigethernetphy interface.

Command	Description
loopback	Configures signal loopback on transparent and wave interfaces.
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]]] [attenuation desired-power value]
```

Syntax Description		
	type	Specifies one of the interface types listed in Table 3-12.
	slot	Specifies a chassis slot.
	subcard	Specifies a subcard position in a motherboard.
	port	Specifies a port.
	attenuation desired-power value	Specifies the desired attenuation power for voain interfaces.

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:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for gigabitphy, wdmrelay, and wdmsplit interfaces.
12.1(12c)EV1	Added the attenuation desired-power keyword.
SV-Release	Modification
12.2(29)SV	Added support for superportgroup interface.
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces.
12.2(25)SV	Added support for multirate, wavesonetphy, and sdcc interfaces.
S-Release	Modification
12.2(22)S	This command was integrated in this release from release 12.2(22)SV.

Usage Guidelines Table 3-12 shows the interface types for the **show interfaces** command.

Table 3-12 Interface Types for the *show interfaces* Command

Type	Description
esconphy <i>slot/0/port</i>	Shows the esconphy interface information.
fastethernet 0	Shows the NME interface information.
fastethernet-sby 0	Shows the NME interface information for the standby CPU switch module.
filter 0/subcard/port	Shows the filter interface information.
gigabitphy <i>slot/0/port</i>	Shows the gigabitphy interface information.
multirate <i>slot/0/port</i>	Show the multirate interface information.
oscfiler <i>slot/subcard</i>	Shows the OSC oscfiler interface information.
portgroup <i>slot/0/port</i>	Shows the portgroup interface information.
sdcc <i>slot/0/0</i>	Shows the sdcc interface information.
superportgroup <i>slot/0/port</i>	Shows the superportgroup interface information.
wavesonetphy <i>slot/0</i>	Shows the wavesonetphy information.
tengigethernetphy <i>slot/0</i>	Shows the tengigethernetphy interface information.
tengigethernetphy <i>slot/0.subinterface</i>	Shows the tengigethernetphy subinterface information.
thru 0/subcard	Shows the thru interface information.
transparent <i>slot/0/0</i>	Shows the transparent interface information.
twogigabitphy <i>slot/0/port</i>	Shows the twogigabitphy interface information.
voabypassin <i>slot/subcard/0</i>	Shows the voabypassin interface information.
voabypassout <i>slot/subcard/0</i>	Shows the voabypassout interface information.
voafilterin <i>slot/subcard/0.subinterface</i>	Shows the voafilterin interface information.
voafilterout <i>slot/subcard/0</i>	Shows the voafilterout interface information.
voain <i>slot/subcard/0.subinterface</i>	Shows the voain interface information.
voaout <i>slot/subcard/0</i>	Shows the voaout interface information.
wave <i>slot/0</i>	Shows the wave interface information.
wavepatch <i>slot/0/port</i>	Shows the wavepatch interface information.
waveethernetphy <i>slot/0</i>	Shows the waveethernetphy interface information.
waveethernetphy <i>slot/0.subinterface</i>	Shows the waveethernetphy subinterface information.
wdm 0/subcard	Shows the wdm interface information.
wdmrelay 0/subcard	Shows the wdmrelay interface information.
wdmsplit 0/subcard/port	Shows the wdmsplit interface information.

Examples

The following example shows how to display the configuration of a waveethernetphy interface:

```
Switch# show interfaces waveethernetphy 10/0
WaveEthernetPhy10/0 is down, line protocol is down
  Channel:30   Frequency:195.7 Thz   Wavelength:1531.90 nm
  Active Wavepatch      :Wavepatch10/0/1
  Splitter Protected    :No
```

```

Signal quality          :Loss of lock
Receive power level    :-35.0 dBm
Laser Bias Current     :91 mA
Laser Temperature      :31.0 degree C
Laser shut down        :No
Osc physical port      :No
Wavelength used for inband management:No
Loopback not set

Configured threshold Group:None
CDL HEC error count:0
Number of times SF threshold exceeded:0
Number of times SD threshold exceeded:0
CRC error count:0
Number of times SF threshold exceeded:0
Number of times SD threshold exceeded:0
Code violation and running disparity error count ( 64b66b cvrd):0
Number of times SF threshold exceeded:0
Number of times SD threshold exceeded:0

Defect Indication Status      :up
Configured Node Behavior      :None
Current Node Behavior          :Path Terminating
Defect Indication Receive     :      None
Defect Indication Transmit    :BDI-H

Total Tx Frames Sent to N/W:  0
Tx Gen CDL Idle Frame:       1843017892

Rx Frames rcvd from N/W:      0
Rx CRC Errors:                0
Rx HEC Errors:                0
Rx XGMII Errors:              0
Rx IPG drpd pkts:             0
Rx Idle Packets :              0
Rx Oversize Frames :          0
Rx Undersize Frames :          0

Rx SII mismatch drpd data Frames :  0
Rx SII mismatch drpd idle Frames :  0

Last clearing of "show interface" counters never
Hardware is data_enabled_port

```

The following example shows how to display transparent interface information. (See Table 3-13 for field descriptions.)

```

Switch# show interfaces transparent 3/0/0
Transparent3/0/0 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 3-13 *show interfaces transparent Field Descriptions*

Field	Description
Transparent 3/0/0 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.
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 information on a wavepatch interface. (See Table 3-14 for field descriptions.)

```

Switch# show interfaces wavepatch 1/0/0
Wavepatch1/0/0 is down, line protocol is down
  Receiver power level: < -23.00 dBm

  Optical threshold monitored for : Receive Power (in dBm)
  Threshold exceeded for      : Low Warning  and Low Alarm
  Low alarm value              = -22.0 dBm (default)

```

```

Low Alarm Severity          = major
Low warning value          = -20.0 dBm (default)
Low Warning Severity       = not alarmed
High alarm value           = -6.0 dBm (default)
High Alarm Severity       = major
High warning value         = -8.0 dBm (default)
High Warning Severity     = not alarmed
Hardware is passive_port

```

The following example shows how to display wave interface information. (See Table 3-14 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(bipl): 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 3-14 *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 in-band management.

Table 3-14 *show interfaces wave* Field Descriptions (continued)

Field	Description
Configured threshold group	Shows whether a threshold group has been configured for the interface.
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 data_only_port	Shows the interface type.

The following example shows how to display OSC wave interface information. (See Table 3-14 for field descriptions.)

```
Switch# show interfaces wave 2/0
Wave2/0 is up, line protocol is up
  Channel: 0      Frequency: 191.9 Thz      Wavelength: 1562.23 nm
  Laser safety control: Off
  Osc physical port: Yes
  Wavelength used for inband management: No
  Configured threshold Group: None
  Last clearing of "show interface" counters never
  Hardware is OSC_phy_port
  Internet address is 1.0.0.3/16
  MTU 1492 bytes, BW 10000000 Kbit, DLY 0 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SNAP, loopback not set
  Last input 00:00:00, 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
    0 packets input, 0 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
  14719 packets output, 971930 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 3-15 for field descriptions.)

```
Switch# show interfaces wdm 0/0
Wdm0/0 is up, line protocol is up
```

```

Wdm Hw capability: N/A
Num of Wavelengths Add/Dropped: 5
List of Wavelengths: 0, 25, 26, 27, 28
Hardware is wavelength_add_drop

```

Table 3-15 *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 OADM modules is optically patched.
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.

The following example shows how to display wdm interface information. (See Table 3-16 for field descriptions.)

```

Switch# show interfaces voain 1/0/0 attenuation desired-power 0
Current Output Power:                10.0dBm
  Desired Output Power:                0.0dBm
  Minimum settable Attenuation:        3.4dB
  Maximum settable Attenuation:        30.0dB
  Current set Attenuation:              3.4dB (default)
Attenuation needed to achieve Desired Output Power:13.4dB

```

Table 3-16 *show interfaces attenuation desired-power Field Descriptions*

Field	Description
Current Output Power:	Shows the current power of the signal leaving the VOA module.
Desired Output Power:	Shows the desired power for the signal leaving the VOA module.
Minimum settable Attenuation:	Shows the minimum attenuation value that can be set.
Maximum settable Attenuation:	Shows the maximum attenuation value that can be set.
Current set Attenuation	Shows the current attenuation value.
Attenuation needed to achieve Desired Output Power:	Shows the attenuation value that must be set to achieve the desired power.

Related Commands

Command	Description
laser control forward enable	Configures forward laser control on transparent and wave interfaces.
laser control safety enable	Configures laser safety control on wave interfaces.
loopback	Configures loopback on transparent and wave interfaces.

Command	Description
optical attenuation automatic desired-power	Configures automatic attenuation on a voain interface.
optical attenuation manual	Manually sets the attenuation value for the input interfaces on VOA modules.
show controllers	Displays interface controller information.

show optical filter

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

show optical filter [detail]

Syntax Description	detail	Shows optical patch connections between the OADM modules in addition to the channels supported. This information displays only if the patch connection has been configured with the patch command.
---------------------------	---------------	---

Defaults Displays only the channels supported by the OADM modules.

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(10)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 verify the system configuration.

Examples The following example shows how to display optical filter information. (See Table 3-17 for field descriptions.)

```
Switch# show optical filter
aggregate                filtered
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
Wdm0/1                   0       Oscfilter0/1
Wdm0/1                   1       Filter0/1/0
```

```

Wdm0/1          2          Filter0/1/1
Wdm0/1          3          Filter0/1/2
Wdm0/1          4          Filter0/1/3

```

Table 3-17 *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.
remaining	Indicates that the channels not supported on the OADM modules are passed thru to the next OADM module.
patched mux/demux interface	Shows the patch connection to another OADM module.

The following example shows how to display optical filter information on a shelf with OADM modules. (See Table 3-18 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             remaining        Thru0/0
Wdm0/1             0                Oscfilter0/1
Wdm0/1             1                Filter0/1/0
Wdm0/1             2                Filter0/1/1
Wdm0/1             3                Filter0/1/2
Wdm0/1             4                Filter0/1/3
Wdm0/1             remaining        Thru0/1

```

Table 3-18 *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.
remaining	Indicates that the channels not supported on the OADM modules are passed thru to the next OADM module.
patched mux/demux interface	Shows the patch connection to another OADM module.

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 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:

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

EV-Release	Modification
12.1(10)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 display the patch connections on the OADM modules configured with the **patch** command.

The error field in the **show patch** command output helps troubleshoot shelf misconfigurations. When there is a channel mismatch between a transponder line card and an OADM module, “Channel Mismatch” appears for the patch connection. When more than one OADM 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 3-19 for field descriptions.)

```
Switch# show patch
Patch Interface      Patch Interface      Type      Dir      Error
-----
Oscfilter0/1        Wave2/1              USER     Both
Oscfilter0/0        Wave2/0              USER     Both
Filter0/1/2         Wavepatch10/0/0     USER     Both
Filter0/0/1         Wavepatch8/0/0      USER     Both
Filter0/1/1         Wavepatch8/0/1      USER     Both
```

```
Filter0/1/3      Wavepatch4/0/0    USER    Both
Filter0/0/2      Wavepatch7/0/1    USER    Both
```

The following example shows how to display detailed patch connection information. (See Table 3-19 for field descriptions.)

```
Switch# show patch detail
Patch Interface    Patch Interface    Type    Dir    Error
-----
Oscfilter0/1      Wave2/1            USER    Both
Oscfilter0/0      Wave2/0            USER    Both
Filter0/0/2        Wavepatch7/0/1     USER    Both
Filter0/0/1        Wavepatch8/0/0     USER    Both
Filter0/1/2        Wavepatch10/0/0    USER    Both
Filter0/1/1        Wavepatch8/0/1     USER    Both
Filter0/1/3        Wavepatch4/0/0     USER    Both

Switch# show patch detail
Patch Interface    Patch Interface    Type    Error
-----
Filter0/0/0        Wavepatch7/0/0     AUTOMATIC    Channel Mismatch
```

Table 3-19 *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]
```

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

Defaults Displays all performance history counters (the current counter, all 15-minute history counters, and the 24-hour counter) for all Cisco ONS 15530 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 view the performance history counters for the Cisco ONS 15530 interfaces.

Examples The following example shows how to display the current counter for an esconphy interface. (See Table 3-20 for field descriptions.)

```
Switch# show performance current esconphy 9/0/0
Current 15 minute performance register
-----
Interface      : EsconPhy9/0/0
Interval Number : 23

Elapsed Time(seconds) : 454
Valid Time(seconds)   : 454

Received Frames : 121203104
Transmit Frames : 121203101
CRC Error count : 659
Code violation and running disparity error count : 9
Egress Packet Sequence error count : 0
Egress Packet Indicated error count : 10
```

Table 3-20 *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 for the current counter.
Valid Time	Shows the time period during which the current counter was in the no shutdown state. A current counter with zero valid time will not contain any valid data.
Received Frames	Shows the total number of ESCON frames that were received from the client device during the elapsed time of the current performance counter.
Transmit Frames	Shows the total number of ESCON frames that were transmitted to the client device during the elapsed time of the current performance counter.
CRC Error Count	Shows the total number of ESCON frames that were received with CRC errors during the elapsed time of the current performance counter.
Code violation and running disparity error count	Shows the total number of code violation and running disparity (CVRD) errors in the ESCON frames that were received from the client device during the elapsed time of the current performance counter.
Egress Packet Sequence error count	Shows the total number of missing or out-of-order packets that were received from the client device during the elapsed time of the current performance counter.
Egress Packet Indicated error count	Shows the total number of packets that were carrying an error indication during the elapsed time of the current performance counter.

The following example shows how to display the 15-minute history counter for a gigabitphy interface. (See Table 3-21 for field descriptions.)

```
Switch# show performance history gigabitphy 2/0/0 53
15 minute performance history register
-----
Interface      : GigabitPhy2/0/0
Interval Number : 53

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

Received Frames : 17328419
Received Bytes  : 25992628500
Transmit Frames : 17328419
Transmit Bytes  : 25992630000
RX CRC Errors   : 0
TX CRC Errors   : 0
Code violation and running disparity error count : 0
Giant Packets   : 0
Runt Packets    : 0
```

Table 3-21 *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.
Received Frames	Shows the total number of Gigabit Ethernet (GE) frames that were received from the client device during the 15 minute period.
Received Bytes	Shows the total number of GE bytes that were received from the client device during the 15 minute period.
Transmit Frames	Shows the total number of GE frames that were transmitted to the client device during the 15 minute period.
Transmit Bytes	Shows the total number of GE bytes that were transmitted to the client device during the 15 minute period.
Rx CRC Error Count	Shows the total number of GE frames that were received with CRC errors during the 15 minute period.
Tx CRC Error Count	Shows the total number of GE frames that were transmitted with CRC errors during the 15 minute period.
Code violation and running disparity error count	Shows the total number of CVRD errors in the GE frames that were received from the client device during the 15 minute period.
Gaint Packets	Shows the total number of GE packets that were received with size greater than 10232 bytes during the 15 minute period.
Runt Packets	Shows the total number of GE packets that were received with size less than 64 bytes during the 15 minute period.

The following example shows how to display the 24-hour counter for a portgroup interface. (See Table 3-22 for field descriptions.)

```
Switch# show performance 24-hour portgroup 4/0/0
24 hour performance register
-----
Interface      : Portgroup4/0/0

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

Transmit Frames      : 57373022290
Received Frames      : 57372085236
Oversized Frames     : 0
Undersized Frames    : 21
Code violation and running disparity error count : 4294967295
Secondary fabric CVRD count : 0
```

■ show performance

```
CRC error count          : 0
CDL HEC error count     : 23
SII Mismatch error count : 24
```

Table 3-22 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.
Transmit Frames	Shows the total number of GE frames that were transmitted to the client port during the 24 hour period.
Received Frames	Shows the total number of GE frames that were received from the client port during the 24 hour period.
Oversized Frames	Shows the total number of GE frames that were received with size greater than 10232 bytes during the 24 hour period.
Undersized Frames	Shows the total number of GE packets that were received with size less than 64 bytes during the 24 hour period.
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.
Secondary fabric CVRD count	Shows the total number of secondary CVRD errors in the GE frames that were received from the fabric during the 24 hour period.
CRC Error Count	Shows the total number of GE frames that were received with CRC errors 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.
SII Mismatch error count	Shows the total number of GE frames that were received with SII mismatch errors 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 and the interface counters.
clear performance history	Clears the performance history counters.

show tsi

To display the TSI (Time Slot Interchange) information on the 8-port multi-service muxponders, use the **show tsi** command.

```
show tsi [slot-number]
```

Syntax Description	<i>slot-number</i>	Displays TSI information for a specific slot.
---------------------------	--------------------	---

Defaults Displays TSI information for all slots.

Command Modes EXEC and privileged EXEC

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

- SV-Release

SV-Release	Modification
12.2(25)SV	This command was introduced.

Usage Guidelines

The 8-port multi-service muxponder assigns variable bandwidth using correctly sized STS-*n* streams for each client protocol and then aggregates the STS-*n* streams to form a 2.5-Gbps ITS signal. The aggregated signal is demultiplexing in the receive direction. This is achieved using a time slot interchange (TSI) mapping scheme.

Each supported client protocol uses a fixed number of STS-1 streams. Table 3-23 shows the bandwidth allocation.

Table 3-23 Bandwidth Allocation for Supported Protocols

Protocol	Bandwidth (in STS-1 streams)
Gigabit Ethernet (optical and copper)	21
Fibre Channel	18
FICON	18
Fast Ethernet (optical and copper)	3
ESCON	4
SONET OC-3	4
SDH STM-1	4
DVB-ASI	5
SDI	6
T1	1

Table 3-23 Bandwidth Allocation for Supported Protocols (continued)

Protocol	Bandwidth (in STS-1 streams)
E1	1
ITS	5

The trunk signal rate is 2.5-Gbps, which translates to 48 STS-1 streams. The STS-1 stream allocation algorithm is a simple top-down search using the first available required number of STS-1 streams.

Based on the order in which client protocols are configured and removed across the various client ports, the resulting TSI mapping in the client-to-trunk transmit direction can vary. The TSI protocol sends the transmit TSI mapping to the remote muxponder where it is used to program the trunk receive TSI maps.

**Note**

The port-to-port mapping on the 8-port multi-service muxponder is static. For example, port 0 on the local muxponder maps to port 0 on the remote muxponder, port 1 on the local muxponder maps to port 1 on the remote muxponder, and so on.

Examples

The following example shows how to display TSI information. (See Table 3-24 for field descriptions.)

```
Switch# show tsi 1
Port  Local  Peer  Error      Trunk STS Map
      Encap  Encap      Transmit  Receive

Card: 1, TSI Ver: 1, DCC: SDCC1/0/0, TSI-Protocol: Enabled

 0.  CFE     CFE     -      00 00 00 00 00 07  00 00 00 00 00 07
 1.  CFE     CFE     -      00 00 00 00 00 38  00 00 00 00 00 38
 2.  CFE     CFE     -      00 00 00 00 01 C0  00 00 00 00 01 C0
 3.  None    None    -
 4.  None    None    -
 5.  None    None    -
 6.  None    None    -
 7.  None    None    -
Available STS= 39
-----

Card: 9, TSI Ver: 1, DCC: SDCC9/0/0, TSI-Protocol: Enabled

 0.  T1      T1      -      00 00 00 00 00 01  00 00 00 00 00 01
 1.  FC1     FC1     -      00 FF FE 00 00 0E  00 00 00 07 FF FE
 2.  T1      T1      -      00 00 00 00 00 01  00 00 00 00 00 01
 3.  CFE     CFE     -      07 00 00 00 00 00  00 00 00 38 00 00
 4.  E1      E1      -      00 00 00 00 00 01  00 00 00 00 00 01
 5.  CGE     CGE     -      00 00 01 FF FF F0  07 FF FF C0 00 00
 6.  T1      ESCON   M      00 00 00 00 00 01  78 00 00 00 00 00
 7.  None    None    -
Available STS= 47
-----
```

The following concepts are shown by the muxponder in slot 9:

- Fibre Channel is configured on port 1 (multirate 9/0/1 interface) on the local and remote muxponders. The Trunk STS Transmit field shows that 18 STS-1 (F+F+F+E+E = 4+4+4+3+3) streams are used for this interface. The exact STS-1 streams used are 2 through 5 and 25 through 40.

The Trunk STS Receive field shows that the STS-1 streams 2 to 19 on the incoming STS-48 signal carry client data from the remote node for this port. A similar explanation can be extended to port 3 (multirate 9/0/3) and port 5 (multirate 9/0/5).

- As shown by ports 0, 2, and 4, all the ports with T1 and E1 encapsulation use the same STS-1 stream. In this example, the first STS-1 stream on both the local and remote muxponders is used.
- If the configured local protocol encapsulation differs from the configured protocol on the remote port, the Error field indicates this as M, which indicates protocol mismatch.

Table 3-24 *show tsi Field Descriptions*

Field	Description
Port	Shows the port number.
Local Encap	Shows the protocol encapsulation of the local port.
Remote Encap	Shows the protocol encapsulation of the remote port.
Error	Shows the error state. An M value indicates a protocol mismatch.
Trunk STS Map Transmit	Shows the hexadecimal bit map for the STS usage for the STS-48 signal transmitted to the trunk. For each port this field shows the STS-1 streams used to transmit the client data from the port to the trunk. This field is displayed in hexadecimal format. The 48 bits represent the 48 STS-1 streams. A value one (1) for a particular STS-1 stream indicates that it is currently used by the corresponding port.
Trunk STS Map Receive	Shows the hexadecimal bit map for the STS usage for the STS-48 signal received from the trunk. For each port this field shows the STS-1 streams used to transmit the client data from the trunk to the port. This field is displayed in hexadecimal format. The 48 bits represent the 48 STS-1 streams. A value one (1) for a particular STS-1 stream indicates that it is currently used by the corresponding port.
Card:	Shows the slot number in the shelf.
TSI Ver:	Shows the TSI version.
DCC:	Shows the DCC interface identifier.
Available STS=	Shows the number of STS-1 streams available.

Related Commands

Command	Description
tsi-protocol	Enables the TSI protocol on a wavesonetphy interface.

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, esconphy, gigabitphy, twogigabitphy, and multirate interfaces, use the **shutdown** command to turn off the transmit lasers. To turn the transmit lasers on, use the **no shutdown** command.

On wave, waveethernetphy, or tengigethernetphy interfaces, a **shutdown** command issued does not affect administrative status of the corresponding wavepatch interfaces. To administratively shut down the wavepatch interfaces, issue **shutdown** commands directly. Also, the **shutdown** command does not shut down the laser on these interfaces or stop CDL message traffic. To shut down the laser, use the **laser shutdown** command.

On wavesonetphy interfaces, the **shutdown** command does not affect data or DCC traffic or the status of the wavepatch interfaces. To administratively shut down the wavepatch interfaces, issue **shutdown** commands directly. To shut down the laser, use the **laser shutdown** command.

To use splitter line cards for line card protection, you must shut down the standby wavepatch interfaces. (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 wave 3/0
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 card or muxponder.

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

Related Commands

Command	Description
laser shutdown	Shuts down the ITU laser.
show interfaces	Displays system interfaces.

tsi-protocol

To enable the TSI protocol on a wavesonetphy interface, use the **tsi-protocol** command. To disable this feature, use the **no** form of the command.

tsi-protocol

no tsi-protocol

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Interface configuration

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

- SV-Release

SV-Release	Modification
12.2(25)SV	This command was introduced.

Usage Guidelines Use the **show tsi** command to verify the status of the STS maps on both nodes.

If the TSI Protocol is disabled, then the user must ensure that the local trunk transmit STS maps match with the remote trunk receive STS map using the **show tsi** command.



Note

The OSCP protocol must be in the 2way state for the STS maps to be exchanged through the TSI protocol. Use the **show oscp interface** command to verify the OSCP state.



Note

Traffic cannot flow through the 8-port multi-service muxponders until the STS maps are synchronized.

You can ensure that the maps are the same by provisioning the interfaces on each node in the same order.

Examples

The following example shows how to disable the TSI protocol on a wavesonetphy interface.

```
Switch# configure terminal
Switch(config)# interface wavesonetphy 4/0
Switch(config-if)# no tsi-protocol
```

Related Commands

Command	Description
show oscp interface	Display OSCP interface information.
show performance	Displays TSI protocol information.

tx-buffer size

To set the transmit buffer size for ESCON aggregation cards, 4-port 1-Gbps/2-Gbps FC aggregation cards, and 8-port Fibre Channel/Gigabit Ethernet aggregation cards, use the **tx-buffer size** command. To revert to the default value, use the **no** form of the command.

tx-buffer size *bytes*

no tx-buffer size

Syntax Description	<i>bytes</i>	Specifies the transmit buffer size. The range is 16 to 232 on esconphy interfaces and 256 to 13,824 on gigabitphy interfaces.
---------------------------	--------------	---

Defaults	16 bytes for esconphy interfaces on an ESCON aggregation card. 256 bytes for gigabitphy interfaces on an 8-port FC/GE aggregation card. 256 bytes for twogigabitphy interfaces on a 4-port 1-Gbps/2-Gbps FC aggregation card carrying 1-Gbps traffic. 512 bytes for twogigabitphy interfaces on a 4-port 1-Gbps/2-Gbps FC aggregation card carrying 2-Gbps traffic.
-----------------	--

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.1(12c)EV	This command was introduced.
	12.1(12c)EV1	This command is now configured on the esconphy interfaces on an ESCON aggregation card instead of the portgroup interface.
	12.2(23)SV	Added support for twogigabitphy interfaces on a 4-port 1-Gbps/2-Gbps FC aggregation card.

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

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

EV-Release	Modification
12.1(12c)EV	This command was introduced.
12.1(12c)EV1	This command is now configured on the esconphy interfaces on an ESCON aggregation card instead of the portgroup interface.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces on a 4-port 1-Gbps/2-Gbps FC aggregation card.

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

Usage Guidelines

The ESCON aggregation card and 8-port FC/GE aggregation card add latency to the traffic transmission depending on the services configured on the transmitting node. Use the values listed in Table 3-25 to configure the transmission buffer on the esconphy interface on the ESCON aggregation card on the receiving node.

Table 3-25 ESCON Transmit Buffer Settings for ESCON Aggregation Cards

Traffic Mix on Transmitting Node	Transmit Buffer Size (in Bytes) on the Receiving Node			
	No GE	1518-Byte GE Packets	4470-Byte GE Packets	10,230-Byte GE Packets
ESCON only	16 (default)			
ESCON and FC/FICON/ISC on the same 10-Gbps ITU tunable or non tunable trunk card	16 (default)			
ESCON and GE only on the same 10-Gbps ITU tunable or non tunable trunk card		24	72	168

**Note**

Changing the transmit buffer size on one esconphy interface changes it for all esconphy interfaces on the ESCON aggregation card.

Use the values listed in Table 3-26 and Table 3-27 to configure the transmission buffer on the twogigabitphy interfaces on the 4-port 1-Gbps/2-Gbps FC aggregation card on the receiving node.

**Note**

FC and FICON traffic on interfaces with buffer credits enabled with the **flow control** command is not affected by latency.

Table 3-26 1-Gbps FC, FICON, and ISC Latency Values for 4-port 1-Gbps/2-Gbps FC Aggregation Cards

Traffic Mix on Transmitting Node	Transmit Buffer Size (in Bytes) on the Receiving Node			
	No GE	1518-Byte GE Packets	4470-Byte GE Packets	10,232-Byte GE Packets
One FC/FICON/ISC signal only on the 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU trunk card	256 (default)			
Two FC/FICON/ISC signals only on the 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU trunk card	256 (default)			

Table 3-26 1-Gbps FC, FICON, and ISC Latency Values for 4-port 1-Gbps/2-Gbps FC Aggregation Cards (continued)

One FC/FICON/ISC signal only on the 2.5-Gbps aggregated signal carried over a 10-Gbps ITU tunable or non tunable trunk card	256 (default)			
Two FC/FICON/ISC signals only on the 2.5-Gbps aggregated signal carried over a 10-Gbps ITU tunable or non tunable trunk card	256 (default)			
One FC/FICON/ISC signal only on the 2.5-Gbps aggregated signal carried over a 10-Gbps ITU tunable or non tunable trunk card		384	640	1280
Two FC/FICON/ISC signals and GE on the same 2.5-Gbps aggregated signal carried over a 10-Gbps ITU tunable or non tunable trunk card		384	640	1280

Table 3-27 2-Gbps FC, FICON, and ISC Latency Values for 4-port 1-Gbps/2-Gbps FC Aggregation Cards

Traffic Mix on Transmitting Node	Transmit Buffer Size (in Bytes) on the Receiving Node			
	No GE	1518-Byte GE Packets	4470-Byte GE Packets	10,232-Byte GE Packets
One FC/FICON/ISC signal only on the 2.5-Gbps aggregated signal carried over a 2.5-Gbps ITU trunk card	512 (default)			
One FC/FICON/ISC signal only on the 2.5-Gbps aggregated signal carried over a 10-Gbps ITU tunable or non tunable trunk card	512 (default)			
One FC/FICON/ISC signal only on the 2.5-Gbps aggregated signal carried over a 10-Gbps ITU tunable or non tunable trunk card		768	1280	2560

Use the values listed in Table 3-28 to configure the transmission buffer on the gigabitphy interfaces on the 8-port FC/GE aggregation card on the receiving node.

**Note**

The transmit buffer must be configured correctly for all gigabitphy interfaces encapsulated for FC, FICON, or ISC traffic regardless of the flow control mode configured on the interfaces.

Table 3-28 FC, FICON, and ISC Transmit Buffer Settings for Gigabitphy Interfaces

Traffic Mix on Transmitting Node	Transmit Buffer Size (in Bytes) on the Receiving Node			
	No GE	1518-Byte GE Packets	4470-Byte GE Packets	10,232-Byte GE Packets

Table 3-28 FC, FICON, and ISC Transmit Buffer Settings for Gigabitphy Interfaces (continued)

FC/FICON/ISC only on the port pair ¹ carried over a 2.5-Gbps ITU trunk card	256 (default)			
FC/FICON/ISC only on the port pair carried over a 10-Gbps ITU trunk card	256 (default)			
FC/FICON/ISC only on the port pair mixed with GE on the same 10-Gbps ITU trunk card		384	640	1280
FC/FICON/ISC and GE on the same port pair carried over a 2.5-Gbps ITU trunk card		768	1792	3712
FC/FICON/ISC and GE on the same port pair carried over a 10-Gbps ITU trunk card		1280	3584	7296

1. A port pair on an 8-port FC/GE aggregation card consists of ports 0–1, 2–3, 4–5, or 6–7.

**Caution**

Momentary disruption of data flow through the interface might occur when using the **tx-buffer size** command. On an ESCON aggregation card, all esconphy interfaces might experience momentary disruption of data flow.

Examples

The following example shows how to set the transmit buffer size for a gigabitphy interface on the receiving node.

```
Switch# configure terminal
Switch(config)# interface gigabitphy 2/0/0
Switch(config-if)# shutdown
Switch(config-if)# tx-buffer size 250
Switch(config-if)# no shutdown
```

Related Commands

Command	Description
show interfaces	Displays interface information.
flow control	Enables buffer credits for FC and FICON traffic on 8-port FC/GE aggregation cards.

sub-rate

To configure subrates for twogigabitphy interfaces that part of an oversubscribed portgroup or a superportgroup on a 4-port 1-Gbps/2-Gbps FC aggregation card, use the **sub-rate** command. To remove the subrate configuration, use the **no** form of the command.

```
sub-rate rate {lock| }
```

```
no sub-rate
```

Syntax Description	rate	lock
	Specifies the subrate for twogigabitphy interfaces that are part of an oversubscribed portgroup or a superportgroup. Subrate is specified in megabytes per second (MBps).	Specify lock if you want to lock the client bandwidth. To unlock it, execute the sub-rate command without the lock attribute.

Defaults The default subrate is 1 MBps.

Command Modes Interface configuration

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

- SV-Release

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

Usage Guidelines When you oversubscribe a portgroup, you need to configure subrates for every client interface. Subrate is specified in megabytes per second (MBps). For example, to permit full-rate 1-Gbps or 2-Gbps FC traffic over an oversubscribed portgroup, you must specify 106 MBps or 212 MBps as the subrate for that client interface. By default, for each client interface, subrate is set to 1 MBps.

Subrates can be configured only for those client interfaces that are already connected to an oversubscribed portgroup or superportgroup. Incorrect subrate configuration can lead to under utilization of the portgroup bandwidth.

Examples The following example shows how to configure the subrate for a twogigabitphy interface that is part of an oversubscribed portgroup.

```
Switch# configure terminal
Switch(config)# interface twogigabitphy 4/0/0
Switch(config-if)# sub-rate 50
```


Related Commands

Command	Description
over-subscription	Enables oversubscription on the 4-port 1-Gbps/2-Gbps FC aggregation card's portgroup interface.
superportgroup	Associates twogigabitphy interfaces to the superportgroup.
show interfaces	Displays interface information.

superportgroup

To associate twogigabitphy interfaces encapsulated for FC or FICON traffic to a superportgroup, use the **superportgroup** command. To remove the superportgroup configuration, use the **no** form of the command.

superportgroup

no superportgroup

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:

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

Usage Guidelines To configure superportgroup, the following system requirements must be met:

- 4-port 1-Gbps/2-Gbps FC aggregation cards with Functional version 1.20 or later are installed at both ends.
- The Cisco IOS version is 12.2(29)SV or later.
- 10-Gbps trunk cards with Functional version 2.31 or later are installed.
- Superportgroup is configured at both ends.

Examples The following example shows how to associate a superportgroup to a twogigabitphy interface:

```
Switch(config)# configure terminal
Switch(config-if)# interface twogigabitphy 3/0/0
Switch(config-if)# superportgroup
```

Related Commands	Command	Description
	sub-rate	Configures subrates for twogigabitphy interfaces that are part of an oversubscribed portgroup or a superportgroup.
	show interfaces	Displays interface information.
	portgroup	Maps portgroups to a superportgroup on the 4-port 1-Gbps/2-Gbps FC aggregation card.



Online Diagnostics Commands

Online diagnostics test the accessibility of the components on the Cisco ONS 15530. Use the following commands to configure and monitor online diagnostic operations.

diag online

To enable online diagnostics for the system, use the **diag online** command. To disable online diagnostics for the system, use the **no** form of this command.

diag online

no diag online

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(10)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 enable or disable online diagnostics for the system. Online diagnostics run in background mode or during OIR (online insertion and removal). Any slot level diagnostics previously configured with the **diag online slot** command take precedence over the **diag online** command.

When online diagnostics are disabled, no further diagnostics can run.

Examples The following example shows how to enable online diagnostics.

```
Switch# configure terminal
Switch(config)# diag online
```

Related Commands

Command	Description
debug diag online	Enables debugging of the online diagnostics.
diag online slot	Enables online diagnostics for a specified slot number.
diag online subslot	Enables online diagnostics for a specified subslot number.
show diag online	Displays the configuration and status of the online diagnostics.
show diag online detail	Shows detailed online diagnostic test results for the shelf.
show diag online slot	Shows detailed online diagnostic test results for a specific slot.

diag online slot

To enable online diagnostics for a specified slot number, use the **diag online slot** command. To disable online diagnostics for a specified slot number, use the **no** form of this command.

diag online slot *slot-number* [**timer** *seconds*]

no diag online slot *slot-number* [**timer** *seconds*]

Syntax Description	slot-number	Specifies the number of the slot on which to run online diagnostics. The range is 0 to 10.
	timer <i>seconds</i>	Specifies a timer the background tests. The range is 30 to 600 seconds. The default value is 60 seconds.

Defaults	Disabled The timer default is 60 seconds.
----------	--

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

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

EV-Release	Modification
12.1(10)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 enable or disable online diagnostics for a specified slot number. It can be useful to disable online diagnostics on a particular slot when there is a spurious error that causes excessive console messages.
------------------	--

Examples The following example shows how to enable online diagnostics for a specific slot number.

```
Switch# configure terminal
Switch(config)# diag online slot 2
```

The following example shows how to enable online diagnostics on all the slots and then disable online diagnostics for a specific slot number.

```
Switch# configure terminal
Switch(config)# diag online
Switch(config)# no diag online slot 10
```

Related Commands

Command	Description
debug diag online	Enables debugging of the online diagnostics.
diag online	Enables online diagnostics for the system.
diag online subslot	Enables online diagnostics for a specified subslot number.
show diag online	Displays the configuration and status of the online diagnostics.
show diag online detail	Shows detailed online diagnostic test results for the shelf.
show diag online slot	Shows detailed online diagnostic test results for a specific slot.

diag online subslot

To enable online diagnostics for a specified subslot number, use the **diag online subslot** command. To disable online diagnostics for a specific slot number, use the **no** form of this command.

diag online subslot *slot/subcard* [**timer** *seconds*]

no diag online subslot *slot/subcard* [**timer** *seconds*]

Syntax Description		
slot	Specifies the number of the slot on which to run online diagnostics. The range is 0 to 10.	
subcard	Specifies the number of the subslot on which to run online diagnostics. The range is 0 to 1.	
timer <i>seconds</i>	Specifies a timer the background tests. The range is 30 to 600 seconds. The default value is 60 seconds.	

Defaults
Disabled
The timer default is 60 seconds.

Command Modes
Global configuration

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

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable online diagnostics for a specific subslot.
You can disable online diagnostics on a particular subslot when there is a spurious error that causes excessive console messages.

Examples
The following example shows how to enable online diagnostics for a specific slot number.

```
Switch# configure terminal
```



```
Switch(config)# diag online subslot 0/0
```

The following example shows how to enable online diagnostics on all the slots and then disable online diagnostics for a specific slot number.

```
Switch# configure terminal
Switch(config)# diag online
Switch(config)# no diag online subslot 0/1
```

Related Commands

Command	Description
debug diag online	Enables debugging of the online diagnostics.
diag online	Enables online diagnostics for the system.
diag online slot	Enables online diagnostics for specified slot number.
show diag online	Displays the configuration and status of the online diagnostics.
show diag online detail	Shows detailed online diagnostic test results for the shelf.
show diag online slot	Shows detailed online diagnostic test results for a specific slot.

show diag online

To display current online diagnostic test results, use the **show diag online** command. Information displayed includes the cards installed, their current status, and the status of online tests performed on the cards.

show diag online

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(10)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 whenever a card is unavailable or is not coming up, to determine card status and the status of various background online tests performed on them.

Examples The following example shows how to display online diagnostic test results for the hardware components. (See Table 4-1 for field descriptions.)

```
Switch# show diag online
Online Diagnostics Current Summary Information
~~~~~
On ACTIVE CPU card Slot: 6
CPU Uptime:    21 hours, 52 minutes

Slot          CardType          Enabled    Bootup/
              ~~~~~          ~~~~~    Insertion
              ~~~~~          ~~~~~    tests
              ~~~~~          ~~~~~    Periodic
              ~~~~~          ~~~~~    Background
              ~~~~~          ~~~~~    tests
              ~~~~~          ~~~~~    Previous
              ~~~~~          ~~~~~    Failures
              ~~~~~          ~~~~~    ~~~~~
0/*/*        Mx-DMx-Mthrbd    Yes       Pass       Pass       No
```

0/ 3/*Mx-DMx-8Mod-Plus1-W	Yes	Pass	Pass	No
1/*/* Mx-DMx-Mthrbd	Yes	Pass	Pass	No
1/ 3/*Mx-DMx-8Mod-Plus1-W	Yes	Pass	Pass	No
6/*/* Queens CPU	Yes	Pass	Pass	No
7/*/* Queens CPU	Yes	Pass	Pass	No
10/*/* XpndrMotherboard	Yes	Pass	Pass	No
10/ 0/* NPlugXpndrMonitor	Yes	Pass	Pass	No
10/ 1/* NPlugXpndrMonitor	Yes	Pass	Pass	No
10/ 2/* NPlugXpndrMonitor	Yes	Pass	Pass	No
10/ 3/* NPlugXpndrMonitor	Yes	Pass	Pass	No

Table 4-1 show diag online Field Descriptions

Field	Description
Slot	Shows the slot on which online diagnostics have been run.
CardType	Shows the card type on which online diagnostics have been run.
Enabled	Indicates whether online diagnostic tests are enabled on the slot.
Bootup/Insertion tests	Indicates whether the card passed the test run at system bootup or when the component is inserted in the chassis.
Periodic Background tests	Indicates whether the card passed the periodic background tests.
Previous Failures	Shows when the last failure occurred for the component.

Related Commands

Command	Description
diag online	Enables online diagnostics for the system.
diag online slot	Enables online diagnostics for the specified slot.
diag online subslot	Enables online diagnostics for a specified subslot number.
show diag online detail	Shows detailed online diagnostic test results for the shelf.
show diag online slot	Shows detailed online diagnostic test results for a specific slot.

show diag online detail

To display the cards currently installed on the system and the detailed results of online diagnostic tests performed on them, use the **show diag online detail** command.

show diag online detail

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(10)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 display detailed status information about all the online diagnostic tests run on the hardware in the system. Information displayed includes the number of times background tests passed or failed, as well as the status of OIR tests.

Use this command to debug possible hardware problems on the cards or subcards installed.

Examples The following example shows how to display current, detailed online diagnostics for the system. (See Table 4-2 for field descriptions.)

```
Switch# show diag online detail

Online Diagnostics Detailed Information
~~~~~
On ACTIVE CPU card Slot: 6
CPU Uptime:    21 hours, 57 minutes

Slot [0] :Mx-DMx-Mthrbd
```

Enabled: Yes

Online Insertion Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
0/*/*	Mx-DMx-Mthrbd	lrcAccess	Pass	0 minutes	never
		idpromAccess	Pass		
0/ 3/*	Mx-DMx-8Mod-Plus1-	idpromAccess	Pass	0 minutes	never

Online Background Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
0/*/*	Mx-DMx-Mthrbd	lrcAccess	Pass	21 hours, 57	never
		idpromAccess	Pass		
0/ 3/*	Mx-DMx-8Mod-Plus1-	idpromAccess	Pass	21 hours, 57	never

Slot [1]:Mx-DMx-Mthrbd

Enabled: Yes

Online Insertion Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
1/*/*	Mx-DMx-Mthrbd	lrcAccess	Pass	0 minutes	never
		idpromAccess	Pass		
1/ 3/*	Mx-DMx-8Mod-Plus1-	idpromAccess	Pass	0 minutes	never

Online Background Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
1/*/*	Mx-DMx-Mthrbd	lrcAccess	Pass	21 hours, 57	never
		idpromAccess	Pass		
1/ 3/*	Mx-DMx-8Mod-Plus1-	idpromAccess	Pass	21 hours, 57	never

Slot [6]:Queens CPU

Enabled: Yes

Online Insertion Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
6/*/*	Queens CPU	srcStatus	Pass	0 minutes	never
		PCIAccess	Pass		
		PCMCIAAccess	Pass		

Online Background Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
6/*/*	Queens CPU	srcStatus	Pass	21 hours, 57	never
		PCIAccess	Pass		
		PCMCIAAccess	Pass		

Slot [7]:Queens CPU

Enabled: Yes

Online Insertion Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
7/*/*	Queens CPU	srcStatus	Pass	0 minutes	never
		PCIAccess	Pass		
		PCMCIAAccess	Pass		

Online Background Tests

Slot	CardType	TestType	Status	LastRunTime	LastFailTime
------	----------	----------	--------	-------------	--------------

show diag online detail

```

~~~~~
7/*/*      Queens CPU      srcStatus      Pass21 hours, 51      never
                        PCIAccess      Pass
                        PCMCIAAccess      Pass
~~~~~

Slot [10]:XpndrMotherboard
Enabled: Yes

Online Insertion Tests
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~
10/*/*    XpndrMotherboard      lrcAccess      Pass      0 minutes      never
                        idpromAccess      Pass
10/ 0/*    NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
                        idpromAccess      Pass
10/ 1/*    NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
                        idpromAccess      Pass
10/ 2/*    NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
                        idpromAccess      Pass
10/ 3/*    NPlugXpndrMonitor      scAccess      Pass      0 minutes      never
                        idpromAccess      Pass

Online Background Tests
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~
10/*/*    XpndrMotherboard      lrcAccess      Pass21 hours, 57      never
                        idpromAccess      Pass
Slot      CardType      TestType      Status      LastRunTime      LastFailTime
~~~~~
10/ 0/*    NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
                        idpromAccess      Pass
10/ 1/*    NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
                        idpromAccess      Pass
10/ 2/*    NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
                        idpromAccess      Pass
10/ 3/*    NPlugXpndrMonitor      scAccess      Pass21 hours, 57      never
                        idpromAccess      Pass

```

Table 4-2 show diag online detail Field Descriptions

Field	Description
On ACTIVE CPU card Slot:	Shows the chassis slot that contains the active CPU switch module.
CPU Uptime	Shows the amount of time since the system booted.
Slot	Shows the slot on which the online diagnostics are being run.
Enabled	Indicates whether online diagnostics are enabled on the slot.
CardType	Shows the card type on which the online diagnostics are being run.
TestType	Shows the type of test run. Test types can be: <ul style="list-style-type: none"> • lrcAccess (Accesses the LRC) • idpromAccess (Accesses the IDPROM) • srcAccess (Accesses the SRC) • PCMCIAAccess (Accesses Flash PC Cards) • scAccess (Accesses transponder line cards)
Status	Shows the result of the diagnostic test (Pass/Fail)

Table 4-2 *show diag online detail Field Descriptions (continued)*

Field	Description
LastRunTime	Shows the amount of time since the test was last run.
LastFailTime	Shows the amount of time since the test failed.

Related Commands

Command	Description
diag online	Enables online diagnostics for the system.
diag online slot	Enables online diagnostics for the specified slot.
diag online subslot	Enables online diagnostics for a specified subslot number.
show diag online	Shows a summary of the online diagnostic test results for the shelf.
show diag online slot	Shows detailed online diagnostic test results for a specific slot.

show diag online slot

To display the results of online diagnostic tests performed on a card in a specific slot, use the **show diag online slot** command.

show diag online slot *slot-number*

Syntax Description	slot-number	Specifies the slot number. The range is 0 to 10.
--------------------	-------------	--

Defaults	None
----------	------

Command Modes	EXEC and privileged EXEC
---------------	--------------------------

Command History	This table includes the following release-specific history entries:
	<ul style="list-style-type: none"> EV-Release SV-Release S-Release

EV-Release	Modification
12.1(10)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 display the status of online diagnostics performed on components installed in a specific slot.
------------------	--

Examples	The following example shows how to display the results of online diagnostic tests performed on slot 0. (See Table 4-3 for field descriptions.)
----------	--

```
Switch# show diag online slot 0
Online Diagnostics Information Per Slot
~~~~~
Slot [0]:Mx-DMx-Mthrbd
Enabled: Yes
CPU Uptime:    21 hours, 59 minutes

Online Insertion Tests
Slot          CardType          TestType          Status  LastRunTime  LastFailTime
~~~~~          ~~~~~          ~~~~~          ~~~~~  ~~~~~          ~~~~~
0/*/*        Mx-DMx-Mthrbd    lrcAccess        Pass    0 minutes    never
                                idpromAccess     Pass
```



```

0/ 3/* Mx-DMx-8Mod-Plus1- idpromAcces      Pass      0 minutes      never

Online Background Tests
Slot          CardType          TestType          Status      LastRunTime      LastFailTime
~~~~~        ~~~~~
0/*/*        Mx-DMx-Mthrbd    lrcAccess        Pass21 hours, 58      never
              idpromAccess        Pass
0/ 3/* Mx-DMx-8Mod-Plus1- idpromAcces      Pass21 hours, 58      never

```

Table 4-3 *show diag online slot Field Descriptions*

Field	Description
Slot	Shows the slot on which online diagnostics were performed.
Enabled	Indicates whether online diagnostics are enabled on the slot.
CPU Uptime	Shows the amount of time since the system booted.
CardType	Shows the card type on which the online diagnostics are being run.
TestType	Shows the type of test run. Test types can be: <ul style="list-style-type: none"> • lrcAccess (accesses the LRC) • idpromAccess (accesses the IDPROM) • srcAccess (accesses the SRC) • PCMCIAAccess (accesses Flash PC Cards) • scAccess (accesses transponder line cards)
Status	Shows the result of the diagnostic test (Pass/Fail).
LastRunTime	Shows the amount of time since the test was last run.
LastFailTime	Shows the amount of time since the test failed.

Related Commands

Command	Description
diag online	Enables online diagnostics for the system.
diag online slot	Enables online diagnostics for the specified slot.
diag online subslot	Enables online diagnostics for a specified subslot number.
show diag online	Shows a summary of the online diagnostic test results for the shelf.
show diag online detail	Shows detailed online diagnostic test results for the shelf.



OSCP Commands

OSCP (Optical Supervisory Channel Protocol) provides out-of-band network management over a 33rd channel. Use the following commands to configure and monitor OSCP operations.

clear oscp

To clear OSCP statistics or traffic counters, use the **clear oscp** command.

```
clear oscp {statistics | traffic}
```

Syntax Description	statistics	Clears OSCP statistics that can be used to debug the protocol, for example:
		<ul style="list-style-type: none"> The hold-down count statistic specifies how many times a hold down has been applied to avoid excessive generation of OSCP Hello packets. The Hello Tx and Rx statistics indicate the number of Hello packets that have been transmitted and received at an interface. The OSCP go-down statistic indicates the number of times an interface has gone out of the two-way state.
	traffic	Clears OSCP control-traffic counters that indicate the number of different protocol packets that were transmitted over the optical supervisory channel.

Defaults	None
----------	------

Command Modes	Privileged EXEC
---------------	-----------------

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

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

EV-Release	Modification
12.1(10)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 perform a one-time clear of the specified OSCP statistics or traffic tables. This command is useful for debugging or monitoring OSCP performance.
------------------	---

Examples	The following example shows how to clear OSCP statistics and traffic tables.
----------	--

```
Switch# clear oscp statistics
Switch# clear oscp traffic
```

Related Commands

Command	Description
show oosp statistics	Displays OSCP Hello statistics information.
show oosp traffic	Display OSCP Hello traffic information.

oscp timer hello holddown

To modify the OSCP timer Hello hold-down interval, use the **oscp timer hello holddown** command. To return the Hello hold-down interval to its default value, use the **no** form of the command.

oscp timer hello holddown *milliseconds*

no oscp timer hello holddown

Syntax Description	<i>milliseconds</i>	Specifies, in milliseconds, the interval in which no more than one Hello packet can be generated. If more than one Hello packet is generated during the hold-down period, the extra packets are delayed. The range is 150 to 30000 milliseconds.
---------------------------	---------------------	--

Defaults	3000 milliseconds
-----------------	-------------------

Command Modes	Global configuration
----------------------	----------------------

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

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

EV-Release	Modification
12.1(10)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 control the amount of OSCP Hello activity that is generated on the network. The Hello hold-down timer specifies the interval during which no more than one Hello packet can be sent. If more than one Hello packet is generated during the hold-down period, the extra packets are delayed. Increasing the hold-down timer limits the number of Hello packets triggered in response to Hello packets received from a neighboring node and reduces the likelihood of Hello packets flooding the OSC.

To ensure proper functioning of the OSCP, the Hello hold-down timer value can be no more than 75 percent of the OSCP Hello interface timer.

**Note**

There is a trade-off between the frequency of generating Hello packets and the speed in which the system detects that the OSCP has gone down. In certain OSCP failure scenarios, a shorter Hello interval leads to faster detection of the OSCP failure.

Examples

The following example shows how to configure the OSCP timer Hello hold-down interval.

```
Switch# configure terminal
Switch(config)# osp timer hello holddown 300
```

Related Commands

Command	Description
<code>debug driver voa</code>	Enables debugging of OSCP activity.
<code>osp timer hello interval</code>	Modifies the OSCP timer Hello interval.
<code>osp timer inactivity-factor</code>	Modifies the OSCP timer inactivity factor.
<code>show osp info</code>	Displays OSCP configuration information.

oosp timer hello interval

To modify the OSCP timer Hello interval, use the **oosp timer hello interval** command. To return the Hello interval to its default value, use the **no** form of the command.

oosp timer hello interval *milliseconds*

no oosp timer hello interval

Syntax Description	<i>milliseconds</i>	Specifies, in milliseconds, the periodic generation of OSCP Hello packets. The range is 100 to 10000 milliseconds.
---------------------------	---------------------	--

Defaults	100 milliseconds
-----------------	------------------

Command Modes	Global configuration
----------------------	----------------------

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

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

EV-Release	Modification
12.1(10)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 control how often OSCP Hello messages are sent. The OSCP sends Hello packets to adjacent nodes at a configured interval. When five packets fail to get a response from the receiving node, that node is declared “down.” By decreasing the interval at which Hello packets are sent, reaction time to a failed node can be lessened. Increasing the interval reduces the amount of Hello packet traffic.



Note

There is a trade-off between the frequency of generating Hello packets and the speed in which the system detects that the OSCP has gone down. In certain OSCP failure scenarios, a shorter Hello interval leads to faster detection of the OSCP failure.

Examples

The following example shows how to configure the OSCP timer Hello interval.

```
Switch# configure terminal
```



```
Switch(config)# oscp timer hello interval 200
```

Related Commands

Command	Description
debug driver voa	Enables debugging of OSCP activity.
oscp timer hello holddown	Modifies the OSCP timer Hello hold-down interval.
oscp timer inactivity-factor	Modifies the OSCP timer Hello inactivity factor.
show oscp info	Displays OSCP configuration information.

oscp timer inactivity-factor

To modify the OSCP timer Hello inactivity factor, use the **oscp timer inactivity-factor** command. To return the Hello inactivity factor to its default value, use the **no** form of the command.

oscp timer inactivity-factor *factor*

no oscp timer inactivity-factor

Syntax Description	<i>factor</i>	Specifies a value used to calculate an inactivity interval. The specified interval of time is equal to the inactivity factor multiplied by the neighbor's advertised Hello interval. The range is 1 to 50.
---------------------------	---------------	--

Defaults	5 seconds
-----------------	-----------

Command Modes	Global configuration
----------------------	----------------------

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

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

EV-Release	Modification
12.1(10)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

The system uses this attribute to determine when a neighbor node, or the link to it, has gone down. The link to a neighbor node is considered inactive if an OSCP Hello packet is not received for a time interval determined by the inactivity factor. The time interval is calculated by multiplying the inactivity factor by the advertised hold-down interval. For example, if the neighbor node's advertised hold-down interval is 5 seconds and the local node's inactivity factor is 5, the time interval that the local node will wait until declaring the neighbor node down is 25 seconds.



Note

There is a trade-off between the frequency of generating Hello packets and the speed in which the system detects that the OSCP has gone down. In certain OSCP failure scenarios, a shorter Hello interval leads to faster detection of the OSCP failure.

Examples

The following example shows how to set the OSCP timer Hello inactivity factor to 3.

```
Switch# configure terminal
Switch(config)# oosp timer inactivity-interval 3
```

Related Commands

Command	Description
debug driver voa	Enables debugging of OSCP activity.
oosp timer hello holddown	Modifies the OSCP timer Hello hold-down interval.
oosp timer hello interval	Modifies the OSCP timer Hello interval.
show oosp info	Displays OSCP configuration information.

show oscp info

To display OSCP (Optical Supervisory Channel Protocol) configuration information, use the **show oscp info** command.

```
show oscp info
```

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(10)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 display OSCP configuration information for the system.

Examples The following example shows how to display OSCP configuration information for the system. (See Table 5-1 for field descriptions.)

```
Switch# show oscp info
OSCP protocol version 1, Node ID          0000.1644.28fb
No. of interfaces 1, No. of neighbors 1
Hello interval 50 tenth of sec, inactivity factor 5,

Hello hold-down 1 tenth of sec
Supported OSCP versions: newest 1, oldest 1
```

Table 5-1 *show oscp info* Field Descriptions

Field	Description
OSCP protocol version	Shows the OSCP version.
Node ID	Shows the node ID.
No. of interfaces	Shows the number of interfaces.
No. of neighbors	Shows the number of neighbors.
Hello interval	Shows the Hello interval in milliseconds.
inactivity factor	Shows the inactivity factor. The system uses the inactivity factor to determine when a link has gone down. A link is returned to the “attempt” state if the system has not received an OSCP Hello packet for a certain time interval. That time interval is equal to the Hello inactivity factor multiplied by the Hello interval from the Hello packet most recently received from the remote system. The range of inactivity factors is from 2 to 50. The default inactivity factor is 5.
Hello hold-down	Shows, in milliseconds, how long to wait before sending another OSCP Hello packet. This avoids excessive generation of OSCP Hello packets.
Supported OSCP versions	Shows the OSCP versions supported.

Related Commands

Command	Description
oscp timer hello holddown	Modifies the OSCP timer Hello hold-down interval.
oscp timer hello interval	Modifies the OSCP timer Hello interval.
oscp timer inactivity-factor	Modifies the OSCP timer inactivity factor.

show oscp interface

To display OSCP (Optical Supervisory Channel Protocol) status information for OSC wave interfaces and ethernetdcc interfaces, use the **show oscp interface** command.

```
show oscp interface [wave slot/subcard | ethernetdcc slot/subcard/port | sdcc slot/subcard/port]
```

Syntax Description

wave <i>slot</i>	Specifies an OSC wave interface.
ethernetdcc <i>slot/subcard/port</i>	Specifies an ethernetdcc interface.
sdcc <i>slot/subcard/port</i>	Specifies an sdcc interface.

Defaults

Displays OSCP status information for all OSC wave interfaces, ethernetdcc interfaces, and sdcc interfaces in the system.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(25)SV	Added support for sdcc interfaces.
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 status information for the local and remote interfaces running OSCP.

Examples

The following example shows how to display status information for the local and remote interfaces running OSCP. (See Table 5-2 for field descriptions.)

```
Switch# show oscp interface
Codes: OSC - dedicated wavelength channel, CDL - in-band wavelength channel

OSCP Interface(s)
Local Port          Port ID   Type  OSCP St  Rem Port ID  Rem Node Id
~~~~~
EthernetDcc1/0/0   00020000 CDL   2way    00020000    0009.7c1a.ce50
```

Table 5-2 *show oscp interface Field Descriptions*

Field	Description
Local Port	Shows the local port for the OSCP interface.
Port ID	Shows the port ID for the local port.
Type	Shows the channel link type, either OSCP or CDL.
OSCP St	Shows the OSCP Hello state. Valid values are: <ul style="list-style-type: none"> • down—the physical layer is down • attempt—the physical layer is up, but no Hello messages have been received from the neighbor • 1way—Hello messages have been received from the neighbor, but their content indicates that the neighbor has not yet received Hellos from this node. • 2way—Hello messages have been received from the neighbor indicating that the neighbor has received Hello packets from this node.
Rem Port Id	Shows the port ID for the remote port.
Rem Node Id	Shows the ID for the remote port.

Related Commands

Command	Description
show oscp neighbor	Displays OSCP neighbor information.
show oscp statistics	Displays OSCP activity statistics.
show oscp traffic	Displays OSCP message traffic information.

show oscp neighbor

To display OSCP (Optical Supervisory Channel Protocol) neighbor information, use the **show oscp neighbor** command.

show oscp neighbor

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(10)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 display information about the identity of the neighbors communicating with the system through OSCP.

Examples The following example shows how to display information about the identity of the neighbors communicating with the system through OSCP. (See Table 5-3 for field descriptions.)

```
Switch# show oscp neighbor
OSCP Neighbors
Neighbor Node Id: 0000.1644.28ff   Port list:
  Local Port   Port ID  Rem Port ID  OSCP state
  ~~~~~
Wave3/0       1000000  1000000     2way
```


Table 5-3 *show oscp neighbor Field Descriptions*

Field	Description
Neighbor Node Id	Shows the node ID for the OSCP neighbor.
Port list	Shows ports and port IDs for local and remote ports.
Local Port	Shows the local port.
Port Id	Shows the port ID of the local port.
Rem Port ID	Shows the port ID of the remote port.
OSCP St	Shows the OSCP Hello state. Valid values are: <ul style="list-style-type: none"> • down—the physical layer is down • attempt—the physical layer is up, but no Hello messages have been received from the neighbor • 1-way—Hello messages have been received from the neighbor, but their content indicates that the neighbor has not yet received Hellos from this node. • 2-way—Hello messages have been received from the neighbor indicating that the neighbor has received Hello packets from this node.

Related Commands

Command	Description
show oscp interface	Displays OSCP information for an interface.
show oscp statistics	Displays OSCP activity statistics.
show oscp traffic	Displays OSCP message traffic information.

show oscp statistics

To display OSCP (Optical Supervisory Channel Protocol) Hello statistics, use the **show oscp statistics** command.

```
show oscp statistics [wave slot/subcard | ethernetdcc slot/subcard/port | sdcc slot/subcard/port]
```

Syntax Description

wave slot	Specifies an OSC wave interface.
ethernetdcc slot/subcard/port	Specifies an ethernetdcc interface.
sdcc slot/subcard/port	Specifies an sdcc interface.

Defaults

Displays OSCP statistics for all OSC wave interfaces, ethernetdcc interfaces, and sdcc interfaces in the system.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(25)SV	Added support for sdcc interfaces.
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 OSCP Hello statistics for an OSC interface.

This command displays the following OSCP statistics, which can be used to debug the OSCP.

- hold down—Shows how many times a hold down has been applied to avoid excessive generation of OSCP Hello packets.
- Hello Tx pkts and Hello Rx pkts—Shows the number of OSCP Hello packets that have been transmitted and received at an interface.
- OSCP go down—Shows the number of times an OSC interface has gone out of two-way state.

Examples

The following example shows how to display OSCP control statistics for an OSC interface. (See Table 5-4 for field descriptions.)

```
Switch# show oscp statistics wave 3/0
OSCP Hello Statistics:
```

```
interface Wave3/0
  Event                      Count
  ~~~~~
hold down                    3
Hello Tx pkts                2262
Hello Rx pkts                2259
Hello discards in           0
Hello discards out          0
OSCP go down events         2

  Event                      Time (seconds)
  ~~~~~
Next Tx Hello due           2
Last Hello sent             2
Last Hello received         4
Inactivity interval        25.0
Time until port dropped     20
```

Table 5-4 *show oscp statistics Field Descriptions*

Field	Description
hold down	Shows how many times a hold down has been applied to avoid excessive generation of OSCP Hello packets.
Hello Tx pkts	Shows the number of Hello transmissions that have been sent.
Hello Rx pkts	Shows the number of Hello transmissions that have been received.
Hello discards in	Shows the number of incoming Hello transmissions that have been discarded.
Hello discards out	Shows the number of outgoing Hello transmissions that have been discarded.
OSCP go down events	Shows the number of times that the OSCP (Optical Supervisory Channel Protocol) has gone down.
Next Tx Hello due	Shows the number of seconds before the next transmit Hello packet is due.
Last Hello sent	Shows the number of seconds since a Hello packet was sent.
Last Hello received	Shows the number of seconds since a Hello packet was received.
Inactivity interval	Shows the number of seconds for the inactivity interval.
Time until port dropped	Shows the number of seconds allowed until the port is dropped.

Related Commands

Command	Description
oscp timer hello holddown	Modifies the OSCP timer Hello hold-down interval.
oscp timer hello interval	Modifies the OSCP timer Hello interval.

show oscp traffic

To display OSCP (Optical Supervisory Channel Protocol) Hello message traffic information, use the **show oscp traffic** command.

```
show oscp traffic [wave slot/subcard | ethernetdcc slot/subcard/port | sdcc slot/subcard/port]
```

Syntax Description

wave slot	Specifies an OSC wave interface.
ethernetdcc slot/subcard/port	Specifies an ethernetdcc interface.
sdcc slot/subcard/port	Specifies an sdcc interface.

Defaults

Displays OSCP Hello message traffic information for all OSC wave interfaces, ethernetdcc interfaces, and sdcc interfaces in the system.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(25)SV	Added support for sdcc interfaces.
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 OSCP control traffic statistics, which show the count of different protocol packets that have been transmitted over the optical supervisory channel.

Examples

The following example shows how to display OSCP control traffic statistics, which show the count of different protocol packets that have been transmitted over the optical supervisory channel. (See Table 5-5 for field descriptions.)

```
Switch# show oscp traffic wave 3/0
OSC Traffic Statistics:

interface Wave3/0
Description          Count
```

```

~~~~~
Tx IP pkt          0
Rx IP pkt          0
Tx CDP pkt        198
Rx CDP pkt        195
Rx pkt dropped    0

```

Table 5-5 *show oscp traffic Field Descriptions*

Field	Description
Tx IP pkt	Shows number of IP packets that have been transmitted over the optical supervisory channel.
Rx IP pkt	Shows number of IP packets that have been received over the optical supervisory channel.
Tx CDP pkt	Shows number of CDP packets that have been transmitted over the optical supervisory channel.
Rx CDP pkt	Shows number of CDP packets that have been received over the optical supervisory channel.
Rx pkt dropped	Shows the number of receive packets that were dropped.

Related Commands

Command	Description
clear oscp	Clears OSCP statistics or traffic counters.

■ `show oosp traffic`



Power-On Diagnostics Commands

Power-on diagnostics test the accessibility and basic functionality of the components and isolates the faults to the component level on the Cisco ONS 15530. All power-on diagnostics tests are enabled by default and can be disabled and monitored by using the commands described in this section.

diag power-on

To enable all power-on diagnostics for the system, use the **diag power-on** command. To disable all power-on diagnostics for the system, use the **no** form of this command.

diag power-on

no diag power-on

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable all power-on diagnostics for the system. Power-on diagnostics run when the system powers up or reloads.

Examples The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on
```

Related Commands	Command	Description
	show diag power-on	Displays the power-on diagnostic test results.

diag power-on 2gfc

To enable power-on diagnostics for the 4-port 1-Gbps/2-Gbps FC aggregation card, use the **diag power-on fcge-8p** command. To disable power-on diagnostics for the 4-port 1-Gbps/2-Gbps FC aggregation card, use the **no** form of this command.

```
diag power-on 2gfc { aps-msg-int-bus | component-access | coney-fabric-lb | coney-qphy-lb |
  coney-serdes-lb | credit-buffer-mem | jtag-access | lrc-access | qphy-fabric-lb |
  qphy-internal-lb | sfp-xcvr-p0-idprom | sfp-xcvr-p1-idprom | sfp-xcvr-p2-idprom |
  sfp-xcvr-p3-idprom | sii-memory } slot slot-number
```

```
no diag power-on 2gfc { aps-msg-int-bus | component-access | coney-fabric-lb | coney-qphy-lb |
  coney-serdes-lb | credit-buffer-mem | jtag-access | lrc-access | qphy-fabric-lb |
  qphy-internal-lb | sfp-xcvr-p0-idprom | sfp-xcvr-p1-idprom | sfp-xcvr-p2-idprom |
  sfp-xcvr-p3-idprom | sii-memory } slot slot-number
```

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
component-access	Enables component access tests.
coney-fabric-lb	Coney switch loopback test.
coney-qphy-lb	Coney Quad PHY loopback test.
coney-serdes-lb	Coney Serdes loopback test.
credit-buffer-mem	Enables buffer credit memory tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
qphy-fabriclb	Enables Quad PHY switch loopback test.
qphy-internal-lb	Enables Quad PHY internal loopback tests.
sfp-xcvr-p0-idprom	Enables port 0 transceiver IDPROM checksum tests.
sfp-xcvr-p1-idprom	Enables port 1 transceiver IDPROM checksum tests.
sfp-xcvr-p2-idprom	Enables port 2 transceiver IDPROM checksum tests.
sfp-xcvr-p3-idprom	Enables port 3 transceiver IDPROM checksum tests.
sii-memory	Enables SII memory tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 1 to 10.

Note Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

- SV-Release

SV-Release	Modification
12.2(23)SV	This command was introduced.

Usage Guidelines

Use this command to enable or disable power-on diagnostics for 4-port 1-Gbps/2-Gbps FC aggregation cards. Power-on diagnostics run when the system powers up or reloads.



Note

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for that 4-port 1-Gbps/2-Gbps FC aggregation card.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on 2gfc jtag-access slot 2
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on carrier-mb

To enable power-on diagnostics for carrier motherboards, use the **diag power-on carrier-mb** command. To disable power-on diagnostics for carrier motherboards, use the **no** form of this command.

```
diag power-on carrier-mb { aps-msg-int-bus | backplane-eth-lb | jtag-access | lrc-access }
slot slot-number
```

```
no diag power-on carrier-mb { aps-msg-int-bus | backplane-eth-lb | jtag-access | lrc-access }
slot slot-number
```

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
backplane-eth-lb	Enables LRC backplane Ethernet loopback tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 1 to 10. Note Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for carrier motherboards. Power-on diagnostics run when the system powers up or reloads.

**Note**

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for that carrier motherboard.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on carrier-mb backplane-eth-1b slot 2
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on cpu

To enable power-on diagnostics for CPU switch modules, use the **diag power-on cpu** command. To disable power-on diagnostics for CPU switch modules, use the **no** form of this command.

```
diag power-on cpu { bcom-sw-access | bcom-sw-config | bootflash | bp-idprom-test |
cpu-l1-cache | cpu-l2-cache | gt-interrupt | gt-mii0-internal-lb | gt-mii1-internal-lb |
gt-mpsc-internal-lb | gt-pci0 | interrupt0 | interrupt2 | interrupt3 | interrupt7 | interrupt8
| iofpga-access | nvram | power-supply0 | power-supply1 | src-access | src-timer |
sw-fabric-config | system-tod | temp-sensor } slot slot-number
```

```
no diag power-on cpu { bcom-sw-access | bcom-sw-config | bootflash | bp-idprom-test |
cpu-l1-cache | cpu-l2-cache | gt-interrupt | gt-mii0-internal-lb | gt-mii1-internal-lb |
gt-mpsc-internal-lb | gt-pci0 | interrupt0 | interrupt2 | interrupt3 | interrupt7 | interrupt8
| iofpga-access | nvram | power-supply0 | power-supply1 | src-access | src-timer |
sw-fabric-config | system-tod | temp-sensor } slot slot-number
```

Syntax Description

bcom-sw-access	Enables Ethernet switch access tests.
bcom-sw-config	Enables Ethernet switch config tests.
bootflash	Enables bootflash checksum tests.
bp-idprom-test	Enables backplane IDPROM checksum tests.
cpu-l1-cache	Enables CPU L1 cache tests.
cpu-l2-cache	Enables CPU L2 cache tests.
gt-interrupt	Enables GT interrupts tests.
gt-mii0-internal-lb	Enables GT MII0 internal loopback tests.
gt-mii1-internal-lb	Enables GT MII1 internal loopback tests.
gt-mpsc-internal-lb	Enables GT MPSC internal loopback tests.
gt-pci0	Enables GT PCI0 tests.
interrupt0	Enables CPU interrupt0 tests.
interrupt2	Enables CPU interrupt2 tests.
interrupt3	Enables CPU interrupt3 tests.
interrupt7	Enables CPU interrupt7 tests.
interrupt8	Enables CPU interrupt8 tests.
iofpga-access	Enables IOFPGA access tests.
nvram	Enables NVRAM tests.
power-supply0	Enables power supply 0 IDPROM checksum tests.
power-supply1	Enables power supply 1 IDPROM checksum tests.
src-access	Enables SRC access tests.
src-timer	Enables SRC timer tests.
sw-fabric-config	Enables switch fabric configuration tests.
system-tod	Enables system Time Of Day tests.
temp-sensor	Enables temperature Sensor tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 5 to 6.

Defaults Enabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for CPU switch modules. Power-on diagnostics run when the system powers up or reloads.

Examples The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on cpu bootflash slot 5
```

Related Commands	Command	Description
	<code>show diag power-on</code>	Displays the power-on diagnostic test results.

diag power-on escon-10p

To enable power-on diagnostics for the ESCON aggregation card, use the **diag power-on escon-10p** command. To disable power-on diagnostics for the ESCON aggregation card, use the **no** form of this command.

diag power-on escon-10p { **aps-msg-int-bus** | **backplane-eth-lb** | **component-access** | **encap-lb** | **fabric-lb** | **jtag-access** | **lrc-access** | **qphy-lb** } **slot** *slot-number*

no diag power-on escon-10p { **aps-msg-int-bus** | **backplane-eth-lb** | **component-access** | **encap-lb** | **fabric-lb** | **jtag-access** | **lrc-access** | **qphy-lb** } **slot** *slot-number*

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
backplane-eth-lb	Enables LRC backplane Ethernet loopback tests.
component-access	Enables component access tests.
encap-lb	Enables encapsulation FPGA loopback tests.
fabric-lb	Enables Quad PHY-to-switch fabric-to-Quad PHY tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
qphy-lb	Enables Quad PHY loopback tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 1 to 10.
	Note Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for ESCON aggregation cards. Power-on diagnostics run when the system powers up or reloads.

**Note**

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for that ESCON aggregation card.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on escon-10p fabric-1b slot 2
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on fcge-8p

To enable power-on diagnostics for the 8-port FC/GE aggregation card, use the **diag power-on fcge-8p** command. To disable power-on diagnostics for the 8-port FC/GE aggregation card, use the **no** form of this command.

```
diag power-on fcge-8p {aps-msg-int-bus | backplane-eth-lb | component-access |
credit-buffer-mem | hudson-montauk-lb | hudson-qphy-lb | hudson-swfabric-lb |
jtag-access | lrc-access | qphy-int-lb | sfp-xcvr-p0-idprom | sfp-xcvr-p1-idprom |
sfp-xcvr-p2-idprom | sfp-xcvr-p3-idprom | sfp-xcvr-p4-idprom | sfp-xcvr-p5-idprom |
sfp-xcvr-p6-idprom | sfp-xcvr-p7-idprom | sii-memory} slot slot-number
```

```
no diag power-on fcge-8p {aps-msg-int-bus | backplane-eth-lb | component-access |
credit-buffer-mem | hudson-montauk-lb | hudson-qphy-lb | hudson-swfabric-lb |
jtag-access | lrc-access | qphy-int-lb | sfp-xcvr-p0-idprom | sfp-xcvr-p1-idprom |
sfp-xcvr-p2-idprom | sfp-xcvr-p3-idprom | sfp-xcvr-p4-idprom | sfp-xcvr-p5-idprom |
sfp-xcvr-p6-idprom | sfp-xcvr-p7-idprom | sii-memory} slot slot-number
```

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
backplane-eth-lb	Enables LRC backplane Ethernet loopback tests.
component-access	Enables component access tests.
credit-buffer-mem	Enables buffer credit memory tests.
hudson-montauk-lb	Enables performance monitor-to-aggregator-to-performance monitor loopback tests.
hudson-qphy-lb	Enables performance monitor-to-Quad PHY-to-performance monitor loopback tests.
hudson-swfabric-lb	Enables performance monitor-to-switch fabric-to-performance monitor loopback tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
qphy-int-lb	Enables Quad PHY internal loopback tests.
sfp-xcvr-p0-idprom	Enables port 1 transceiver IDPROM checksum tests.
sfp-xcvr-p1-idprom	Enables port 2 transceiver IDPROM checksum tests.
sfp-xcvr-p2-idprom	Enables port 3 transceiver IDPROM checksum tests.
sfp-xcvr-p3-idprom	Enables port 4 transceiver IDPROM checksum tests.
sfp-xcvr-p4-idprom	Enables port 5 transceiver IDPROM checksum tests.
sfp-xcvr-p5-idprom	Enables port 6 transceiver IDPROM checksum tests.
sfp-xcvr-p6-idprom	Enables port 7 transceiver IDPROM checksum tests.
sfp-xcvr-p7-idprom	Enables port 8 transceiver IDPROM checksum tests.
sii-memory	Enables SII memory tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 1 to 10.
Note	Slots 5 and 6 are reserved for the CPU switch modules.

diag power-on fcge-8p

Defaults Enabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for 8-port FC/GE aggregation cards. Power-on diagnostics run when the system powers up or reloads.

**Note**

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for that 8-port FC/GE aggregation card.

Examples The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on fcge-8p credit-buffer-mem slot 2
```

Related Commands	Command	Description
	show diag power-on	Displays the power-on diagnostic test results.

diag power-on itu2

To enable power-on diagnostics for 10-Gbps ITU trunk cards, use the **diag power-on itu2** command. To disable power-on diagnostics for 10-Gbps ITU trunk cards, use the **no** form of this command.

```
diag power-on itu2 {aps-msg-int-bus | backplane-eth-lb | component-access | jtag-access |
lrc-access | om-fifo | qphy-fabric-lb | sii-memory} slot slot-number
```

```
no diag power-on itu2 {aps-msg-int-bus | backplane-eth-lb | component-access | jtag-access |
lrc-access | om-fifo | qphy-fabric-lb | sii-memory} slot slot-number
```

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
backplane-eth-lb	Enables LRC-to-backplane-Ethernet loopback tests.
component-access	Enables component access tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
om-fifo	Enables optical message first-in first-out queue tests.
qphy-fabric-lb	Enables Quad PHY-to-switch fabric-to-Quad PHY tests.
sii-memory	Enables SII memory tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 1 to 10.
Note	Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for 10-Gbps ITU trunk cards. Power-on diagnostics run when the system powers up or reloads.

**Note**

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for that 10-Gbps ITU trunk card.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on itu2 component-access slot 2
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on itu2-tun

To enable power-on diagnostics for 10-Gbps ITU tunable trunk cards, use the **diag power-on itu2-tun** command. To disable power-on diagnostics for 10-Gbps ITU tunable trunk cards, use the **no** form of this command.

```
diag power-on itu2-tun { aps-msg-int-bus | backplane-eth-lb | component-access | jtag-access |
lrc-access | om-fifo | qphy-fabric-lb | sii-memory } slot slot-number
```

```
no diag power-on itu2-tun { aps-msg-int-bus | backplane-eth-lb | component-access |
jtag-access | lrc-access | om-fifo | qphy-fabric-lb | sii-memory } slot slot-number
```

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
backplane-eth-lb	Enables LRC-to-backplane-Ethernet loopback tests.
component-access	Enables component access tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
om-fifo	Enables optical message first-in first-out queue tests.
qphy-fabric-lb	Enables Quad PHY-to-switch fabric-to-Quad PHY tests.
sii-memory	Enables SII memory tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 1 to 10.
Note	Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

- SV-Release

SV-Release	Modification
12.2(26)SV	This command was integrated in this release.

Usage Guidelines

Use this command to enable or disable power-on diagnostics for 10-Gbps ITU tunable trunk cards. Power-on diagnostics run when the system powers up or reloads.



Note

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for 10-Gbps ITU tunable trunk card.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on itu2-tun component-access slot 2
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on itu3

To enable power-on diagnostics for 2.5-Gbps ITU trunk cards, use the **diag power-on itu3** command. To disable power-on diagnostics for 2.5-Gbps ITU trunk cards, use the **no** form of this command.

```
diag power-on itu3 { aps-msg-int-bus | backplane-eth-lb | component-access | cpu-serdes-lb |
jtag-access | lrc-access | om-fifo | ponte-qphy-lb | ponte-serdes-lb | qphy-internal-lb |
qphy-switch-lb } slot slot-number
```

```
no diag power-on itu3 { aps-msg-int-bus | backplane-eth-lb | component-access | cpu-serdes-lb |
jtag-access | lrc-access | om-fifo | ponte-qphy-lb | ponte-serdes-lb | qphy-internal-lb |
qphy-switch-lb } slot slot-number
```

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
backplane-eth-lb	Enables LRC-to-backplane-Ethernet loopback tests.
component-access	Enables component access tests.
cpu-serdes-lb	Enables the CPU serializer/deserialize loopback tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
om-fifo	Enables optical management first-in first-out queue tests.
ponte-qphy-lb	Enables performance-monitor-to-Quad-PHY loopback tests.
ponte-serdes-lb	Enables performance-monitor-to-serializer/deserializer loopback tests.
qphy-internal-lb	Enables internal Quad PHY loopback tests.
qphy-switch-lb	Enables switch loopback tests.
slot slot-number	Specifies the number of the slot on which to perform the tests. The range is 1 to 10.
Note	Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

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 enable or disable power-on diagnostics for 2.5-Gbps ITU trunk cards. Power-on diagnostics run when the system powers up or reloads.



Note

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for that 2.5-Gbps ITU trunk card.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on itu3 cpu-serdes-lb slot 8
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on mdx

To enable power-on diagnostics for OADM modules, use the **diag power-on mdx** command. To disable power-on diagnostics for OADM modules, use the **no** form of this command.

```
diag power-on mdx idprom subslot slot/subcard
```

```
no diag power-on mdx idprom subslot slot/subcard
```

Syntax Description	idprom	Enables the IDPROM tests.
	subslot <i>slot/subcard</i>	Specifies the slot and subcard of the OADM modules. The value for <i>slot</i> is 0 and the values for <i>subcard</i> is 0 or 1.

Defaults Enabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for OADM modules. Power-on diagnostics run when the system powers up or reloads.

Examples The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on mdx idprom subslot 0/1
```

■ `diag power-on mdx`

Related Commands

Command	Description
<code>show diag power-on</code>	Displays the power-on diagnostic test results.

diag power-on oscm

To enable power-on diagnostics for OSC modules, use the **diag power-on oscm** command. To disable power-on diagnostics for OSC modules, use the **no** form of this command.

```
diag power-on oscm { hudjr-access | hudjr-internal-lb | idprom | serdes-lb }
  subslot slot/subcard
```

```
no diag power-on oscm { hudjr-access | hudjr-internal-lb | idprom | serdes-lb }
  subslot slot/subcard
```

Syntax Description

hudjr-access	Enables performance monitor access tests.
hudjr-internal-lb	Enables performance monitor Internal loopback tests.
idprom	Enables IDPROM checksum tests.
serdes-lb	Enables SerDes loopback tests.
subslot <i>slot/subcard</i>	Specifies the number of the slot on which to perform the tests. The slot range is 1 to 10. The subcard range is 0 to 1.
Note	Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for OSC modules. Power-on diagnostics run when the system powers up or reloads.

**Note**

If the IDPROM checksum **idprom** test fails or is disabled, no other power-on diagnostics are performed for that OSC module.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on oscm hudjr-access subslot 2/0
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on psm

To enable power-on diagnostics for PSMs (protection switch modules), use the **diag power-on psm** command. To disable power-on diagnostics for PSMs, use the **no** form of this command.

```
diag power-on psm {aps-test | idprom | lol-test | psm-access | temp-sensor}
                 subslot slot/subcard
```

```
no diag power-on psm {aps-test | idprom | lol-test | psm-access | temp-sensor}
                 subslot slot/subcard
```

Syntax Description

aps-test	Enables APS (Automatic Protection Switching) tests.
idprom	Enables IDPROM checksum tests.
lol-test	Enables Loss of Light tests.
psm-access	Enables PSM access tests.
temp-sensor	Enables temperature sensor tests.
subslot slot/subcard	Specifies the number of the slot on which to perform the tests. The slot is 0 and the subcard range is 0 to 1.

Defaults

Enabled

Command Modes

Global configuration

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 enable or disable power-on diagnostics for PSMs. Power-on diagnostics run when the system powers up or reloads.

**Note**

If the IDPROM checksum **idprom** test fails or is disabled, no other power-on diagnostics are performed for that PSM.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on psm temp-sensor subslot 0/0
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on tsp1

To enable power-on diagnostics for transponder line cards, use the **diag power-on tsp1** command. To disable power-on diagnostics for transponder line cards, use the **no** form of this command.

```
diag power-on tsp1 {aps-msg-int-bus | backplane-eth-lb | hudjr-access |
  hudjr-egress-internal-lb | hudjr-egress-serdes-lb | hudjr-ingress-internal-lb |
  hudjr-ingress-serdes-lb | jtag-access | lrc-access} slot slot-number
```

```
no diag power-on tsp1 {aps-msg-int-bus | backplane-eth-lb | hudjr-access |
  hudjr-egress-internal-lb | hudjr-egress-serdes-lb | hudjr-ingress-internal-lb |
  hudjr-ingress-serdes-lb | jtag-access | lrc-access} slot slot-number
```

Syntax Description

aps-msg-int-bus	Enables APS message interface tests.
backplane-eth-lb	Enables LRC bp ethernet loopback tests.
hudjr-access	Enables performance monitor access tests.
hudjr-egress-internal-lb	Enables performance monitor egress internal loopback tests.
hudjr-egress-serdes-lb	Enables performance monitor egress SerDes loopback tests.
hudjr-ingress-internal-lb	Enables performance monitor ingress internal loopback tests.
hudjr-ingress-serdes-lb	Enables performance monitor ingress SerDes loopback tests.
jtag-access	Enables IDPROM checksum tests.
lrc-access	Enables LRC access tests.
slot <i>slot-number</i>	Specifies the number of the slot on which to perform the tests. The range is 1 to 10.
Note	Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for transponder line cards. Power-on diagnostics run when the system powers up or reloads.

**Note**

If the IDPROM checksum **jtag-access** test fails or is disabled, no other power-on diagnostics are performed for that transponder line card.

Examples

The following example shows how to enable power-on diagnostics.

```
Switch# configure terminal
Switch(config)# diag power-on tsp1 lrc-access slot 2
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

diag power-on voa

To enable power-on diagnostics for VOA modules, use the **diag power-on voa** command. To disable power-on diagnostics for VOA modules, use the **no** form of this command.

diag power-on voa { **config-interface** | **idprom** } **subslot** *slot/subcard*

no diag power-on voa { **config-interface** | **idprom** } **subslot** *slot/subcard*

Syntax Description

config-interface	Enables configuration interface tests.
idprom	Enables IDPROM checksum tests.
subslot <i>slot/subcard</i>	Specifies the number of the slot on which to perform the tests. The slot range is 1 to 10 and the subcard range is 0 to 1
Note	Slots 5 and 6 are reserved for the CPU switch modules.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(12c)EV	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 enable or disable power-on diagnostics for VOA modules, WB-VOA modules and PB-OE modules. Power-on diagnostics run when the system powers up or reloads.



Note

If the IDPROM checksum **idprom** test fails or is disabled, no other power-on diagnostics are performed for that VOA module.

Examples

The following example shows how to enable power-on diagnostics.

■ **diag power-on voa**

```
Switch# configure terminal
Switch(config)# diag power-on voa config-interface slot 2/1
```

Related Commands

Command	Description
show diag power-on	Displays the power-on diagnostic test results.

show diag power-on

To display the power-on diagnostic test results, use the **show diag power-on** command.

```
show diag power-on [detail | slot slot-number]
```

Syntax Description	detail	Displays the results of the power-on diagnostic tests for the entire system.
	slot slot-number	Displays the results of the power-on diagnostic tests for the specified slot.

Defaults Displays summary information for all components on the shelf.

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(12c)EV	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 display the results of the power-on diagnostics.



Note

All the power-on diagnostic tests run from the primary CPU switch module. Only CPU switch module related and basic line card access tests are performed from the secondary CPU switch module. The systems displays power-on diagnostic test results for the cards that are present at the time of system bootup. Any removal or insertion of cards does not change the output of these command.

Examples The following example shows how to display the summarized power-on diagnostic results.

```
Switch# show diag power-on
-----
Power-on Diagnostics: Version 1.0
System-wide result: PASSED
Ran on: Mon Mar 13 2000    At: 03:45:13 UTC    CPU was: Primary
-----
```

show diag power-on

Slot/Subslot	Card-type	Result
0/1	mdx	Passed
1/*	tsp1	Passed
3/*	itu2	Passed
4/*	tsp1	Passed
6/*	cpu	Passed
7/*	tsp1	Passed
8/*	carrier-mb	Passed
8/0	oscm	Passed
8/1	oscm	Passed
9/*	escon-10p	Passed
10/*	tsp1	Passed

The following example shows how to display the detailed power-on diagnostic results.

```
Switch# show diag power-on detail
```

```
-----
Power-on Diagnostics: Version 1.0
System-wide result: FAILED
Ran on: Mon Mar 13 2000      At: 03:45:13 UTC      CPU was: Primary
-----
Subslot: 0/1      mdx      Result: Passed
H/w Ver: 1.0      FPGA func ver: N/A      Versions compatible: N/A

Test-name      Result      Cause-code
-----
idprom      Passed      -
-----
Slot: 1/*      tsp1      Result: Passed
H/w Ver: 5.10      FPGA func ver: 3.12      Versions compatible: Yes

Test-name      Result      Cause-code
-----
jtag-access      Passed      -
lrc-access      Passed      -
backplane-eth-lb      Passed      -
aps-msg-int-bus      Passed      -
hudjr-access      Passed      -
hudjr-ingress-inter      Passed      -
hudjr-ingress-serde      Passed      -
hudjr-egress-intern      Passed      -
hudjr-egress-serdes      Passed      -
-----
Slot: 3/*      itu2      Result: Passed
H/w Ver: 4.9      FPGA func ver: 2.31      Versions compatible: Yes

Test-name      Result      Cause-code
-----
jtag-access      Passed      -
lrc-access      Passed      -
backplane-eth-lb      Passed      -
aps-msg-int-bus      Passed      -
component-access      Passed      -
sii-memory      Passed      -
qphy-fabric-lb      Passed      -
om-fifo      Passed      -
-----
Slot: 4/*      tsp1      Result: Passed
H/w Ver: 5.8      FPGA func ver: 3.12      Versions compatible: Yes

Test-name      Result      Cause-code
-----
jtag-access      Passed      -
lrc-access      Passed      -
-----
```

```

backplane-eth-lb      Passed      -
aps-msg-int-bus      Passed      -
hudjr-access         Passed      -
hudjr-ingress-inter  Passed      -
hudjr-ingress-serde  Passed      -
hudjr-egress-intern  Passed      -
hudjr-egress-serdes  Passed      -
-----
Slot: 6/*             cpu
H/w Ver: 4.6         FPGA func ver: 1.43      Result: FAILED
                      Versions compatible: Yes

```

Test-name	Result	Cause-code
cpu-l1-cache	Passed	-
cpu-l2-cache	Passed	-
gt-pci0	Passed	-
iofpga-access	Passed	-
nvrpm	Passed	-
system-tod	Passed	-
bootflash	Passed	-
src-access	Passed	-
src-timer	Passed	-
sw-fabric-config	Passed	-
bcom-sw-access	Passed	-
bcom-sw-config	Passed	-
gt-mii0-internal-lb	Passed	-
gt-mii1-internal-lb	Passed	-
gt-mpsc-internal-lb	Passed	-
bp-idprom-test	FAILED	1
power-supply0	FAILED	3
power-supply1	Passed	-
temp-sensor	Passed	-
gt-interrupt	Passed	-
interrupt0	Passed	-
interrupt2	Passed	-
interrupt3	Passed	-
interrupt7	Passed	-
interrupt8	Passed	-

```

Slot: 7/*             tsp1
H/w Ver: 5.8         FPGA func ver: 3.12      Result: Passed
                      Versions compatible: Yes

```

Test-name	Result	Cause-code
jtag-access	Passed	-
lrc-access	Passed	-
backplane-eth-lb	Passed	-
aps-msg-int-bus	Passed	-
hudjr-access	Passed	-
hudjr-ingress-inter	Passed	-
hudjr-ingress-serde	Passed	-
hudjr-egress-intern	Passed	-
hudjr-egress-serdes	Passed	-

```

Slot: 8/*             carrier-mb
H/w Ver: 4.2         FPGA func ver: 1.37      Result: Passed
                      Versions compatible: Yes

```

Test-name	Result	Cause-code
jtag-access	Passed	-
lrc-access	Passed	-
backplane-eth-lb	Passed	-
aps-msg-int-bus	Passed	-

show diag power-on

```
Subslot: 8/0          oscm                      Result: Passed
```

```
Test-name           Result      Cause-code
-----
hudjr-access        Passed     -
idprom              Passed     -
hudjr-internal-lb   Passed     -
serdes-lb           Passed     -
```

```
-----
Subslot: 8/1          oscm                      Result: Passed
```

```
Test-name           Result      Cause-code
-----
hudjr-access        Passed     -
idprom              Passed     -
hudjr-internal-lb   Passed     -
serdes-lb           Passed     -
```

```
-----
Slot: 9/*            escon-10p                Result: Passed
H/w Ver: 3.4         FPGA func ver: 2.36     Versions compatible: Yes
```

```
Test-name           Result      Cause-code
-----
jtag-access         Passed     -
lrc-access          Passed     -
backplane-eth-lb    Passed     -
aps-msg-int-bus     Passed     -
component-access    Passed     -
encap-lb            Passed     -
qphy-lb             Passed     -
fabric-lb           Passed     -
```

```
-----
Slot: 10/*          tsp1                      Result: Passed
H/w Ver: 5.9        FPGA func ver: 3.12     Versions compatible: Yes
```

```
Test-name           Result      Cause-code
-----
jtag-access         Passed     -
lrc-access          Passed     -
backplane-eth-lb    Passed     -
aps-msg-int-bus     Passed     -
hudjr-access        Passed     -
hudjr-ingress-inter Passed     -
hudjr-ingress-serde Passed     -
hudjr-egress-intern Passed     -
hudjr-egress-serdes Passed     -
```

Related Commands

Command	Description
diag power-on	Enables power-on diagnostics for the entire system.
diag power-on 2gfc	Enables power-on diagnostics for 4-port 1-Gbps/2-Gbps FC aggregation cards.
diag power-on carrier-mb	Enables power-on diagnostics for carrier motherboards.
diag power-on cpu	Enables power-on diagnostics for CPU switch modules.
diag power-on escon-10p	Enables power-on diagnostics for ESCON aggregation cards.
diag power-on fcge-8p	Enables power-on diagnostics for 8-port FC/GE aggregation cards.

Command	Description
diag power-on itu2	Enables power-on diagnostics for 10-Gbps ITU trunk cards.
diag power-on itu3	Enables power-on diagnostics for 2.5-Gbps ITU trunk cards.
diag power-on mdx	Enables power-on diagnostics for OADM modules.
diag power-on psm	Enables power-on diagnostics for PSMs.
diag power-on oscm	Enables power-on diagnostics for OSC modules.
diag power-on tsp1	Enables power-on diagnostics for transponder line cards.
diag power-on voa	Enables power-on diagnostics for VOA modules.

■ show diag power-on



Redundancy Commands

CPU switch module redundancy provides protection against CPU switch module failure. Use the following commands to configure and monitor CPU switch module redundancy operations.

auto-sync counters interface

To enable automatic synchronizing of traffic statistics, performance monitoring counters, and performance history counters on the active CPU switch module to the standby CPU switch module, use the **auto-sync counters interface** command. To disable this feature, use the **no** form of this command.

auto-sync counters interface

no auto-sync counters interface

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Redundancy configuration

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

SV-Release	Modification
12.2(24)SV	This command was introduced.
12.2(29)SV	Added support for the automatic syncing of performance history counters.

Usage Guidelines Use this command to enable or disable automatic synchronizing of the traffic statistics, performance monitoring counters, and performance history counters without affecting the following types of synchronization:

- Startup configuration
- Dynamic database synchronizing
- Running configuration

Examples The following example shows how to disable automatic synchronizing of the traffic statistics and performance counters.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# no auto-sync counters interface
```

Related Commands	Command	Description
	auto-sync startup-config	Selectively enables only automatic synchronizing of the startup configuration to the standby CPU switch module.
	maintenance-mode	Disables all CPU switch module redundancy synchronization.

Command	Description
redundancy	Enters redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time database update.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

auto-sync running-config

To selectively enable only automatic synchronizing of the running configuration on the active processor to the standby CPU switch module, use the **auto-sync running-config** command. To disable automatic synchronizing of the running configuration, use the **no** form of this command.

auto-sync running-config

no auto-sync running-config

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Redundancy configuration

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

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

EV-Release	Modification
12.1(10)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 enable or disable automatic synchronizing of the running configuration without affecting the following types of synchronization:

- Startup configuration
- Dynamic database synchronizing

When a CPU switch module switchover occurs, the standby CPU switch module normally uses the running configuration rather than the startup configuration. However, if **auto-sync running-config** is disabled when a CPU switch module switchover occurs, the standby CPU switch module uses the startup configuration.

In maintenance mode, all database synchronizing to the standby CPU switch module is disabled even if **auto-sync running-config** is enabled.

Examples

The following example shows how to disable automatic synchronizing of the running configuration.

```
Switch# configure terminal  
Switch(config)# redundancy  
Switch(config-red)# no auto-sync running-config
```

Related Commands

Command	Description
auto-sync startup-config	Selectively enables only automatic synchronizing of the startup configuration to the standby CPU switch module.
maintenance-mode	Disables all CPU switch module redundancy synchronization.
redundancy	Enters redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time database update.
show bootvar	Displays boot and other environmental variables.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

auto-sync startup-config

To selectively enable only automatic synchronizing of the startup configuration to the standby CPU switch module, use the **auto-sync startup-config** command. To disable automatic synchronizing of the startup configuration, use the **no** form of this command.

auto-sync startup-config

no auto-sync startup-config

Syntax Description This command has no other arguments or keywords.

Defaults Enabled

Command Modes Redundancy configuration

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

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

EV-Release	Modification
12.1(10)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 enable or disable only automatic synchronizing of the startup configuration without affecting the following synchronization:

- Running configuration
- Dynamic database synchronizing

In maintenance mode, all database synchronizing to the standby CPU switch module is disabled even if **auto-sync startup-config** is enabled.

Examples The following example shows how to disable automatic synchronizing of the startup configuration.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# no auto-sync startup-config
```

Related Commands

Command	Description
auto-sync running-config	Selectively enables only automatic synchronizing of the running configuration to the standby CPU switch module.
maintenance-mode	Disables all CPU switch module redundancy synchronization.
redundancy	Enters redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time database update.
show bootvar	Displays boot and other environmental variables.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

clear redundancy

To clear redundancy history or counters, use the **clear redundancy** command.

```
clear redundancy {history | counters}
```

Syntax Description	history	Clears the redundancy event history log.
	counters	Clears the redundancy internal operational counters.

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 perform a one-time clear of the specified redundancy history or statistics database. This command may be useful for debugging or monitoring redundancy performance.

Examples The following example shows how to clear the redundancy history log.

```
Switch# clear redundancy history
```

Related Commands	Command	Description
	show redundancy counters	Displays redundancy software counter information.
	show redundancy history	Displays redundancy software history information.

maintenance-mode

To disable all CPU switch module redundancy synchronization, use the **maintenance-mode** redundancy command. To reenble redundancy synchronization, use the **no** form of this command.

maintenance-mode

no maintenance-mode

Syntax Description

This command has no other arguments or keywords.

Defaults

Disabled

Command Modes

Redundancy configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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

In maintenance mode, the active CPU switch module does not automatically synchronize information to the standby CPU switch module. No standby CPU switch module errors and alarms are reported to the active CPU switch module. The standby CPU switch module leaves the hot-standby mode, enters the negotiation state, and transitions to the cold-standby state.

When maintenance mode is disabled, the standby CPU switch module reloads until it reaches the hot-standby state.

Maintenance mode is useful for CPU switch module maintenance operations and system image troubleshooting.



Note

We do not recommend leaving the active and standby CPU switch modules in maintenance mode for extended periods because any added configuration is lost unless the startup configuration on the active CPU switch module is manually updated and manually synchronized with the standby CPU switch module.

Examples

The following example shows how to enable maintenance mode redundancy.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)# maintenance-mode
This command will place the system in SIMPLEX mode [confirm] y
```

Related Commands

Command	Description
redundancy	Enters redundancy configuration mode.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

redundancy

To switch to redundancy configuration mode, use the **redundancy** command.

redundancy

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(10)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 gain access to both CPU switch module redundancy configuration commands and APS configuration commands.

Examples The following example shows how to switch to redundancy configuration mode.

```
Switch# configure terminal
Switch(config)# redundancy
Switch(config-red)#
```

Related Commands	Command	Description
	associate group	Associates wavepatch interfaces for APS splitter protection.
	associate interface	Associates two interfaces for APS protection.
	auto-sync running-config	Selectively enables only automatic synchronizing of the running configuration to the standby CPU switch module.

Command	Description
auto-sync startup-config	Selectively enables only automatic synchronizing of the startup configuration to the standby CPU switch module.
maintenance-mode	Enables or disables CPU switch module redundancy synchronization.

redundancy manual-sync

To cause an immediate one-time database update of the specified database information, use the **redundancy manual-sync** command.

redundancy manual-sync { **running-config** | **startup-config** | **both** }

Syntax Description		
	running-config	Causes an immediate one-time update of the running configuration to the standby CPU switch module.
	startup-config	Causes an immediate one-time update of the startup configuration to the standby CPU switch module.
	both	Causes an immediate one-time update of the running configuration and the startup configuration to the standby CPU switch module.

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 This command is not usually required because automatic synchronization is enabled by default and, upon exiting global configuration mode, the running configuration is updated on the standby CPU switch module. (Exit global configuration mode by entering **Ctrl-Z** or **end**.) The startup configuration is updated when the **copy** command is issued.

If auto-synchronizing is disabled, the **redundancy manual-sync** command updates the standby processor database information to be identical with the active CPU switch module.

If the system is unable to complete the update, an error message is displayed.

This command is only allowed on the active CPU switch module.

Examples

The following example shows how to make the active CPU switch module send an update for both the running configuration and the startup configuration to the standby CPU switch module.

```
Switch# redundancy manual-sync both
```

Related Commands

Command	Description
auto-sync running-config	Selectively enables only automatic synchronizing of the running configuration to the standby CPU switch module.
auto-sync startup-config	Selectively enables only automatic synchronizing of the startup configuration to the standby CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

redundancy reload peer

To reload the standby CPU switch module, use the **redundancy reload peer** command.

redundancy reload peer

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 reload the standby (or peer) CPU switch module.

The active CPU switch module is allowed to reload a standby CPU switch module that is fully running the Cisco IOS software by using an NMI (non-maskable interrupt).

This command will not succeed on the active CPU switch module if the standby CPU switch module has not fully loaded its system IOS image and reached the hot-standby state.

This command cannot be entered on the standby CPU switch module.

Examples The following example shows how to reload the standby CPU switch module.

```
Switch# redundancy reload peer
Reload peer [confirm] y
Preparing to reload peer
```

Related Commands

Command	Description
maintenance-mode	Enables or disables CPU switch module redundancy synchronization.
redundancy reload shelf	Reloads both CPU switch modules in the shelf.
redundancy switch-activity	Manually switches activity from the active CPU switch module to the standby CPU switch module.
environment-monitor shutdown temperature	Reloads the active CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

redundancy reload shelf

To reload both redundant CPU switch modules, use the **redundancy reload shelf** command.

redundancy reload shelf

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 This command causes both CPU switch modules to reload.

Examples The following example shows how to reload the entire shelf.

```
Switch# redundancy reload shelf
Reload the entire shelf [confirm] y
Preparing to reload shelf
```

Related Commands	Command	Description
	maintenance-mode	Enables or disables CPU switch module redundancy synchronization.
	redundancy reload peer	Reloads the standby CPU switch module.
	redundancy switch-activity	Manually switches activity from the active CPU switch module to the standby CPU switch module.

Command	Description
environment-monitor shutdown temperature	Reloads the active CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

redundancy switch-activity

To manually switch activity from the active CPU switch module to the standby CPU switch module, use the **redundancy switch-activity** command.

redundancy switch-activity [force]

Syntax Description

force	Forces a switch of activity even when the standby CPU switch module has not reached the hot-standby state, or if some other software condition is preventing a normal switchover from occurring.
-------	--

Defaults

The active CPU switch module switches over only if the standby CPU switch module has reached hot-standby mode.

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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

This command must be issued on the active CPU switch module. It takes effect if the CPU switch module is in a state to allow switchover; that is, the standby CPU switch module is in the “Standby Hot” state and platform software is not temporarily disallowing the switchover.

Examples

The following example shows how to switch activity to the standby CPU switch module.

```
Switch# redundancy switch-activity
Preparing to switch activity
This will reload the active unit and force a switch of activity [confirm] y

01:40:35: %SYS-5-RELOAD: Reload requested
```

Related Commands	Command	Description
	maintenance-mode	Enables or disables CPU switch module redundancy synchronization.
	redundancy reload peer	Reloads the standby CPU switch module.
	redundancy reload shelf	Reloads both CPU switch modules in the shelf.
	environment-monitor shutdown temperature	Reloads the active CPU switch module.
	show redundancy summary	Displays CPU switch module redundancy status and configuration information.

show redundancy capability

To display capabilities of the active and standby CPU switch modules, use the **show redundancy capability** command.

show redundancy capability

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 display hardware and functional versions of the various components. If the capabilities do not match, the system is running in a degraded redundancy mode.

Examples The following example shows how to display capabilities for the active and standby CPU switch modules. (See Table 7-1 for field descriptions.)

```
Switch# show redundancy capability
```

```
CPU capability support
```

Active CPU	Sby CPU	Sby Compat	CPU capability description
96 MB	96 MB	OK	CPU DRAM size
32 MB	32 MB	OK	CPU PMEM size
512 KB	512 KB	OK	CPU NVRAM size
16 MB	16 MB	OK	CPU Bootflash size
3.5	3.5	OK	CPU hardware major.minor version
1.20	1.18	OK	CPU functional major.minor version

show redundancy capability

Linecard driver major.minor versions, (counts: Active=18, Standby=18)

Active CPU	Sby CPU	Sby Compat	Drv ID	Driver description
1.1	1.1	OK	0x1000	CPU w/o Switch Fabric
1.1	1.1	OK	0x1001	Fixed Transponder, w/monitor
1.1	1.1	OK	0x1002	Fixed Transponder, no monitor
1.1	1.1	OK	0x1003	Pluggable Transponder, w/monitor
1.1	1.1	OK	0x1004	Pluggable Transponder, no monitor
1.1	1.1	OK	0x1005	Line Card Motherboard
1.1	1.1	OK	0x1006	Backplane
1.1	1.1	OK	0x1007	32-ch Mux/Demux
1.1	1.1	OK	0x1008	Fixed 4-ch Mux/Demux, no OSC
1.1	1.1	OK	0x1009	Fixed 8-ch Mux/Demux, no OSC
1.1	1.1	OK	0x100A	Modular 4-ch Mux/Demux, no OSC
1.1	1.1	OK	0x100B	Modular 8-ch Mux/Demux, no OSC
1.1	1.1	OK	0x100C	32-ch Array Wave Guide
1.1	1.1	OK	0x100D	Mux/Demux Motherboard
1.1	1.1	OK	0x100E	Modular 4-ch Mux/Demux plus OSC
1.1	1.1	OK	0x100F	Modular 8-ch Mux/Demux plus OSC
1.1	1.1	OK	0x1010	Mux-Demux Motherboard, no OSC
1.1	1.1	OK	0x1011	Line Card Motherboard, no splitter

Software sync client versions, listed as version range X-Y.

X indicates the oldest peer version it can communicate with.

Y indicates the current sync client version.

Sync client counts: Active=2, Standby=2

Active CPU	Sby CPU	Sby Compat	Cl ID	Redundancy Client description
ver 1-1	ver 1-1	OK	17	CPU Redundancy
ver 1-1	ver 1-1	OK	6	OIR Client

Backplane IDPROM comparison

Backplane IDPROM field	Match	Local CPU	Peer CPU
idversion	YES	1	1
magic	YES	153	153
card_type	YES	4102	4102
order_part_num_str	YES	N/A	N/A
description_str	YES	Manhattan_Backplane_PHASE_0	Manhattan_Backplane_PHASE_0
board_part_num_str	YES	73-5655-03	73-5655-03
board_revision_str	YES	02	02
serial_number_str	YES	TBC05031572	TBC05031572
date_of_manufacture_str	YES	02/16/2001	02/16/2001
deviation_numbers_str	YES	0	0
manufacturing_use	YES	0	0
rma_number_str	YES	0x00	0x00
rma_failure_code_str	YES	0x00	0x00
oem_str	YES	Cisco_Systems	Cisco_Systems
clei_str	YES		
snmp_oid_substr	NO	0	
schematic_num_str	YES	92-4113-03	92-4113-03
hardware_major_version	YES	3	3
hardware_minor_version	YES	0	0
engineering_use_str	YES	1	1
crcl6	OK	5913	24184
user_track_string	NO	lab	
diagst	YES	^A	^A
board_specific_revision	YES	1	1
board_specific_magic_number	YES	153	153

```

board_specific_length      YES  56          56
mac_address_block_size    YES  16          16
mac_address_base_str      YES  0000164428fb0  0000164428fb0
cpu_number                 OK   1           1
optical_backplane_type    YES  255         255

```

Table 7-1 *show redundancy capability Field Descriptions*

Field	Description
Active CPU	Shows the following information for the active CPU switch module: <ul style="list-style-type: none"> processor DRAM size—the size of dynamic random access memory processor PMEM size—the amount of dynamic RAM reserved for packet I/O usage processor NVRAM size—the size of nonvolatile RAM processor Bootflash size—the size of bootflash memory processor hardware major.minor version—the CPU switch module hardware version processor functional major.minor version—the CPU switch module functional version
Sby CPU	Shows information for the standby CPU switch module. See the “Active CPU” description above.
Sby Compat	Indicates whether the standby CPU switch module is compatible with the active CPU switch module.
CPU capability description	Shows the capability descriptions for the active and standby CPU switch modules. See the “Active CPU” description above.
Linecard driver major.minor versions	Shows the number of line card drivers.
Drv ID	Shows the driver ID.
Driver description	Shows the driver description.
Software sync client versions	Shows the redundancy client version in the range X-Y, where: <ul style="list-style-type: none"> X indicates the oldest peer version it can communicate with. Y indicates the current sync client version. Also shows the sync client counts.
CI ID	Shows the client ID.
Redundancy Client description	Shows the redundancy client descriptions.

Related Commands

Command	Description
redundancy	Switches to redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time update of the specified database.
redundancy reload peer	Reloads the redundant peer CPU switch module.
redundancy reload shelf	Reloads both redundant CPU switch modules in the shelf.

Command	Description
redundancy switch-activity	Manually switches activity from the active CPU switch module to the current standby CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

show redundancy clients

To display a list of internal redundancy clients, use the **show redundancy clients** command.

show redundancy clients

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(10)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 display information about the software subsystems that are clients of the platform-independent RF (Redundancy Facility) subsystem. Subsystems that need to synchronize information from the active CPU switch module to the standby CPU switch module (or vice versa) are registered as clients of the RF.

This client information can be used to debug redundancy software.

Examples The following example shows how to display a list of internal redundancy clients. (See Table 7-2 for field descriptions.)

```
Switch# show redundancy clients
clientID = 0      clientSeq = 0      RF_INTERNAL_MSG
clientID = 6      clientSeq = 16     OIR Client
clientID = 17     clientSeq = 40     CPU Redundancy
clientID = 19     clientSeq = 9999   RF_LAST_CLIENT
```

Table 7-2 *show redundancy clients Field Descriptions*

Field	Description
clientID	Shows the ID of the redundant client.
clientSeq	Shows the client notification sequence number. Client sequence numbers determine the order in which a client is notified of RF events, relative to other clients. There are cases where one client must be notified before another. This should be noted when the sequence number is defined. The lower sequence numbers are notified first.
RF_INTERNAL_MSG	Shows the RF first client, which is part of the RF subsystem and is necessary for its operation.
OIR Client	Shows the OIR (online insertion and removal) client, which updates the standby CPU switch module when line cards are inserted and removed.
CPU Redundancy	Shows the CPU switch module redundancy client, which sends running or startup configuration changes to the standby CPU switch module. This client also reports hardware/software compatibility and version numbers between the CPU switch modules. It also ensures that CPU switch module arbitration changes and peer CPU switch module communication losses are reported to the RF and to other subsystems.
RF_LAST_CLIENT	Shows the RF last client, which is part of the RF subsystem and is necessary for its operation.

Related Commands

Command	Description
redundancy	Switches to redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time update of the specified database.
redundancy reload peer	Reloads the redundant peer CPU switch module.
redundancy reload shelf	Reloads both redundant CPU switch modules in the shelf.
redundancy switch-activity	Manually switches activity from the active CPU switch module to the current standby CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

show redundancy counters

To display internal redundancy software counters, use the **show redundancy counters** command.

show redundancy counters

Syntax Description This command has no other arguments or keywords

Defaults None

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 display internal redundancy software counter information, which can be used to debug redundancy software.

Examples The following example shows how to display internal redundancy software counter information. (See Table 7-3 for field descriptions.)

```
Switch# show redundancy counters
Redundancy Facility OMs
    comm link up = 1
    comm link down down = 0

    invalid client tx = 0
    null tx by client = 0
    tx failures = 0
    tx msg length invalid = 0

    client not rxing msgs = 0
    rx peer msg routing errors = 0
    null peer msg rx = 0
```

■ **show redundancy counters**

```

    errored peer msg rx = 0
        buffers tx = 656
tx buffers unavailable = 0
        buffers rx = 1302
    buffer release errors = 0

duplicate client registers = 0
failed to register client = 0
Invalid client syncs = 0

```

Table 7-3 *show redundancy counters Field Descriptions*

Field	Description
comm link up	Shows how many communications links are up.
comm link down down	Shows how many communications links are down.
invalid client tx	Shows the number of invalid client transmissions.
null tx by client	Shows the number of null transmissions by the client.
tx failures	Shows the number of transmission failures.
tx msg length invalid	Shows the number of transmission messages with invalid lengths.
client not rxing msgs	Shows that the client is not receiving event messages.
rx peer msg routing errors	Shows errors occurring in the RF application. This usually indicates a software problem.
null peer msg rx	Shows that the interprocess communication (IPC) has sent an empty message to the RF application. This usually indicates a software problem.
errored peer msg rx	Shows an IPC error when an RF message was received. This usually indicates a software problem.
buffers tx	Shows the number of internal buffers acquired for sending RF messages.
tx buffers unavailable	Shows the number of times internal buffers for sending RF messages were not available due to the high volume of messages being sent. This usually indicates a software problem.
buffers rx	Shows the number of buffers released back to the internal buffer pool.
buffer release errors	Shows errors in releasing internal buffers.
duplicate client registers	Shows that an application has been registered with the RF more than once. This usually indicates a software problem.
failed to register client	Shows that the system was unable to register an RF client application due to low memory or a software problem.
Invalid client syncs	Shows an internal software problem in the RF.

Related Commands

Command	Description
redundancy	Switches to redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time update of the specified database.
redundancy reload peer	Reloads the standby CPU switch module.
redundancy reload shelf	Reloads both redundant CPU switch modules in the shelf.

Command	Description
redundancy switch-activity	Manually switches activity from the active CPU switch module to the current standby CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

show redundancy history

To display internal redundancy software history, use the **show redundancy history** command.

show redundancy history

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(10)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 display the internal redundancy software history log, which can be used to debug redundancy software.

Examples The following example shows how to display the internal redundancy software history log, which can be useful for debugging redundancy software. (See Table 7-4 for field descriptions.)

```
Switch# show redundancy history
Redundancy Facility Event Log:
00:00:00 client added: RF_INTERNAL_MSG(0) seq=0
00:00:00 client added: RF_LAST_CLIENT(19) seq=9999
00:00:16 client added: CPU Redundancy(17) seq=40
00:00:16 *my state = INITIALIZATION(2) *peer state = DISABLED(1)
00:00:16 RF_PROG_INITIALIZATION(0) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(0) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_INITIALIZATION(0) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = NEGOTIATION(3) peer state = DISABLED(1)
00:00:16 RF_STATUS_PEER_PRESENCE(12) op=0
00:00:16 RF_EVENT_GO_ACTIVE(28) op=0
00:00:16 *my state = ACTIVE-FAST(9) peer state = DISABLED(1)
```

```

00:00:16 RF_STATUS_SPLIT_ENABLE(15) CPU Redundancy(17) op=0
00:00:16 RF_PROG_ACTIVE_FAST(6) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(6) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_FAST(6) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE-DRAIN(10) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE_DRAIN(7) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_DRAIN(7) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_DRAIN(7) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE_PRECONFIG(11) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE_PRECONFIG(8) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_PRECONFIG(8) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_PRECONFIG(8) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE_POSTCONFIG(12) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE_POSTCONFIG(9) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_POSTCONFIG(9) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE_POSTCONFIG(9) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 *my state = ACTIVE(13) peer state = DISABLED(1)
00:00:16 RF_PROG_ACTIVE(10) RF_INTERNAL_MSG(0) op=0 rc=11
00:00:16 RF_PROG_ACTIVE(10) CPU Redundancy(17) op=0 rc=11
00:00:16 RF_PROG_ACTIVE(10) RF_LAST_CLIENT(19) op=0 rc=11
00:00:16 client added: OIR Client(6) seq=16
00:00:19 RF_STATUS_PEER_PRESENCE(12) op=0
00:00:36 Configuration parsing complete
00:00:36 System initialization complete

```

Table 7-4 *show redundancy history Field Descriptions*

Field	Description
client added	Shows the RF subsystem client added.
*my state = INITIALIZATION	Shows that the CPU switch module has been initialized.
*peer state = DISABLED	Shows that the peer (or standby) CPU switch module is disabled.
Configuration parsing complete	Shows that the configuration has been read either from NVRAM or, on a switchover, from the stored running-config file.
System initialization complete	Shows that the system initialization is complete.

Related Commands

Command	Description
clear redundancy	Clears the redundancy history buffer in processor memory.
redundancy	Switches to redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time update of the specified database.
redundancy reload peer	Reloads the standby CPU switch module.
redundancy reload shelf	Reloads both redundant CPU switch modules in the shelf.
redundancy switch-activity	Manually switches activity from the active CPU switch module to the current standby CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

show redundancy running-config-file

To display the running configuration on the standby CPU switch module, use the **show redundancy running-config-file** command.

```
show redundancy running-config-file
```

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(10)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 This command is only available on the standby CPU switch module. It shows the stored running-config file that has been synchronized from the active CPU switch module, which will be applied as the system configuration during the next standby to active transition.

If auto-synchronization is disabled for the running-config-file on the active CPU switch module, or if the IPC (interprocessor communications) is down, this command displays the message `running-config-file is not currently valid and does not show the running-config-file`.



Note

While the standby CPU switch module remains in the hot-standby state, the running configuration, as shown by the **show running-config** command, is not expected to match the synchronized running-config file. Instead, it contains mostly default configuration values.

Examples The following example displays the running-config file on the standby CPU switch module. (See Table 7-5 for field descriptions.)

```
sby-switch# show redundancy running-config-file
```



```

!
version 12.1
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Switch
!
boot system flash bootflash:ons15530-i-mz
boot bootldr slot0:ons15530-i-mz

<Information deleted>

```

Table 7-5 *show redundancy running-config-file Field Descriptions*

Field	Description
version	Shows the software version.
no service pad	Shows service pad configuration. In the output example, “no” indicates that incoming and outgoing packet assembler/disassembler (PAD) connections are not accepted.
service timestamps	Shows that logging appears with timestamps.
no service password-encryption	Shows that password encryption has been disabled.
hostname	Shows the system name.
boot system flash	Shows the boot system flash version.
boot bootldr	Shows the bootldr version.

Related Commands

Command	Description
redundancy	Switches to redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time update of the specified database.
redundancy reload peer	Reloads the redundant peer CPU switch module.
redundancy reload shelf	Reloads both redundant CPU switch modules in the shelf.
redundancy switch-activity	Manually switches activity from the active CPU switch module to the current standby CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

show redundancy states

To display internal redundancy software state information, use the **show redundancy states** command.

show redundancy states

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(10)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 display internal redundancy software state information, which may be used to debug redundancy software.

Examples The following example shows how to display internal redundancy software state information. (See Table 7-6 for field descriptions.)

```
Switch> show redundancy states
  my state = 13 -ACTIVE
  peer state = 8  -STANDBY HOT
    Mode = Duplex
    Unit ID = 6

  Split Mode = Disabled
  Manual Swact = Enabled
  Communications = Up

  client count = 5
  client_notification_TMR = 30000 milliseconds
  keep_alive TMR = 5000 milliseconds
```

```

keep_alive count = 1
keep_alive threshold = 10
RF debug mask = 0x0

```

Table 7-6 *show redundancy states Field Descriptions*

Field	Description
my state	Shows the state of the active CPU switch module.
peer state	Shows the state of the peer (or standby) CPU switch module.
Mode	Shows either simplex (single CPU switch module) or duplex (two CPU switch modules) mode.
Unit	Shows either primary (or active) CPU switch module or peer (or standby) CPU switch module.
Unit ID	Shows the unit ID of the CPU switch module.
Split Mode	Indicates whether split mode is enabled or disabled.
Manual Swact	Indicates whether manual switchovers have been enabled without the force option.
Reason	Shows why manual switchovers have been disabled. Valid reasons are: <ul style="list-style-type: none"> • Simplex mode • Invalid peer state • Split mode • Progression in progress • Unidentified platform-specific reason
Communications	Indicates whether communications are up or down between the two CPU switch modules.
Reason	Shows why communications are down, either because the system is in simplex mode or due to a failure.
client count	Shows the number of redundancy subsystems that are registered as RF clients.
client_notification_TMR	Shows, in milliseconds, the time that an internal RF timer has for notifying RF client subsystems.
keep_alive TMR	Shows, in milliseconds, the time interval the RF manager has for sending keep-alive messages to its peer on the standby CPU switch module.
keep_alive count	Shows the number of keep-alive messages sent without receiving a response from the standby CPU switch module.
keep_alive threshold	Shows the threshold for declaring that interprocessor communications are down when keep-alive messages have been enabled (which is the default).
RF debug mask	Shows an internal mask used by the RF to keep track of which debug modes are on.

Related Commands

Command	Description
redundancy	Switches to redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time update of the specified database.
redundancy reload peer	Reloads the redundant standby CPU switch module.
redundancy reload shelf	Reloads both redundant CPU switch modules in the shelf.
redundancy switch-activity	Manually switches activity from the active CPU switch module to the current standby CPU switch module.
show redundancy summary	Displays CPU switch module redundancy status and configuration information.

show redundancy summary

To display a summary of active and standby CPU switch module redundancy information, use the **show redundancy summary** command.

show redundancy summary

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(10)EV2	This command was introduced.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release and added new required keyword summary .
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 a summary of redundancy-related information, including active and standby slots, uptimes, images, and current alarms. This information is useful for troubleshooting CPU switch module redundancy problems.

Examples The following example shows how to display a summary of redundancy-related information for the system. (See Table 7-7 for field descriptions.)

```
Switch# show redundancy summary

Redundant system information
-----
Available Uptime:          12 minutes
Time since last switchover: 6 minutes
Switchover Count:         2

Inter-CPU Communication State:UP
```

show redundancy summary

```

Last Restart Reason:          Switch over
Reported Switchover Reason:   User initiated
Software state at switchover: STANDBY HOT

Last Running Config sync:     2 minutes
Running Config sync status:   In Sync
Last Startup Config sync:     2 minutes
Startup Config sync status:   In Sync

This CPU is the Active CPU.
-----
Slot:                          6
Time since CPU Initialized:     8 minutes
Image Version:                  ONS-15530 Software (ONS15530-I-M), Experimental Version
12.1(20010824:021324) [ffrazer-lh2 106]
Image File:                     tftp://171.69.1.129/ffrazer/ons15530-i-mz
Software Redundancy State:      ACTIVE
Hardware State:                 ACTIVE
Hardware Severity:              0

Peer CPU is the Standby CPU.
-----
Slot:                          7
Time since CPU Initialized:     2 minutes
Image Version:                  ONS-15530 Software (ONS15530-I-M), Experimental Version
12.1(20010824:021324) [ffrazer-lh2 106]
Image File (on sby-CPU):       tftp://171.69.1.129/ffrazer/ons15530-i-mz
Software Redundancy State:      STANDBY HOT
Hardware State:                 STANDBY
Hardware Severity:              0

```

Table 7-7 show redundancy summary Field Descriptions

Field	Description
Available Uptime	Shows the elapsed time since the system began providing uninterrupted operation, including the time when either CPU switch module is active.
Time since last switchover	Shows the amount of time since the last switchover.
Switchover Count	Shows the number of times switchover has occurred during the Available Uptime.
Inter-CPU Communication State	Shows the status of IPC (interprocess communications).
Last Restart Reason	Shows the reason for the last restart. Valid reasons include normal boot and switchover.
Last Switchover Reason	Shows the reason for the last switchover when the Last Restart Reason field shows "Switch over." Valid reasons are: <ul style="list-style-type: none"> • Not known • User initiated • User forced • User forced (reload) • Active unit failed • Active unit removed

Table 7-7 *show redundancy summary Field Descriptions (continued)*

Field	Description
Software state at switchover	Shows the software redundancy state of the processor at the time of the last switchover.
Last Running Config sync	Shows the amount of time since the CPU switch module was synchronized with the last running configuration.
Running Config sync status	Indicates whether the CPU switch module is in sync with the running configuration.
Last Startup Config sync	Shows the amount of time since the CPU switch module was synchronized with the last startup configuration.
Startup Config sync status	Indicates whether the CPU switch module is in sync with the startup configuration.
Slot	Shows the slot number on the active or standby system.
Time since CPU Initialized	Shows the amount of time since the active or standby CPU switch module was last initialized.
Image	Shows the active or standby CPU switch module system image and version.
Software Redundancy State	Indicates whether software redundancy is enabled for the active and standby CPU switch module.
Hardware State	Shows the hardware state of the active or standby CPU switch module.
Hardware Severity	Shows the severity of hardware faults. Valid values are: <ul style="list-style-type: none"> • 0 = good CPU switch module hardware (no hardware faults) • 1 = CPU switch module hardware fault that does not affect traffic • 2 = fault that partially affects traffic • 3 = fault that may affect all user data traffic

Related Commands

Command	Description
redundancy	Switches to redundancy configuration mode.
redundancy manual-sync	Causes an immediate one-time update of the specified database.
redundancy reload peer	Reloads the redundant peer CPU switch module.
redundancy reload shelf	Reloads both redundant CPU switch modules in the shelf.
redundancy switch-activity	Manually switches activity from the active CPU switch module to the current standby CPU switch module.
show redundancy capability	Displays CPU switch module redundancy capability information.

standby privilege-mode enable

To enable access to privileged EXEC mode from the standby CPU switch module CLI, use the **standby privilege-mode enable** command. To revert to the default state, use the **no** form of the command.

standby privilege-mode enable

no standby privilege-mode enable

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Redundancy configuration

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

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

EV-Release	Modification
12.1(10)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 This command must be entered on the active CPU switch module CLI before you can access privileged EXEC mode on the standby CPU switch module CLI.

Examples The following example shows how to enable access to privileged EXEC mode on the standby CPU switch processor module.

```
Switch(config-red)# standby privilege-mode enable
```

Related Commands	Command	Description
	show redundancy summary	Displays CPU switch module redundancy status and configuration information.



SNMP Commands

This section contains the Cisco ONS 15530-specific SNMP commands. For the complete list of SNMP commands supported on the Cisco ONS 15530, and their descriptions, refer to *Cisco IOS Configuration Fundamentals Command Reference* publication.

snmp-server enable traps aps

To enable SNMP trap notifications for APS activity, use the **snmp-server enable traps aps** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps aps

no snmp-server enable traps aps

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(10)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 enable the SNMP trap notifications defined in the APS MIB (CISCO-APS-MIB). The **snmp-server enable traps aps** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for APS activity, the **snmp-server enable traps aps** command and the **snmp-server host** command for that host must be enabled.

Examples The following example shows how to enable SNMP trap notifications for APS activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps aps
```

Related Commands

Command	Description
associate interface	Specifies interfaces to be associated and enters APS configuration mode.
show aps	Displays APS configuration information and status.
show running-config	Displays the configuration information currently running on the system.
snmp-server host	Specifies the recipient for SNMP notification messages.

snmp-server enable traps cdl

To enable SNMP trap notifications defined in CISCO-CDL-MIB, use the **snmp-server enable traps cdl** command. To disable this feature, use the **no** form of the command.

```
snmp-server enable traps cdl {all | terminating-interfaces} [soak-interval set-soak-interval
clear-soak-interval]
```

```
no snmp-server enable traps cdl {all | terminating-interfaces} [soak-interval set-soak-interval
clear-soak-interval]
```

Syntax Description		
all	Enables trap notifications on all in-band message channel capable interfaces.	
terminating-interfaces	Enables trap notifications only on terminating interfaces for in-band message channel traffic.	
soak-interval	Interval after which trap notifications are sent.	
<i>set-soak-interval</i>	Time interval in milliseconds before sending defect indication trap notifications when a defect is set. The range is 100 to 60,000.	
<i>clear-soak-interval</i>	Time interval in milliseconds before sending defect indication trap notifications when a defect is cleared. The range is 100 to 60,000.	

Defaults	
	Disabled
	Set interval: 2500 milliseconds
	Clear interval: 10,000 milliseconds

Command Modes	
	Global configuration

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

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

EV-Release	Modification
12.1(10)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 enable the SNMP trap notifications defined in the in-band message channel MIB (CISCO-CDL-MIB). SNMP trap notifications are sent when an in-band message channel connection is created, modified, or deleted.

The soak interval prevents the system from being flooded with set and clear notifications for defect indications. The default values for the soak interval are adequate for most network topologies.

The **snmp-server enable traps cdl** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for patch connection activity, the **snmp-server enable traps cdl** command and the **snmp-server host** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for patch connection activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps cdl all
```

Related Commands

Command	Description
show running-config	Displays the configuration information currently running on the system.
snmp-server host	Specifies the recipient for SNMP notification messages.

snmp-server enable traps optical monitor min-severity

To enable SNMP trap notifications defined in optical monitor MIB with the minimum severity threshold, use the **snmp-server enable traps optical monitor min-severity** command. To disable this feature, use the **no** form of the command.

```
snmp-server enable traps optical monitor min-severity { critical | major | minor | not-alarmed }
```

```
no snmp-server enable traps optical monitor min-severity { critical | major | minor | not-alarmed }
```

Syntax Description

critical	Enables trap notifications for critical optical monitor alarms.
major	Enables trap notifications for major optical monitor alarms.
minor	Enables trap notifications for minor optical monitor alarms.
not-alarmed	Enables trap notifications for optical monitor events.

Defaults

Disabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 enable the SNMP trap notifications defined in the optical monitor MIB (CISCO-OPTICAL-MONITOR-MIB).

The **snmp-server enable traps optical monitor min-severity** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for patch connection activity, the **snmp-server enable traps optical monitor min-severity** command and the **snmp-server host** command for that host must be enabled.

Examples

The following example shows how to enable SNMP trap notifications for major and critical optical monitor trap activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps optical monitor min-severity major.
```

Related Commands

Command	Description
patch	Configures patch connections.
show patch	Displays patch connection information.
show running-config	Displays the configuration information currently running on the system.
snmp-server host	Specifies the recipient for SNMP notification messages.

snmp-server enable traps oscp

To enable SNMP trap notifications for OSCP activity, use the **snmp-server enable traps oscp** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps oscp

no snmp-server enable traps oscp

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(10)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 enable the SNMP trap notifications defined in the OSCP MIB (CISCO-OSCP-MIB).

The **snmp-server enable traps oscp** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for OSCP activity, the **snmp-server enable traps oscp** command and the **snmp-server host** command for that host must be enabled.

Examples The following example shows how to enable SNMP trap notifications for OSCP activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps oscp
```


Related Commands

Command	Description
show oscp info	Displays OSCP configuration information.
show oscp neighbor	Displays OSCP neighbor information.
show running-config	Displays the configuration information currently running on the system.
snmp-server host	Specifies the recipient for SNMP notification messages.

snmp-server enable traps rf

To enable SNMP trap notification for CPU switch module redundancy activity, use the **snmp-server enable traps rf** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps rf

no snmp-server enable traps rf

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(10)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 enable the SNMP trap notifications defined in the Redundancy Facility MIB (CISCO-RF-MIB).

The **snmp-server enable traps patch** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for patch connection activity, the **snmp-server enable traps patch** command and the **snmp-server host** command for that host must be enabled.

Examples The following example shows how to enable SNMP trap notifications for CPU switch module redundancy activity.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps rf
```

Related Commands

Command	Description
redundancy	Enters redundancy configuration mode.
show redundancy summary	Displays redundancy configuration information and status.
show running-config	Displays the configuration information currently running on the system.
snmp-server host	Specifies the recipient for SNMP notification messages.

snmp-server enable traps threshold min-severity

To enable SNMP trap notifications for alarm thresholds, use the **snmp-server enable traps threshold min-severity** command. To disable this feature, use the **no** form of this command.

snmp-server enable traps threshold min-severity {degrade | failure}

no snmp-server enable traps threshold min-severity

Syntax Description	degrade	Specifies signal degrade as the minimum severity for SNMP trap notifications.
	failure	Specifies signal failure as the minimum severity for SNMP trap notifications.

Defaults Disabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(10)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 enable the SNMP trap notifications defined in the alarm threshold MIB (CISCO-IF-THRESHOLD-MIB).

The **snmp-server enable traps threshold min-severity** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for alarm threshold activity, the **snmp-server enable traps threshold min-severity** command and the **snmp-server host** command for that host must be enabled.

Examples The following example shows how to enable SNMP trap notifications for alarm threshold activity and set the minimum severity to failure.

```
Switch# configure terminal
```

```
Switch(config)# snmp-server enable traps threshold min-severity failure
```

Related Commands	Command	Description
	show running-config	Displays the configuration information currently running on the system.
	show threshold-list	Displays the contents of a threshold list.
	snmp-server host	Specifies the recipient for SNMP notification messages.
	threshold-list	Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode.

snmp-server enable traps topology

To enable SNMP trap notifications for the network topology activity, use the **snmp-server enable traps topology** command. To disable this feature, use the **no** form of the command.

snmp-server enable traps topology [**throttle-interval** *seconds*]

no snmp-server enable traps topology [**throttle-interval** *seconds*]

Syntax Description	throttle-interval <i>seconds</i>	Specifies the number of seconds for the throttle timer interval. Valid values are 5 through 3600 seconds. If this keyword is omitted, the command defaults to 60 seconds at bootup time, or to the previous value configured.
---------------------------	---	---

Defaults	Disabled
-----------------	----------

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

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

EV-Release	Modification
12.1(10)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 enable the SNMP trap notifications defined in the physical topology MIB (PTOPO-MIB).

The network topology trap throttle timer prevents the system from flooding the network with messages. We recommend a 60-second interval value.

The **snmp-server enable traps topology** command is used in conjunction with the **snmp-server host** command. For a host to receive SNMP trap notifications for physical topology activity, the **snmp-server enable traps topology** command and the **snmp-server host** command for that host must be enabled.

Examples The following example shows how to enable SNMP trap notifications for network topology activity and set the throttle timer interval to 30 seconds.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps topology throttle-interval 30
```

The following example shows how to enable SNMP trap notifications for network topology activity and set the throttle timer interval to the default value.

```
Switch# configure terminal
Switch(config)# snmp-server enable traps topology
```

Related Commands

Command	Description
<code>show running-config</code>	Displays the configuration information currently running on the system.
<code>snmp-server host</code>	Specifies the recipient for SNMP notification messages.
<code>show topology</code>	Displays global physical topology configuration.
<code>topology neighbor cdp</code>	Enables CDP on the interface.

snmp-server host

To specify the recipient for SNMP notification messages, use the **snmp-server host** command. To remove the specified host, use the **no** form of the command.

```
snmp-server host host-addr [traps | informs] [version [1 | 2c | 3 {auth | noauth}]]
community-string [udp-port port] [notification-type]
```

```
no snmp-server host host-addr {traps | informs}
```

Syntax Description

<i>host-addr</i>	Specifies the name or IP address of the targeted recipient host.
traps	Sends SNMP trap notifications to this host. This is the default. (Optional)
informs	Sends SNMP inform notifications to this host. (Optional)
version	<p>Specifies the version of the SNMP used to send the traps. (Optional)</p> <p>Version 3 is the most secure model, as it allows packet encryption with the priv keyword. If you use the version keyword, one of the following must be specified:</p> <ul style="list-style-type: none"> • 1—SNMPv1. This option is not available with informs. • 2c—SNMPv2C. • 3—SNMPv3. The following three optional keywords can follow the version 3 keyword: <ul style="list-style-type: none"> – auth—Enables MD5 (Message Digest 5) and SHA (Secure Hash Algorithm) packet authentication. – noauth—Gives the noAuthNoPriv security level. This is the default if no keyword is specified.
<i>community-string</i>	Specifies the password-like community string sent with the notification operation. Though you can set this string using the snmp-server host command by itself, we recommend you define this string using the snmp-server community command prior to using the snmp-server host command.

udp-port <i>port</i>	Specifies the UDP port of the host to use. The range is 0 to 65535. The default is 162. (Optional)
<i>notification-type</i>	<p>Specifies the type of notification to be sent to the host. (Optional)</p> <p>If no type is specified, all notifications are sent. The notification type can be one or more of the following keywords:</p> <ul style="list-style-type: none"> • alarms—Sends alarm state change notifications (CISCO-ENTITY-ALARM-MIB). • aps—Sends APS MIB (CISCO-APS-MIB) modification notifications. • bgp—Sends BGP (Border Gateway Protocol) state change notifications. • cdl—Sends in-band message channel MIB (CISCO-CDL-MIB) modification notifications. • config—Sends configuration notifications. • entity—Sends entity MIB (ENTITY-MIB) modification notifications. • fru-ctrl—Sends entity FRU (field replaceable unit) control MIB (CISCO-ENTITY-FRU-CONTROL-MIB) modification notifications. • optical power—Sends optical power modification notifications. • oscp—Sends OSCP MIB (CISCO-OSCP-MIB) modification notifications. • patch—Sends optical patch MIB (CISCO-OPTICAL-PATCH-MIB) modification notifications. • rf—Sends redundancy facility MIB (CISCO-RF-MIB) modification notifications. • snmp—Sends SNMP notifications (as defined in RFC 1157). • syslog—Sends error message notifications (CISCO-SYSLOG-MIB). Specify the level of messages to be sent with the logging history level command. • threshold—Sends interface alarm threshold MIB (CISCO-IF-THRESHOLD-MIB) modification notifications. • topology—Sends physical topology MIB (PTOPO-MIB) modification notifications.

Defaults

This command is disabled by default. No notifications are sent.

If you enter this command with no keywords, the default is to send all trap types to the host. No informs are sent to this host.

If no **version** keyword is present, the default is version 1.

Command Modes

Global configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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

SNMP notifications can be sent as traps or inform requests. Traps are unreliable because the receiver does not send acknowledgments when it receives traps. The sender cannot determine if the traps were received. However, an SNMP entity that receives an inform request acknowledges the message with an SNMP response PDU. If the sender never receives the response, the inform request can be sent again. Thus, informs are more likely to reach their intended destination.

However, informs consume more resources in the agent and in the network. Unlike a trap, which is discarded as soon as it is sent, an inform request is held in memory until a response is received or the request times out. Also, traps are sent only once, while an inform might be retried several times. The retries increase traffic and contribute to a higher overhead on the network.

If you do not enter an **snmp-server host** command, no notifications are sent. To configure the system to send SNMP notifications, you must enter at least one **snmp-server host** command. If you enter the command with no keywords, all trap types are enabled for the host.

To enable multiple hosts, you must issue a separate **snmp-server host** command for each host. You can specify multiple notification types in the command for each host.

When multiple **snmp-server host** commands are given for the same host and kind of notification (trap or inform), each succeeding command overwrites the previous command. Only the last **snmp-server host** command will be in effect. For example, if you enter an **snmp-server host** command to enable informs for a host and then enter another **snmp-server host** command to enable informs for the same host, the second command will replace the first.

The **snmp-server host** command is used in conjunction with the **snmp-server enable** command. Use the **snmp-server enable** command to specify which SNMP notifications are sent globally. For a host to receive most notifications, at least one **snmp-server enable** command and the **snmp-server host** command for that host must be enabled.

Some notification types cannot be controlled with the **snmp-server enable** command. Certain notification types are always enabled. Other notification types are enabled by a different command. For example, the linkUpDown notifications are controlled by the **snmp trap link-status** command. These notification types do not require an **snmp-server enable** command.

Examples

The following example shows how to enable SNMP trap notifications for APS activity.

```
Switch# configure terminal
Switch(config)# snmp-server host nodel traps
```

Related Commands

Command	Description
show running-config	Displays the configuration information currently running on the system.
show snmp	Displays the status of SNMP communications.
snmp-server enable traps aps	Enables SNMP trap notification for APS activity.
snmp-server enable traps cdl	Enables SNMP trap notification for in-band message channel activity.
snmp-server enable traps optical monitor min-severity	Enables SNMP trap notifications for OSCP activity.
snmp-server enable traps patch	Enables SNMP trap notifications for patch connection activity.
snmp-server enable traps rf	Enables SNMP trap notifications for redundancy facility activity.
snmp-server enable traps threshold min-severity	Enables SNMP trap notifications for alarm threshold activity.
snmp-server enable traps topology	Enables SNMP trap notifications for physical topology activity.



System Management Commands

Use the following commands to manage your Cisco ONS 15530.

clear facility-alarm

To clear the external indications for the facility alarms, use the **clear facility-alarm** command.

clear facility-alarm [**critical** | **major** | **minor**]

Syntax Description		
	critical	Specifies that all external critical alarm indications be cleared.
	major	Specifies that all external major alarm indications be cleared.
	minor	Specifies that all external minor alarm indications be cleared.

Defaults Clears all external alarm indications and LEDs.

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 perform a one-time clear of the specified LEDS and external audible and visual alarm relays.

The facility alarm conditions and alarm threshold error conditions are still posted in the processor memory and can be seen by using the **show facility-alarm status** command. You can clear the alarm threshold error conditions in memory by disabling protocol monitoring using the **no monitor enable** command. Online removal of a component or disabling an interface with the **shutdown** command also clears an alarm from processor memory.

Examples The following examples shows how to clear critical external facility alarm indications.

```
Switch# clear facility-alarm critical
```

Related Commands

Command	Description
monitor enable	Enables signal monitoring for certain protocol encapsulations.
show facility-alarm status	Shows the facility alarm status information.
shutdown	Disables an interface.

environment-monitor shutdown fan

To enable the fan failure shutdown feature, use the **environment-monitor shutdown fan** command. To disable fan failure shutdown, use the **no** form of the command.

environment-monitor shutdown fan

no environment-monitor shutdown fan

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(12c)EV3	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 If a single fan fails on the Cisco ONS 15530, a minor alarm is reported to the CPU switch module. However, the chassis will never reach a critical high temperature when only one fan fails.

If two or more fans fail, a major alarm is reported to the CPU switch module.

If all six fans in the fan tray fail, the chassis will reach critical temperature after 4 minutes.

To prevent damage to the cards and modules in the shelf when two or more fans fail, use the **environment-monitor shutdown fan** command to configure the system to automatically reset the following components:

- ESCON aggregation cards
- 8-port FC/GE aggregations cards
- 2.5-Gbps ITU trunk cards
- 10-Gbps ITU trunk cards
- Transponder line cards

In addition, the ITU lasers on the transponder line cards are powered off.
To recover from fan failure shutdown, you must power-cycle the shelf.

**Caution**

Do not save the startup configuration file after the line cards shutdown. This action would result in losing the previous startup configuration.

**Caution**

The fan failure shutdown feature disrupts traffic on the shelf when two or more fans fail.

Examples

The following example shows how to enable fan failure shutdown.

```
Switch# configure terminal  
Switch(config)# environment-monitor shutdown fan
```

Related Commands

Command	Description
show environment	Displays the temperature sensor and fan status.

environment-monitor shutdown temperature

To enable the automatic shutdown of the system if the operating temperature exceeds the critical threshold, use the **environment-monitor shutdown temperature** command. To disable this feature, use the **no** form of the command.

environment-monitor shutdown temperature *slot /subslot/module*

no environment-monitor shutdown temperature

Syntax Description

<i>slot</i>	Specifies a chassis slot.
<i>subslot</i>	Specifies a chassis sub slot.
<i>module</i>	Specifies a temperature sensor module.

Defaults

Enabled

Command Modes

Global configuration

Command History

This table includes the following release-specific history entry:

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

Usage Guidelines

The Cisco ONS 15530 system automatically resets the following cards if the operating temperature exceeds the critical threshold:

- ESCON aggregation cards
- 8-port FC/GE aggregations cards
- 2.5-Gbps ITU trunk cards
- 10-Gbps ITU trunk cards
- Transponder line cards
- Multirate cards

All the other cards will be shutdown if the operating temperature exceeds the critical threshold. In addition, the ITU lasers on the trunk cards will be powered off. Though possible, Cisco does not recommend that you disable this feature.

To recover from a shutdown, you must power-cycle the shelf.



Caution

Do not save the startup configuration file after the line cards shut down. This action would result in losing the previous startup configuration.

**Caution**

The shutdown feature disrupts traffic on the shelf when the operating temperature exceeds the critical temperature.

Examples

The following example shows how to enable the automatic shutdown of the system if the operating temperature exceeds the critical threshold:

```
Switch# configure terminal
Switch(config)# environment-monitor shutdown temperature 6/0/0
```

Related Commands

Command	Description
<code>show environment</code>	Displays the temperature sensor and fan status.
<code>environment-monitor temperature-threshold</code>	Changes the default threshold temperatures.

environment-monitor temperature-threshold

To change the default threshold temperatures, use the **environment-monitor temperature-threshold** command. To reset all the thresholds to the default values for all temperature sensor modules, use the **no** form of the command.

environment-monitor temperature-threshold {**critical** | **major** | **minor** | **low**} *slot/subslot/module*
<threshold value>

no environment-monitor temperature-threshold

Syntax Description

critical	Specifies the critical alarm.
major	Specifies the major alarm.
minor	Specifies the minor alarm.
low	Specifies the low alarm.
<i>slot</i>	Specifies a chassis slot.
<i>subslot</i>	Specifies a chassis sub slot.
<i>module</i>	Specifies a temperature sensor module.
<i>threshold value</i>	Specifies the new threshold temperature.

Defaults

The following table provides the default threshold temperatures for the alarms:

Alarm	Threshold Temperature in degree Celsius (° C)
Minor	50
Major	60
Critical	70
Low	-15

Command Modes

Global configuration

Command History

This table includes the following release-specific history entry:

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

Usage Guidelines

If you do not specify the threshold temperature for an alarm (critical, major, minor, or low), the threshold will be reset to the default value. If you do not specify the temperature sensor module as well, the threshold temperature will be reset for all the temperature sensor modules.

Examples

The following example shows how to configure the critical threshold temperature:

```
Switch# configure terminal  
Switch(config)# environment-monitor temperature-threshold critical 6/0/0 65
```

Related Commands

Command	Description
show environment	Displays the temperature sensor and fan status.
environment-monitor shutdown temperature	Enables the automatic shutdown of the system if the operating temperature exceeds the critical threshold

reload

To reload the active CPU switch module, use the **reload** command.

reload [*text* | **in** [*hh:*]*mm* [*text*] | **at** *hh:mm* [*month day* | *day month*] [*text*] | **cancel**]

Syntax Description

text	Specifies a reason for reloading the active CPU switch module (maximum of 255 characters).
in [<i>hh:</i>] <i>mm</i>	Schedules a reload of the software to occur in the specified hours and minutes. The reload must occur within approximately 24 days.
at <i>hh:mm</i>	<p>Note The at keyword can only be used if the system clock has been set (either through NTP, the hardware calendar, or manually). The time is relative to the configured time zone on the system.</p> <p>Schedules a reload of the software to occur at the specified time (using a 24-hour clock).</p> <p>If you specify the month and day, the reload is scheduled to occur at that specified time and date. If you do not specify the month and day, the reload occurs at the specified time on the current day (if the specified time is later than the current time), or on the next day (if the specified time is earlier than the current time).</p> <p>Specifying 00:00 schedules the reload for midnight.</p> <p>The reload must occur within approximately 24 days.</p>
month	Specifies the name of the month the reload is to occur, with any number of characters in a unique string.
day	Specifies the number of the day the reload is to occur, in the range 1 to 31.
cancel	Cancels a scheduled reload.

Defaults

Immediate active CPU switch module reload

Command Modes

Privileged EXEC

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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

This command halts the active CPU switch module. If the CPU switch module is set to restart on error, it reboots itself.

Use this command after configuration information is entered into a file and saved to the startup configuration. You cannot reload from a virtual terminal if the CPU switch module is not set up for automatic booting. This prevents the CPU switch module from dropping to the ROM monitor and thereby taking the CPU switch module out of the remote user's control.

If you modify your configuration file, the system prompts you to save the configuration. During a save operation, the system asks you if you want to proceed with the save if the CONFIG_FILE environment variable points to a startup configuration file that no longer exists. If you enter **yes** in this situation, the CPU switch module goes to setup mode upon reload.

When you schedule a reload to occur at a later time, it must occur within approximately 24 days.

This command can be entered on either the active or standby CPU switch module console and only a reload of the CPU switch module on which the command was entered occurs.

When entered on the active CPU switch module, this command synchronizes the running-config to the standby CPU switch module just before the reload is executed, and causes a switchover to the standby CPU switch module only if the standby CPU switch module is in the hot-standby state.

By default the system is configured to reboot automatically, so the active CPU switch module reboots as the standby CPU switch module after the reload.

To display information about a scheduled reload, use the **show reload** command.

Examples

The following example shows how to reload the software on the CPU switch module.

```
Switch# reload
```

The following example reloads the software on the CPU switch module in 10 minutes.

```
Switch# reload in 10
Reload scheduled for 11:57:08 PDT Mon Feb 26 2001 (in 10 minutes)
Proceed with reload? [confirm]
Switch#
```

The following example reloads the software on the CPU switch module at 1:00 p.m. today.

```
Switch# reload at 13:00
Reload scheduled for 13:00:00 PPDT Mon Feb 26 2001 (in 1 hour and 2 minutes)
Proceed with reload? [confirm]
Switch#
```

The following example reloads the software on the CPU switch module on 2/27 at 2:00 a.m.

```
Switch# reload at 02:00 feb 27
Reload scheduled for 02:00:00 PDT Tues Feb 26 2001 (in 38 hours and 9 minutes)
Proceed with reload? [confirm]
Switch#
```

The following example cancels a pending reload.

```
Switch# reload cancel
%Reload cancelled.
```

Related Commands

Command	Description
config-register	Changes the configuration register settings.
maintenance-mode	Enables or disables CPU switch module redundancy synchronization.
redundancy reload peer	Reloads the standby CPU switch module.
redundancy reload shelf	Reloads both CPU switch modules in the shelf.
redundancy switch-activity	Manually switches activity from the active CPU switch module to the standby CPU switch module.
show reload	Displays reload status information.

reprogram

To upgrade the FPGA or functional image on a selected card from a flash file, use the **reprogram** privileged EXEC command.

```
reprogram flash-file-name {slot [subcard] | rommon | sby-rommon}
```

Syntax Description	
<i>flash-file-name</i>	Specifies the name of the image to download, which can be in the CompactFlash Card or bootflash.
<i>slot</i>	Specifies the physical slot number of the controller you want to reprogram. The slot number ranges from 0 to 10.
<i>subcard</i>	Indicate a subcard in a slot for half-width modules or in a carrier motherboard. The subcard number ranges from 0 to 3.
rommon	Specify reprogramming the ROMMON (ROM monitor) image of the active CPU switch card.
sby-rommon	Specify reprogramming the ROMMON image of the standby CPU switch card.

Defaults None.

Command Modes EXEC

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

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

EV-Release	Modification
12.1(10)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 This command the image to the controller you select. It also resets the selected controller, which causes active connections and configurations to be lost.

**Caution**

Do not power-cycle the system during a reprogram operation because damage can occur to the controller you are reprogramming. If you power-cycle the system while reprogramming is in progress, you also might be unable to boot the system.

Examples

The following example shows how to reprogram the image on the ESCON aggregation card in slot 3.

```
Switch# reprogram bootflash:fi-ons15530-escon.A.2-36.exo 3
```

Related Commands

Command	Description
show hardware	Displays hardware information for the system.
show upgrade-info functional-image	Displays information from a version diagnostics data file about the versions of the ROMMON and functional images on the shelf.
show version	Display version information for the Cisco IOS system image and the ROMMON image.

show bootvar

To display boot and related environmental variables for both the active and standby CPU switch modules, use the **show bootvar** command.

show bootvar

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(10)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

This command shows boot and related information for the active and standby CPU switch modules.

Examples

The following example shows how to display boot information for the system. (See Table 9-1 for field descriptions.)

```
Switch# show bootvar
BOOT variable = bootflash:<imagename>;
CONFIG_FILE variable =
BOOTLDR variable =
Configuration register is 0x2

Standby auto-sync startup config mode is on

Standby auto-sync running config mode is on

Standby is up.
Standby BOOT variable = bootflash:<imagename>;
Standby CONFIG_FILE variable =
```

```
Standby BOOTLDR variable =
Standby Configuration register is 0x2
```

Table 9-1 *show bootvar Field Descriptions*

Field	Description
BOOT variable	Shows a list of bootable images on various devices.
CONFIG_FILE variable	Shows the configuration file used during system initialization.
BOOTLDR variable	Shows the configuration file used during system initialization.
Configuration register	Shows the stored configuration information.
Standby auto-sync startup config mode	Indicates whether startup-config file autosynchronization is enabled or disabled on the standby CPU switch module.
Standby auto-sync running config mode	Indicates whether running-config file autosynchronization is enabled or disabled on the standby CPU switch module.
Standby	Indicates whether the standby CPU switch module is up or down.
Standby BOOT variable	Shows a list of bootable images on various devices for the standby CPU switch module.
Standby CONFIG_FILE variable	Shows the configuration file used during system initialization for the standby CPU switch module.
Standby BOOTLDR variable	Shows the configuration file used during system initialization for the standby CPU switch module.
Standby Configuration register	Shows the stored configuration information for the standby CPU switch module.

Related Commands

Command	Description
auto-sync running-config	Selectively enables only automatic synchronizing of the running configuration to the standby CPU switch module.
auto-sync startup-config	Selectively enables only automatic synchronizing of the startup configuration to the standby CPU switch module.

show ciscoview package

To display Embedded CiscoView package information, use the **show ciscoview package** command.

show ciscoview package

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(10)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 display Embedded CiscoView package file information or to troubleshoot.

Examples The following example shows how to display Embedded CiscoView package information. (See Table 9-2 for field descriptions.)

```
Switch# show ciscoview package

File source:slot1:
CVFILE                               SIZE(in bytes)
-----
ONS15530-1.0.html                     8861
ONS15530-1.0.sgz                       1183238
ONS15530-1.0_ace.html                  3704
ONS15530-1.0_error.html                 401
ONS15530-1.0_jks.jar                   17003
ONS15530-1.0_nos.jar                   17497
applet.html                             8861
cisco.x509                               529
identitydb.obj                          2523
```

Table 9-2 *show ciscoview package Field Descriptions*

Field	Description
File source	Identifies the slot.
CVFILE	Identifies the Embedded CiscoView files in the package.
SIZE (in bytes)	Shows the file size in bytes.

Related Commands

Command	Description
show ciscoview version	Displays Embedded CiscoView version information.

show ciscoview version

To display Embedded CiscoView version information, use the **show ciscoview version** command.

show ciscoview version

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(10)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 display Embedded CiscoView version information.

Examples The following example shows how to display Embedded CiscoView version information. (See Table 9-3 for field descriptions.)

```
Switch# show ciscoview version
```

```
Engine Version: 5.3 ADP Device: ONS15530 ADP Version: 1.0 ADK: 39
```

Table 9-3 *show ciscoview version* Field Descriptions

Field	Description
Engine Version	Identifies the Embedded CiscoView version.
ADP Device	Identifies the ADP (Autonomous Device Package) device.
ADP Version	Identifies the ADP version.

Related Commands

Command	Description
<code>show ciscoview package</code>	Displays Embedded CiscoView package information.

show environment

To display the temperature sensor and fan status, use the **show environment** command.

show environment

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes EXEC

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

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

EV-Release	Modification
12.1(12c)EV3	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.

Examples

The following example shows how to display the fan tray failure shutdown feature configuration:

```
Switch# show environment
Fan
---
Status:                Total Failure

Line card shutdown on fan failure:enabled

      Sensor                Temperature                Thresholds
      (degree C)           Minor           Major           Critical           Low
-----
Inlet Sensor                28                65                75                80                -15
Outlet Sensor                28                75                85                90                -15

      Sensor                Alarms
      Min
Critical
-----
Inlet Sensor                0                0                0
Outlet Sensor                0                0                0
```

■ show environment

```
Power Entry Module 0 type DC status:          OK
```

Related Commands

Command	Description
environment-monitor shutdown fan	Enables system shutdown when the fans fail.

show facility-alarm status

To display the facility alarm status, use the **show facility-alarm status** command.

```
show facility-alarm status [critical | info | major | minor]
```

Syntax Description	critical	Shows the status information for critical facility alarms.
	info	Shows the status information for information facility alarms.
	major	Shows the status information for major facility alarms.
	minor	Shows the status information for minor facility alarms.

Defaults Displays all facility alarm status information. This information includes external alarms and protocol monitoring alarms.

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(10)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 display the facility alarm and alarm threshold error status information.

Examples The following example shows how to display the facility alarm status information. (See Table 9-4 for field descriptions.)

```
Switch# show facility-alarm status
System Totals Critical: 0 Major: 5 Minor: 1

Source          Severity      Description [Index]
-----
Chassis         INFO         Chassis power supply 1 missing [6]
Giga2/0/4       INFO         Keep-alive timeout event [12]
WaveE4/0        MAJOR        Loss of Lock event [0]
WaveE4/0        MAJOR        Loss of Sync event [2]
```

show facility-alarm status

```

PSC card 6          MINOR      Unprotected. Peer not responding [10]
TenGE7/0           MAJOR      Loss of Lock event [0]
TenGE7/0           MAJOR      Loss of Sync event [2]
Wave4/0/1          MAJOR      Low alarm threshold exceeded for
                  Receive Power (in dBm)
Wave4/0/1          INFO       Low warning threshold exceeded for
                  Receive Power (in dBm)

```

Table 9-4 *show facility-alarm status Field Descriptions*

Field	Description
System Totals	Shows the number of alarms in the output display by severity.
Source	Shows the system component that is the source of the alarm.
Severity	Shows the severity of the alarm.
Description [Index]:	Shows a description of the alarm, including a MIB index if present.

Related Commands

Command	Description
clear facility-alarm	Clears external facility alarm indications.
monitor enable	Enables signal monitoring for certain protocol encapsulations.

show hardware

To display hardware information, use the **show hardware** command.

show hardware [**detail** | **linecard** [*slot*]]

Syntax Description	detail	Shows detailed hardware information for the entire shelf.
	linecard [<i>slot</i>]	Shows detailed hardware information for the motherboard or CPU switch module in a specific slot. The range is 0 to 10.

Defaults Displays a summary of hardware information for the entire shelf.

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 display hardware information for debugging and tracking.

Examples The following example shows how to display hardware information for the shelf. (See Table 9-5 for field descriptions.)

```
Switch# show hardware
-----
ONS 15530 Chassis, NEBS Version named Switch, Date: 08:44:06 UTC Wed Apr 27 2005
-----

-----
Back-Plane Information
-----
Orderable Product No.  MAC-Address          MAC-Size  Serial No.   Mfg. Date  H/W Ver
-----
15530-CHAS-N=          00-0e-83-44-b0-30 16         TBC07464403 2004/01/20 3.1
```

```

-----
Slot Orderable Product No.      Part No.   Rev Serial No.   Mfg. Date H/W Ver.
-----
1/* 15530-ITU2-2110=           800-24373- A0 CNH08060204 10/11/2004 8.1
2/* 15530-ITU2-1310=           800-24365- A0 CNH084300WR 11/01/2004 8.1
3/* 15530-ITU2-0520           800-24389- 04 CNH071900BZ 05/16/2003 8.0
5/* 15530-CPU=PROTO           73-7399-04 02 CAB0602M9XE 01/31/2002 4.6
6/*  PROTO-HAMPTON-CPU        73-6572-04 06 CAB0602M9XV 01/29/2002 4.0
7/* 15530-ITU3-0120           68-1761-02 2  CAB06280T7Q 01/01/2000 3.0
10/* 15530-ITU2-0120=         800-19405- A0 CNH0711001J 03/28/2003 7.1

```

Power Supply:

```

Slot Part No.      Rev Serial No.   RMA No.      Hw Vrs   Power Consumption
-----
0          34-1811-01 A0  SNI06090004 00-00-00-00  1.0              4900 cA

```

Power Supply 0 :

```

type      : 600W AC
status    : OK

```

Power Supply 1 Not present

Table 9-5 show hardware Field Descriptions

Field	Description
Slot	Shows the slot or slot and subcard position for the hardware component.
Controller Type	Shows the hardware component controller type.
Part No.	Shows the part number.
Rev	Shows the revision number.
Serial No.	Shows the serial number.
Mfg. Date	Shows the date the component was manufactured.
RMA No.	Shows the RMA number.
H/W Ver.	Shows the hardware version number.

The following example shows how to display detailed hardware information for a specific slot. (See Table 9-6 for field descriptions.)

Switch# show hardware linecard 1

```

-----
Slot Number          : 1/*
Controller Type      : 0x1113
On-Board Description : ONS 15530 Tunable Ch 21-24 10Gpbs ITU Line Card MU w/
splitter
Orderable Product Number: 15530-ITU2-2110=
Board Part Number    : 800-24373-02
Board Revision       : A0
Serial Number        : CNH08060204
Manufacturing Date   : 10/11/2004
Hardware Version     : 8.1
RMA Number           :
RMA Failure Code     :
Functional Image Version: 2.38
Function-ID          : 0
Version-ID (VID)     : V01

```

Table 9-6 *show hardware linecard Field Descriptions*

Field	Description
Slot Number	Shows the slot or slot and subcard position for the hardware component.
Controller Type	Shows the hardware component controller type.
On-Board Description	Shows the description stored on the component.
Orderable Product Number	Shows the component product order number.
Board Part Number	Shows the part number.
Board Revision	Shows the revision number.
Serial Number	Shows the serial number.
Manufacturing Date	Shows the date the component was manufactured.
Hardware Version	Shows the hardware version number.
RMA Number	Shows the RMA number.
RMA Failure Code	Shows the RMA failure code.
Functional Image Version	Shows the version of the component functional image.
Function-ID	Shows the FPGA version of the subcards.
Version-ID	Shows the version of the component.

show inventory

To display hardware inventory information, use the **show inventory** command.

show inventory [raw]

Syntax Description	raw	Shows hardware inventory information for every slot in the shelf, including empty slots.
--------------------	-----	--

Defaults Displays summary hardware inventory information.

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 display hardware information for debugging and tracking.

Examples The following example shows how to display hardware inventory information for the shelf. (See Table 9-7 for field descriptions.)

```
Switch# show inventory
NAME: "Cisco ONS 15530 Chassis, NEBS compliant", DESCR: "Cisco ONS 15530 Chassis
, NEBS compliant"
PID: 15530-CHAS-N=      , VID: 3.1, SN: TBC07464403

NAME: "ONS 15530 4-Channel Band F 10Gbps ITU Line Card MU with Splitter", DESCR:
"ONS 15530 4-Channel Band F 10Gbps ITU Line Card MU with Splitter"
PID: 15530-ITU2-2110=  , VID: 8.1, SN: CNH08060204

NAME: "ONS 15530 4-Channel Band D 10Gbps ITU Line Card MU with Splitter", DESCR:
"ONS 15530 4-Channel Band D 10Gbps ITU Line Card MU with Splitter"
PID: 15530-ITU2-1310=  , VID: 8.1, SN: CNH084300WR
```


NAME: "ONS 15530 Ch 05 10Gbps ITU Line Card MU without Splitter", DESCR: "ONS 15530 Ch 05 10Gbps ITU Line Card MU without Splitter"
 PID: 15530-ITU2-0520 , VID: 8.0, SN: CNH071900BZ

NAME: "Cisco ONS 15530 CPU and Switch Board", DESCR: "Cisco ONS 15530 CPU and Switch Board"
 PID: 15530-CPU=PROTO , VID: 4.6, SN: CAB0602M9XE

NAME: "Cisco ONS 15530 CPU and Switch Board", DESCR: "Cisco ONS 15530 CPU and Switch Board"
 PID: PROTO-HAMPTON-CPU , VID: 4.0, SN: CAB0602M9XV

NAME: "ONS 15530 Ch 01/02 2.5Gbps ITU Line Card MU without Splitter", DESCR: "ONS 15530 Ch 01/02 2.5Gbps ITU Line Card MU without Splitter"
 PID: 15530-ITU3-0120 , VID: 3.0, SN: CAB06280T7Q

NAME: "ONS 15530 Ch 01 10Gbps ITU Line Card MU without Splitter", DESCR: "ONS 15530 Ch 01 10Gbps ITU Line Card MU without Splitter"
 PID: 15530-ITU2-0120= , VID: 7.1, SN: CNH0711001J

Table 9-7 *show inventory* Field Descriptions

Field	Description
NAME:	Shows the name for the hardware component.
DESCR:	Shows the description of the hardware component.
PID:	Shows the part identifier.
VID:	Shows the hardware version identifier.
SN:	Shows the serial number.

show optical wavelength mapping

To display the mapping of Cisco ONS 15530 channels to ITU grid frequencies and wavelengths, use the **show optical wavelength mapping** command.

show optical wavelength mapping

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(10)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 display how the Cisco ONS 15530 channels map to the ITU G.692 grid wavelengths. Channel 0 is the OSC. Channels 1 through 32 are the client data channels. The last two digits of the frequency correspond to the ITU number (for example, the frequency for channel 1 is 192.1 so the ITU grid number is 21).

The frequencies ending in 0 and 5 are missing from the output because they are used as buffers between the 4-channel bands.

Examples The following example shows how to display wavelength mapping information for the system. (See Table 9-8 for field descriptions.)

```
Switch# show optical wavelength mapping
      Frequency      Wavelength
Channel (THz)      (nm)
-----
0         191.9      1562.23
1         192.1      1560.61
2         192.2      1559.79
```

3	192.3	1558.98
4	192.4	1558.17
5	192.6	1556.55
6	192.7	1555.75
7	192.8	1554.94
8	192.9	1554.13
9	193.1	1552.52
10	193.2	1551.72
11	193.3	1550.92
12	193.4	1550.12
13	193.6	1548.51
14	193.7	1547.72
15	193.8	1546.92
16	193.9	1546.12
17	194.1	1544.53
18	194.2	1543.73
19	194.3	1542.94
20	194.4	1542.14
21	194.6	1540.56
22	194.7	1539.77
23	194.8	1538.98
24	194.9	1538.19
25	195.1	1536.61
26	195.2	1535.82
27	195.3	1535.04
28	195.4	1534.25
29	195.6	1532.68
30	195.7	1531.90
31	195.8	1531.12
32	195.9	1530.33

Table 9-8 *show optical wavelength mapping Field Descriptions*

Field	Description
Channel	Identifies the channel.
Frequency (THz)	Shows the frequency for the channel in THz. The last two digits correspond to the ITU grid number.
Wavelength (nm)	Shows the wavelength for the channel in nm.

show temperature

To display shelf temperature information, use the **show temperature** command.

show temperature

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(10)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 display the current shelf temperature and the alarm threshold temperatures.

Examples The following example shows how to display internal redundancy software state information. (See Table 9-9 for field descriptions.)

```
Switch> show temperature
  Sensor                Temperature           Thresholds
                (degree C)   Minor      Major      Critical   Low
-----
Sensor                27             65         75         80         -15

  Sensor                Alarms
                Minor      Major      Critical
-----
Sensor                0         0         0
```

Table 9-9 *show temperature Field Descriptions*

Field	Description
Sensor	Shows the type of sensor.
Temperature (degree C)	Shows the current temperature in degrees Celsius.
Minor	Shows temperature threshold that generates a minor alarm.
Major	Shows temperature threshold that generates a major alarm.
Critical	Shows temperature threshold that generates a critical alarm.
Low	Shows temperature threshold that generates a low alarm.
Alarms	Shows the number of minor, major, and critical alarms on the inlet and outlet sensors.

Related Commands

Command	Description
<code>show facility-alarm status</code>	Shows the facility alarm status information.

show upgrade-info functional-image

To display ROMMON and functional image version diagnostics, use the **show upgrade-info functional-image** command.

```
show upgrade-info functional-image {all | latest-version [software-compatible]}
  dat-file device:filename [detail]
```

Syntax Description		
all		Displays information about all the functional images found in the data file.
latest-version		Displays information about the latest functional images on the system.
software-compatible		Displays information about the latest functional images which are compatible with the currently running system image.
dat-file <i>device:filename</i>		Specifies the name of the data file containing the version diagnostics for the ROMMON and functional images on the system.
detail		Displays detailed functional image version diagnostics.

Defaults None

Command Modes Privileged EXEC

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

- SV-Release
- S-Release

SV-Release	Modification
12.2(18)SV	This command was introduced.
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 version diagnostics for ROMMON and functional images. The data file to use in conjunction with this command can be downloaded from the following URL:

<http://www.cisco.com/cgi-bin/tablebuild.pl/ons15530-fpga>

The following example shows how to display detailed APS information for all APS groups. (See Table 9-10 for field descriptions.)

```
Switch# show upgrade-info functional-image all dat-file fi-ons15530-index.010.dat
Validating CRC...100%
```

```
Generating Functional Image Upgrade Information for the currently running IOS
using DAT file fi-ons15530-index.010.dat, created on Thu Aug 21 00:23:10 PST 2003.
```

Please ensure that you are using the latest DAT file from

Cisco Connection Online (CCO) Webpage

Abbr: Cur.FV = Functional Image Version of the Card.

Lis.FV = List of Func. Image Versions found in the DAT-file for the corresponding card.

(U) = IOS Software upgrade is required, to upgrade to the recommended functional image version.

Slot	Product No	Cur.FV	Lis.FV	Listed Functional Image
1/*	15530-TSP1-2912=	3.12	3.12	No Func. Image Upgrade Required
1/0	Unknown	1.A2	1.A2	No Func. Image Upgrade Required
2/*	15530-TSP1-3112	3.55	3.55	No Func. Image Upgrade Required
2/0	Unknown	1.F2	1.F2	No Func. Image Upgrade Required
3/*	15530-TSP1-2911	3.11	3.12	fi-ons15530-tpd.A.3-12.exo
3/0	Unknown	1.9F	1.A0	fi-ons15540-tlcmdb.A.1-A0.exo
4/*	PROTO-HAMPTON-ESCON	2.33	2.36	fi-ons15530-escon.A.2-36.exo
5/*	PROTO-HAMPTON-CPU	1.43	1.43	No Func. Image Upgrade Required
5/0	Active Rommon	1.1	1.1	No Func. Image Upgrade Required
6/*	PROTO-HAMPTON-CPU	1.43	1.43	No Func. Image Upgrade Required
6/0	Standby Rommon	1.1	1.1	No Func. Image Upgrade Required
8/*	PROTO-HAMPTON-OSCM	1.37	1.37	No Func. Image Upgrade Required
8/0	15530-OSCM	0.58	0.58	No Func. Image Upgrade Required
8/1	15530-OSCM	0.58	0.58	No Func. Image Upgrade Required

Table 9-10 show upgrade-info functional-image Field Descriptions

Field	Description
Slot	Indicate the slot for a card and the slot and subcard for a module.
Product No	Indicates the product number for the card or module.
Cur. FV	Indicates the current ROMMON or functional image version on the card or module.
Lis. FV	Indicates the ROMMON or functional image version listed in the data file.
Listed Function Image	Indicates the name of the ROMMON or functional image file to use to upgrade the card or module.

Related Commands

Command	Description
reprogram	Updates the ROMMON or functional image on a card or module.
show hardware	Displays information about the hardware on the shelf.

show version

To display the system hardware configuration, software version, and names and sources of configuration files and boot images, use the **show version** command.

show version

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(10)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 display the system hardware configuration, software version, and names and sources of configuration files and boot images.



Note

Always specify the complete software version number when reporting a possible software problem.

Examples

The following example shows how to display version information for the system. Table 9-11 describes the output from the **show version** command.

```
Switch# show version
Cisco IOS Software, ONS-15530 Software (ONS15530-I-M), Experimental Version 12.2
(20050406:093210) [ksrinu-flo_ons_dev 100]
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 06-Apr-05 15:26 by ksrinu
```

```
ROM: System Bootstrap, Version 12.1(10r)EV, RELEASE SOFTWARE (fc1)
```



```

switch uptime is 1 day, 7 hours, 35 minutes
Uptime for this control processor is 1 day, 6 hours, 37 minutes
System returned to ROM by reload at 02:29:17 UTC Tue Apr 26 2005
System image file is "bootflash:ons15530-i-mz-UT-APR6"

Cisco ONS15530 (RM7000) processor with 49152K/16384K bytes of memory.
R7000 CPU at 234Mhz, Implementation 39, Rev 2.1, 256KB L2, 2048KB L3 Cache

Last reset from s/w nmi
2 FastEthernet interfaces
509K bytes of NVRAM.

16384K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x0

```

Table 9-11 *show version* Field Descriptions

Field	Description
Software version	Shows the software version.
Compiled	Shows the date and time the software was compiled.
System Bootstrap, Version	Shows the system bootstrap version number.
Switch uptime	Shows the number of days, hours, minutes, and seconds the system has been up and running.
System returned to ROM by reload	Shows how the system was last booted—as a result of a normal system startup or because of system error.
System image file	Shows the name and location of the system image file.
bytes of memory	Shows the amount of system memory.
Last reset from s/w nmi	Shows how the system was last reset.
2 FastEthernet interface(s)	Shows the number, type, and encapsulation of interfaces available.
NVRAM	Shows the amount of nonvolatile configuration RAM available.
Flash internal SIMM	Shows the amount of Flash internal SIMM memory.
Configuration register	Shows the location of the configuration register.

t11 user

To add a new user for the TL1 command environment, use the **t11 user** command. To remove a TL1 user, use the **no** form of the command.

```
t11 user user-name { maint | prov | rtrv | super } [0 | 7] password
```

```
no t11 user user-name
```

Syntax Description	
<i>user-name</i>	Specifies the TL1 user name. The user name is case sensitive and can be 1 to 10 alphanumeric characters.
maint	Specifies TL1 maintenance command privileges only.
prov	Specifies TL1 provisioning command privileges only.
rtrv	Specifies TL1 retrieval command privileges only.
super	Specifies access to all TL1 commands.
0	Specifies that the password is unencrypted.
7	Specifies that the password is hidden.
<i>password</i>	Specifies the TL1 user password. The password is case sensitive and can be 1 to 10 printable ASCII characters, excluding “?”, “:”, “;”, “”, “””, “ ”, “-”, and “=”.

Defaults None

Command Modes Global configuration

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

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

EV-Release	Modification
12.1(12c)EV1	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 the **t11 user** command to create user names for the TL1 command environment using the Cisco IOS CLI.

Examples

The following example shows how to create a TL1 user name and password.

```
Switch(config)# t11 user admin super 0^x3T1
```

tracert

To trace the IP routes the packets actually take when traveling from the Cisco ONS 15530 NME (network management Ethernet) port to their destination, use the **tracert** EXEC command.

EXEC Mode

tracert *protocol destination*

Privileged EXEC Mode

tracert [*protocol*] [*destination*]

Syntax Description

<i>protocol</i>	Protocols that can be used are appletalk , clns , ip , ipx , and vines . In privileged EXEC mode, the default protocol is assumed for the destination address format.
<i>destination</i>	Destination address or host name on the command line. In privileged EXEC mode, the default parameters for the appropriate protocol are assumed.

Defaults

The *protocol* argument is based on the format of the *destination* argument. For example, if the system finds a destination in IP format, the protocol defaults to **ip**.

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(10)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

The **tracert** command works by taking advantage of the error messages generated by the system when a datagram exceeds its TTL (Time To Live) value. The **tracert** command starts by sending probe datagrams with a TTL value of 1. This causes the first system to discard the probe datagram and send back an error message. The **tracert** command sends several probes at each TTL level and displays the round-trip time for each.

The **traceroute** command sends out one probe at a time. Each outgoing packet may result in one or two error messages. A `time exceeded` error message indicates that an intermediate system detected and discarded the probe. A `destination unreachable` error message indicates that the destination node received and discarded the probe because it could not deliver the packet. If the timer goes off before a response comes in, **traceroute** prints an asterisk(*).

The **traceroute** command terminates when the destination responds, when the maximum TTL is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, enter **^X**.

Common Trace Problems

Due to bugs in the IP implementation of various hosts and switches, the IP **traceroute** command may behave in unexpected ways.

Not all destinations respond correctly to a probe message by sending back an `ICMP port unreachable` message. A long sequence of TTL levels with only asterisks, terminating only when the maximum TTL is reached, may indicate this problem.

There is a known problem with the way some hosts handle an `ICMP TTL exceeded` message. Some hosts generate an ICMP message, but they reuse the TTL of the incoming packet. Because this is zero, the ICMP packets do not make it back. When you trace the path to such a host, you may see a set of TTL values with asterisks (*). Eventually, the TTL gets high enough that the ICMP message can get back. For example, if the host is 6 hops away, **traceroute** times out in responses 6 through 11.

Examples

The following example displays sample IP **traceroute** output in EXEC mode when a destination host name is specified. (See Table 9-12 for field descriptions.)

```
Switch> traceroute ip ABA.NYC.mil

Type escape sequence to abort.
Tracing the route to ABA.NYC.mil (26.0.0.73)
 0 DEBRIS.CISCO.COM (131.108.1.6) 1000 msec 8 msec 4 msec
 1 BARNET-GW.CISCO.COM (131.108.16.2) 8 msec 8 msec 8 msec
 2 EXTERNAL-A-GATEWAY.STANFORD.EDU (192.42.110.225) 8 msec 4 msec 4 msec
 3 BB2.SU.BARNET.NET (131.119.254.6) 8 msec 8 msec 8 msec
 4 SU.ARC.BARNET.NET (131.119.3.8) 12 msec 12 msec 8 msec
 5 MOFFETT-FLD-MB.in.MIL (192.52.195.1) 216 msec 120 msec 132 msec
 6 ABA.NYC.mil (26.0.0.73) 412 msec 628 msec 664 msec
```

Table 9-12 *traceroute command Field Descriptions*

Field	Description
1	Indicates the sequence number of the system in the path to the host.
DEBRIS.CISCO.COM	Shows the host name of this system.
131.108.1.61	Shows the IP address of this system.
1000 msec 8 msec 4 msec	Shows the round-trip time for each of the three probes that are sent.

Table 9-13 describes the characters that can appear in **traceroute** output.

Table 9-13 IP Trace Text Characters

Character	Description
nn msec	Indicates for each node the round-trip time in milliseconds for the specified number of probes.
*	Indicates that the probe timed out.
?	Indicates an unknown packet type.
Q	Indicates a source quench.
P	Indicates that the protocol is unreachable.
N	Indicates that the network is unreachable.
U	Indicates that the port is unreachable.
H	Indicates that the host is unreachable.

The following example displays sample IP **tracert** output in privileged EXEC mode when a destination IP address is specified. (See Table 9-14 for prompt descriptions and Table 9-12 for field descriptions.)

```
Switch# tracert
Protocol [ip]:
Target IP address: 10.0.0.1
Source address:
Numeric display [n]:
Timeout in seconds [3]:
Probe count [3]:
Minimum Time to Live [1]:
Maximum Time to Live [30]:
Port Number [33434]:
Loose, Strict, Record, Timestamp, Verbose [none]:
Type escape sequence to abort.
Tracing the route to 10.0.0.1

  1 10.0.0.2 msec 0 msec 4 msec
  2 10.0.1.9 0 msec 0 msec 0 msec
  3 10.0.0.1 0 msec 0 msec 4 msec
```

Table 9-14 **tracert** Command Prompt Descriptions

Prompt	Description
Protocol [ip]:	Specifies the protocol. The default is IP.
Target IP address:	Specifies the host name or an IP address. There is no default.
Source address:	Specifies one of the interface addresses of the router to use as a source address for the probes. The system will normally pick what it feels is the best source address to use.
Numeric display [n]:	Specifies the tracert display format. The default is to have both a symbolic and numeric display; however, you can suppress the symbolic display.
Timeout in seconds [3]:	Specifies the number of seconds to wait for a response to a probe packet. The default is 3 seconds.
Probe count [3]:	Specifies the number of probes to be sent at each TTL level. The default count is 3.

Table 9-14 *traceroute Command Prompt Descriptions (continued)*

Prompt	Description
Minimum Time to Live [1]:	Specifies the TTL value for the first probes. The default is 1, but it can be set to a higher value to suppress the display of known hops.
Maximum Time to Live [30]:	Specifies the largest TTL value that can be used. The default is 30. The traceroute command terminates when the destination is reached or when this value is reached.
Port Number [33434]:	Specifies the destination port used by the UDP probe messages. The default is 33434.
Loose, Strict, Record, Timestamp, Verbose [none]:	<p>Specifies the IP header options. You can specify any combination. The traceroute command issues prompts for the required fields. Note that trace will place the requested options in each probe; however, there is no guarantee that all routers (or end nodes) will process the options. The default is no header options.</p> <p>The options are:</p> <ul style="list-style-type: none"> • Loose—Allows you to specify a list of nodes that must be traversed when going to the destination. • Strict—Allows you to specify a list of nodes that must be the only nodes traversed when going to the destination. • Record—Allows you to specify the number of hops to leave room for. • Timestamp—Allows you to specify the number of time stamps to leave room for. • Verbose—If you select any of the above options, the verbose mode is automatically selected and the traceroute command prints the contents of the option field in any incoming packets. You can prevent verbose mode by selecting it again, toggling its current setting.



Threshold Commands

Interface alarm thresholds provide a way to monitor the quality of the client signal. Use the following commands to configure and monitor interface alarm threshold operations.

aps trigger

To enable y-cable line card protection signal switchover when the alarm thresholds are exceeded, use the **aps trigger** command. To disable y-cable protection signal switchover, use the **no** form of this command.

aps trigger

no aps trigger

Syntax Description This command has no other arguments or keywords.

Defaults Disabled

Command Modes Threshold configuration

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

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

EV-Release	Modification
12.1(10)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 in a y-cable protection configuration to cause a signal switchover when the active signal error rates exceed the alarm thresholds. The signal switchover occurs only if the standby signal is acceptable.



Note

The threshold list must be applied to both interfaces in the associated pair.

Examples The following example shows how to configure an APS switchover trigger for an alarm threshold.

```
Switch(config)# threshold-list sonet-alarms
Switch(config-t-list)# threshold name sonet-sdh section cv failure
Switch(config-threshold)# value rate 6
Switch(config-threshold)# aps trigger
Switch(config-threshold)# exit
```

```

Switch(config-t-list)# exit
Switch(config)# redundancy
Switch(config-red)# associate group chicago
Switch(config-red-aps)# aps working transparent 3/0/0
Switch(config-red-aps)# aps protection transparent 4/0/0
Switch(config-red-aps)# aps y-cable
Switch(config-red-aps)# aps revertive
Switch(config-red-aps)# aps enable
Switch(config-red-aps)# exit
Switch(config-red)# exit
Switch(config)# interface transparent 3/0/0
Switch(config-if)# encaps sonet oc3
Switch(config-if)# monitor enable
Switch(config-if)# threshold-group sonet-alarms
Switch(config-if)# exit
Switch(config)# interface transparent 4/0/0
Switch(config-if)# encaps sonet oc3
Switch(config-if)# monitor enable
Switch(config-if)# threshold-group sonet-alarms

```

Related Commands

Command	Description
monitor enable	Enables protocol performance monitoring.
show threshold-list	Displays the contents of a threshold list.
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list to an interface.
threshold-list	creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.

description

To configure a alarm threshold description, use the **description** command. To remove a threshold description, use the **no** form of the command.

description *text*

no description

Syntax Description	text	Threshold description for the MIB.
---------------------------	------	------------------------------------

Defaults	None
-----------------	------

Command Modes	Threshold configuration
----------------------	-------------------------

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

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

EV-Release	Modification
12.1(10)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	First use the threshold-list command to enter threshold list configuration mode and create a threshold list. Then use the threshold command to specify a threshold to modify and enter threshold configuration mode. This description can be accessed and displayed by network management systems that support SNMP.
-------------------------	--

Examples	The following example shows how to create a description for a threshold in a threshold list named temp.
-----------------	---

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name sonet-sdh section cv degrade
Switch(config-threshold)# description This threshold is for SONET and SDH BIP1 errors
```

Related Commands	
-------------------------	--

Command	Description
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list with an interface.
threshold-list	Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.

notification-throttle timer

To modify the alarm threshold notification throttle timer, use the **notification-throttle timer** command. To return the notification throttle timer interval to its default value, use the **no** form of the command.

notification-throttle timer *seconds*

no notification-throttle timer

Syntax Description	<i>seconds</i>	Specifies, in seconds, the interval in which no more than one threshold alarm notification can be generated. If more than one notification is generated during the hold-down period, the extra notifications are delayed. The range is 5 to 500 seconds.
---------------------------	----------------	--

Defaults	5 seconds
-----------------	-----------

Command Modes	Threshold list configuration
----------------------	------------------------------

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

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

EV-Release	Modification
12.1(10)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 control the amount of alarm threshold notification activity that is generated on the system.
-------------------------	--

Examples The following example shows how to set an alarm threshold list notification throttle timer to 10 seconds.

```
Switch# configure terminal
Switch(config)# threshold-list sonet-alarms
Switch(config-t-list)# notification-throttle timer 10
```

Related Commands

Command	Description
show threshold-list	Displays the contents of a threshold list.
threshold-list	Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode.

show threshold-list

To display information about alarm threshold lists, use the **show threshold-list** command.

```
show threshold-list [name]
```

Syntax Description	<i>name</i>	Specifies the name of an alarm threshold list.
---------------------------	-------------	--

Defaults Displays information about all threshold lists in the system.

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(10)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 display the threshold values configured for all alarm threshold lists or for a specific alarm threshold list.

Examples The following example shows how to display information for alarm threshold list named sonet-counters. (See Table 10-1 for field descriptions.)

```
Switch# show threshold-list

Threshold List Name: sonet-counters
Notification throttle timer : 5 (in secs)
Threshold name : sonet-sdh section cv          Severity : Degrade
Value : 10e-9
APS Trigger : Not set
Description : SONET BIP1 counter
Threshold name : sonet-sdh section cv          Severity : Failure
Value : 10e-6
APS Trigger : Set
Description : SONET BIP1 counter
```


Table 10-1 *show threshold-list Field Descriptions*

Field	Description
Threshold List Name	Shows the name of the threshold list.
Notification throttle timer	Shows, in seconds, the interval in which no more than one threshold alarm notification can be generated. If more than one notification is generated during the hold-down period, the extra notifications are delayed.
Threshold name	Shows the name of the threshold counter. See the threshold command for a list of threshold names.
Severity	Shows the threshold severity (Degrade or Failure).
Value	Shows the threshold rate value for the system to issue an alarm.
APS Trigger	Indicates whether the APS switchover trigger is set.
Description	Shows the description text for the counter.

Related Commands

Command	Description
aps trigger	Enables APS switchover trigger for threshold alarms.
description	Configures MIB description for threshold alarms.
notification-throttle timer	Modifies the alarms threshold notification throttle timer.
snmp-server enable traps threshold min-severity	Enables SNMP trap notification for threshold alarms.
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list to a transparent or wave interface.
threshold-list	Creates a list of thresholds.
value	Configures the value for threshold alarms.

threshold

To configure an alarm threshold in a threshold list, use the **threshold** command. To remove a threshold from a threshold list, use the **no** form of the command.

```
threshold name { cvrd | crc | cdl hec | sonet-sdh section cv | tx-crc } { degrade | failure }
  [index value]
```

```
no threshold name { cvrd | cdl hec | crc | sonet-sdh section cv | tx-crc } { degrade | failure }
  [index value]
```

Syntax Description

cvrd	Specifies the coding violation and running disparity counter. This counter is monitored for interfaces with the following encapsulation: <ul style="list-style-type: none"> • Gigabit Ethernet • ESCON • Fibre Channel • FICON
cdl hec	Specifies the in-band message channel HEC (header error control) error counter. This counter is monitored for wave interfaces that insert and delete in-band message channel headers.
crc	Specifies the cyclic redundancy error counter.
sonet-sdh section cv	Specifies the bit interleaved parity error. This counter is monitored for interfaces with either SONET or SDH encapsulation.
tx-crc	Specifies the transmit cyclic redundancy error counter.
degrade	Specifies that a signal degrade threshold alarm is generated.
failure	Specifies that a signal failure threshold alarm is generated.
index value	Specifies a MIB index. The range is 0 to 63.

Defaults

None

Command Modes

Threshold-list configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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

First use the **threshold-list** command to enter threshold-list configuration mode and create a threshold list. Then use the **threshold** command to enter threshold configuration mode for the specific threshold. In threshold configuration mode, you can modify the threshold attribute values.

Interfaces have no default alarm threshold values. When monitoring is enabled, alarm thresholds are only in effect when a threshold list is associated with the interface.

By default, the **threshold** command uses the next available threshold index number in the threshold list MIB. The **index** keyword and value allow you to explicitly assign an index for the threshold. This is particularly useful as index numbers become available when thresholds are deleted.

Examples

The following example shows how to configure an alarm threshold in a threshold list and enter threshold configuration mode.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name cvrd degrade
Switch(config-threshold)#
```

Related Commands

Command	Description
aps trigger	Enables APS switchover when the alarm threshold is crossed.
description	Specifies a threshold description for the SNMP MIB.
notification-throttle timer	Modifies the alarm threshold notification throttle timer.
show threshold-list	Displays the contents of a threshold list.
snmp-server enable traps threshold min-severity	Enables SNMP trap notifications for alarm threshold activity.
threshold-group	Associates a threshold list to an interface.
threshold-list	Groups a set of thresholds with a name. Switches from configuration mode to threshold-list configuration mode.
value	Specifies the threshold value.

threshold-group

To associate a threshold list to an interface, use the **threshold-group** command. To remove a threshold list from an interface, use the **no** form of this command.

threshold-group *name*

no threshold-group *name*

Syntax Description

<i>name</i>	Specifies the name of a threshold list and associates it with a specified interface.
-------------	--

Defaults

The default list on gigabitphy interfaces raises signal failure alarms for CVRD errors. The default rate value is 5.

All other interfaces have no default threshold list.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for gigabitphy interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces.
12.2(25)SV	Added support for wavesonetphy interfaces.
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 associate a threshold list to a specified interface.

Even though a threshold list might contain the thresholds for all error counters, not all of these thresholds are applicable to the interface. Thresholds are recognized by the interface based on the interface type (for example, wave or waveethernetphy) and the encapsulation type (in the case of transparent interfaces).

You can associate more than one threshold list with an interface. The lists cannot contain overlapping thresholds. The system will not allow you to associate a threshold list if it contains a counter the interface already monitors for another threshold list.

If the interface is not associated with any threshold list, the threshold counters that are monitored on that interface are set to their default values. For y-cable protected interfaces, disable monitoring on the interface with the **no monitor** command before removing an alarm threshold. Use the **show aps** command to determine the protection configuration for the interface.

**Note**

Threshold lists for gigabitphy interfaces must contain a signal failure threshold for CVRD.

Examples

The following example shows how to associate a threshold list to a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# threshold-group temp
```

Related Commands

Command	Description
show threshold-list	Displays the contents of a threshold list.
threshold	Creates failure and degrade thresholds for different error counters that are monitored on the interface.
threshold-list	Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.

threshold-list

To create a list of thresholds, or modify an existing threshold list, use the **threshold-list** command. To delete the threshold list, use the **no** form of this command.

threshold-list *name*

no threshold-list *name*

Syntax Description	<i>name</i>	Specifies the name of the threshold list to be created and associated with a specified interface. The list name cannot begin with the text string “default”.
---------------------------	-------------	--

Defaults	None
-----------------	------

Command Modes	Global configuration
----------------------	----------------------

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

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

EV-Release	Modification
12.1(10)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 create a list, or modify an existing list, of signal degrade and signal failure alarm thresholds for monitored error counters. After entering the command, the CLI enters threshold configuration mode where you can specify the threshold list attributes or threshold counters to add or modify.

Before deleting or modifying a threshold list, remove it from all the interfaces that use it.

Examples The following example shows how to create a threshold list called temp.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)#
```

Related Commands

Command	Description
aps trigger	Enables APS switchover when the alarm threshold is crossed.
description	Specifies a threshold description for the SNMP MIB.
notification-throttle timer	Modifies the alarm threshold notification throttle timer.
show threshold-list	Displays the contents of a threshold list.
snmp-server enable traps threshold min-severity	Enables SNMP trap notifications for alarm threshold activity.
threshold	Creates failure and degrade thresholds for different error counters that are monitored on the interface.
threshold-group	Associates a threshold list to an interface.
value	Specifies the threshold value.

value

To configure the values of failure and degrade alarm threshold rates, use the **value** command. To remove an threshold rate, use the **no** form of the command.

value rate *value*

no value

Syntax Description	rate <i>value</i>	Enters the threshold value as 10^{-x} , where <i>value</i> is x in 10^{-x} . The range is 3 to 9.
---------------------------	--------------------------	---

Defaults	None
-----------------	------

Command Modes	Threshold configuration
----------------------	-------------------------

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

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

EV-Release	Modification
12.1(10)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 First use the **threshold-list** command to enter threshold-list configuration mode and create a threshold list. Then use the **threshold** command to specify a threshold to modify and enter threshold configuration mode.

The degrade rate value for a threshold must always be less than the failure rate value. For example, if the failure rate for a threshold is 7, or 10^{-7} , then the degrade value must be 8 or 9.

Table 10-2 lists the errors per second for the threshold rates for each of the protocol encapsulations.

Table 10-2 Thresholds for Monitored Protocols on Transponder Line Cards in Errors Per Second

Rate	SONET OC-3 or SDH STM-1	SONET OC-12 or SDH STM-4	SONET OC-48 or SDH STM-16	Gigabit Ethernet	ESCON	FICON	Fibre Channel ¹	ISC ²
3	31,753	32,000	32,000	1,244,390	199,102	1,057,731	1,057,731	1,057,731
4	12,318	27,421	31,987	124,944	19,991	106,202	106,202	106,202
5	1518	56,54	17,296	12,499	2000	10,625	10,625	10,625
6	155	616	2394	1250	200	1062	1062	1062
7	15.5	62	248	125	20	106	106	106
8	1.55	6.2	24.8	12.5	2	10.6	10.6	10.6
9	0.155	0.62	2.48	1.25	0.2	1.06	1.06	1.06

1. Only 1 Gbps rate is supported.

2. Compatibility mode only.

Table 10-3 lists the threshold error rates in errors per second for ESCON signals on ESCON aggregation cards.

Table 10-3 Threshold Values for Monitored Rates on ESCON Aggregated Signals in Errors Per Second

Rate	ESCON CRC	ESCON CVRD
3	19999	20000
4	19999	20000
5	1999	2000
6	199	200
7	20	20
8	2	2
9	0.2	0.2

Table 10-4 lists the threshold error rates in errors per second for waveethernetphy interfaces on 2.5-Gbps ITU trunk cards and 10-Gbps ITU trunk cards.

Table 10-4 Threshold Values for Monitored Rates on 2.5-Gbps and 10-Gbps Signals in Errors Per Second

Rate	2.5-Gigabit CVRD	2.5-Gigabit CDL HEC	10-Gigabit CVRD	10-Gigabit CDL HEC
3	19,968,416	1628	12,443,900	6512
4	2,055,776	166	1,249,438	665
5	206,176	17	124,944	67
6	20,624	17	10,312	7
7	2,064	17	1031	0.7

Table 10-4 Threshold Values for Monitored Rates on 2.5-Gbps and 10-Gbps Signals in Errors Per Second (continued)

Rate	2.5-Gigabit CVRD	2.5-Gigabit CDL HEC	10-Gigabit CVRD	10-Gigabit CDL HEC
8	208	17	103	0.07
9	24	17	10	0.007

Examples

The following example shows how to create thresholds within a threshold list (temp) with the SONET and SDH section code violation error threshold signal degrade rate of 9 and signal failure rate of 7.

```
Switch# configure terminal
Switch(config)# threshold-list temp
Switch(config-t-list)# threshold name sonet-sdh section cv degrade
Switch(config-threshold)# value rate 9
Switch(config-threshold)# exit
Switch(config-t-list)# threshold name sonet-sdh section cv failure
Switch(config-threshold)# value rate 7
Switch(config-threshold)# end
Switch#
```

Related Commands

Command	Description
threshold	Selects alarm threshold to modify and enters threshold configuration mode.
threshold-group	Associates a threshold list with an interface.
threshold-list	Creates a threshold list with a name or allows an existing list to be modified. Switches from configuration mode to threshold-list configuration mode.



Topology Neighbor Commands

Use the following commands to configure and monitor network topology neighbors.

show topology

To display information about the global physical network topology configuration, use the **show topology** command.

show topology

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(10)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 display the global physical network topology configuration information.

Examples The following example shows how to display the topology hold-time interval. (See Table 11-1 for field descriptions.)

```
Switch# show topology
Global Physical Topology configuration:
  Maximum Hold Time = 300 secs
  Trap interval = 60 secs
```

Table 11-1 *show topology hold-time Field Descriptions*

Field	Description
Maximum Hold Time	Shows the maximum number of seconds a dynamically generated topology entry will remain before it times out.
Trap interval	Shows the number of seconds for the topology SNMP trap notification throttle interval.

Related Commands

Command	Description
show topology neighbor	Displays network topology information.
snmp-server enable traps topology	Configures the network topology SNMP trap notification throttle interval.
topology hold-time	Modifies the interval to hold a nonstatic topology node entry.

show topology neighbor

To display the network topology neighbors for the shelf, use the **show topology neighbor** command.

show topology neighbor [detail]

Syntax Description	detail	Shows the agent IP address and how the topology entry was created.
---------------------------	---------------	--

Defaults Displays summary information.

Command Modes Privileged EXEC

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

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

EV-Release	Modification
12.1(10)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 display the network topology neighbors for the shelf.

Examples The following example shows how to display network topology neighbor information for the shelf. (See Table 11-2 for field descriptions.)

```
Switch# show topology neighbor
Physical Topology:
```

Local Port	Neighbor Node	Neighbor Port	Link Dirn
-----	-----	-----	-----
Wdm0/0	ham2	Wdm0/1	Both
Wdm0/1	ham2	Wdm0/0	Both

Table 11-2 *show topology neighbor Field Descriptions*

Field	Description
Local Port	Identifies the local port.
Neighbor Node	Identifies the neighbor node.
Neighbor Port	Identifies the port or wdm interface on the neighbor node.

The following example shows how to display detailed network topology neighbor information for the shelf. (See Table 11-3 for field descriptions.)

```
Switch# show topology neighbor detail
Physical Topology:

Local Port: Wdm0/0
Neighbor Node      : ham2
Neighbor Port      : Wdm0/1
Neighbor Agent Address: 1.1.1.10
Neighbor Discovery  : Via CDP (Proxy Port: Wave2/1)
Link Direction     : Both

Local Port: Wdm0/1
Neighbor Node      : ham2
Neighbor Port      : Wdm0/0
Neighbor Agent Address: 172.20.42.27
Neighbor Discovery  : Via CDP (Proxy Port: Wave2/0)
Link Direction     : Both
```

Table 11-3 *show topology neighbor detail Field Descriptions*

Field	Description
Local Port	Identifies the local port.
Neighbor Node	Identifies the neighbor node.
Neighbor Port	Identifies the port on the neighbor node.
Neighbor Agent Address	Identifies the IP address of the topology agent on the neighbor node.
Neighbor Discovery	Indicates how the topology neighbor was discovered, either automatically via CDP or manually via the CLI.

Related Commands

Command	Description
show topology	Displays global physical topology configuration.
snmp-server enable traps topology	Configures the network topology SNMP trap notification throttle interval.
topology neighbor	Adds a static entry for an interface to the network topology.
topology neighbor agent ip-address	Specifies the network management agent address on a remote node.
topology neighbor cdp	Enables CDP on wdm interfaces.
topology neighbor disable	Removes an interface from the network topology.
topology hold-time	Modifies the interval to hold a nonstatic topology node entry.

topology hold-time

To modify the interval to hold nonstatic topology node entries, use the **topology hold-time** command. To return the hold-time interval to its default value, use the **no** form of the command.

topology hold-time *seconds*

no topology hold-time

Syntax Description	<i>seconds</i>	Specifies the number of seconds. The range is 1 to 2147483647 seconds.
---------------------------	----------------	--

Defaults	300 seconds
-----------------	-------------

Command Modes	Global configuration
----------------------	----------------------

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

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

EV-Release	Modification
12.1(10)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 modify the network topology hold-time timer interval. This timer helps avoid reconstructing a nonstatic topology entry when a node leaves the network for only a brief time.
-------------------------	--

Examples	The following example shows how to modify the network topology hold time.
-----------------	---

```
Switch# configure terminal
Switch(config)# topology hold-time 60
```

Related Commands	Command	Description
	show topology	Displays global physical topology configuration.

Command	Description
snmp-server enable traps topology	Configures the network topology SNMP trap notification throttle interval.
topology neighbor cdp	Enables CDP on wdm interfaces.

topology neighbor

To manually add a static entry for an esconphy, gigabitphy, multirate, OSC wave, oscfilter, transparent, twogigabitphy, voain, wdm, or wdmsplit interface to the network topology, use the **topology neighbor** command. To remove the interface from the network topology, use the **no** form of the command or the **topology neighbor disable** command.

```
topology neighbor { name node-name | ip-address ip-address |
  mac-address mac-address } { port name port-name | port ip-address port-ip-address |
  port mac-address port-mac-address } [transmit | receive]
```

no topology neighbor

Syntax Description

name <i>node-name</i>	Specifies the name of the neighbor node.
ip-address <i>ip-address</i>	Specifies the IP address of the neighbor node.
mac-address <i>mac-address</i>	Specifies the MAC address of the neighbor node.
port name <i>port-name</i>	Specifies the name of the port on the neighbor node.
port ip-address <i>port-ip-address</i>	Specifies the IP address of the port on the neighbor node.
port mac-address <i>port-mac-address</i>	Specifies the MAC address of the port on the neighbor node.
transmit	Indicates that the link to the neighbor is transmit only.
receive	Indicates that the link to the neighbor is receive only.

Defaults

CDP (Cisco Discovery Protocol) is enabled on wdm interfaces.
Both directions.
No topology is configured on transparent or wdmsplit interfaces.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Added support for multirate and wdmsplit interfaces.
SV-Release	Modification
12.2(18)SV	This command was integrated in this release.
12.2(23)SV	Added support for twogigabitphy interfaces.
12.2(25)SV	Added support for multirate interfaces.

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 manually add `esconphy`, `gigabitphy`, `multirate`, `wdm`, `thru`, `oscfilter`, `OSC wave`, `twogigabitphy`, `wdmsplit`, and `transparent` interfaces to the network topology. You must also configure the network management agent IP address with the `topology neighbor agent ip-address` command. By default, CDP is enabled on all these interface types.

For `esconphy`, `gigabitphy`, `multirate`, `twogigabitphy`, and `transparent` interfaces, you must use the `topology neighbor` command to add the interface to the network topology because the `transparent` interfaces do not support CDP. For `wdm` interfaces, use either the `topology neighbor` command or the `topology neighbor cdp` command to populate the network topology.

For `wdmsplit` interfaces, you must use the `topology neighbor` command to add both the west and east interfaces on the PSM to the network topology.

For `y-cable` protected configurations, add both associated `transparent`, `gigabitphy`, or `twogigabitphy` interfaces to the network topology.

You can also use the `topology neighbor disable` command to remove an interface from the network topology.

Use the `direction` option to distinguish between bidirectional link neighbors and unidirectional (transmit or receive) link neighbors.

Examples

The following example shows a configuration example of network topology neighbor for the shelf. This allows either 1 bidirectional neighbor or 2 unidirectional neighbors on 1 interface. (See Table 11-2 for field descriptions.)

```
Switch(config)# interface transparent 8/0/0
Switch(config-if)# topology neighbor name edfa1 port name inport transmit
Switch(config-if)# topology neighbor name edfa2 port name outport receive
Switch(config-if)# topology neighbor agent ip-address 10.0.0.31 transmit
Switch(config-if)# topology neighbor agent ip-address 10.0.0.32 receive
Switch(config-if)# exit
Switch(config)# interface transparent 8/0/0
Switch(config-if)# topology neighbor name 15530-box2 port name wdm0/0
Switch(config-if)# topology neighbor agent ip-address 10.0.0.20
Switch(config-if)# end
Switch#
```

The following example shows how to connect an OADM module to an OADM module in another node.

```
Switch# configure terminal
Switch(config)# interface wdm 0/0
Switch(config-if)# topology neighbor name NodeA port name wdm0/0
Switch(config-if)# topology neighbor agent ip-address 10.1.1.1
```

The following example shows how to connect a transponder line card to an interface on client equipment.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# topology neighbor name Router1 port name gigabitethernet2/1
Switch(config-if)# topology neighbor agent ip-address 10.2.2.2
```

The following example shows how to connect a PSM to the PSM on another node.

```
Switch# configure terminal
```

```
Switch(config)# interface wdmsplit 0/1/0
Switch(config-if)# topology neighbor name NodeB port name wdmsplit0/1/0
Switch(config-if)# topology neighbor agent ip-address 10.3.3.3
```

Related Commands

Command	Description
show topology neighbor	Displays network topology information.
snmp-server enable traps topology	Enables SNMP trap notifications for the network topology.
topology neighbor agent ip-address	Specifies the network management agent IP address.
topology neighbor cdp	Enables CDP on wdm interfaces.
topology neighbor disable	Removes the interface from the network topology.

topology neighbor agent ip-address

To specify the network management agent address on a remote node, use the **topology neighbor agent ip-address** command. To remove the network management agent address from an interface, use the **no** form of the command.

topology neighbor agent ip-address *ip-address* [**transmit** | **receive**]

no topology neighbor agent ip-address *ip-address* [**transmit** | **receive**]

Syntax Description

ip-address	Specifies the IP address of the network management agent on the neighbor node or remote node. This address is usually the IP address configured on the NME interface on the neighbor node.
transmit	Indicates that the link to the neighbor is transmit only.
receive	Indicates that the link to the neighbor is receive only.

Defaults

Both directions

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)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 if you have configured a network topology manually with the **topology neighbor** command. Use this command on both wdm and transparent interfaces.

The network management agent IP address is usually the IP address of the NME on the node.



Note

Do not use this command if you have enabled CDP on the interface with the **topology neighbor cdp** command.

Examples

The following example shows how to configure a network management agent on a wdm interface.

```
Switch# configure terminal
Switch(config)# interface wdm 0/2
Switch(config-if)# topology neighbor name NodeA port name wdm0/0
Switch(config-if)# topology neighbor agent ip-address 209.165.202.129
```

The following example shows how to configure a network management agent on a transparent interface.

```
Switch# configure terminal
Switch(config)# interface transparent 2/0/0
Switch(config-if)# topology neighbor name Router2 port name gigabitethernet 2/2
Switch(config-if)# topology neighbor agent ip-address 209.165.202.130
```

The following example shows how to configure directional parameters for a network management agent.

```
Switch(config)# interface transparent 8/0/0
Switch(config-if)# topology neighbor name edfa1 port name inport transmit
Switch(config-if)# topology neighbor name edfa2 port name outport receive
Switch(config-if)# topology neighbor agent ip-address 10.0.0.31 transmit
Switch(config-if)# topology neighbor agent ip-address 10.0.0.32 receive
Switch(config-if)# exit
```

Related Commands

Command	Description
show topology neighbor	Displays the topology configuration.
topology neighbor	Adds a static entry for an interface to the network topology.

topology neighbor cdp

To enable physical topology discovery through CDP on wdm and tengigethernetphy interfaces, use the **topology neighbor cdp** command. To disable CDP topology discovery on the interface, use the **no** form of the command or the **topology neighbor disable** command.

topology neighbor cdp [*proxy interface*]

no topology neighbor cdp [*proxy interface*]

Syntax Description

proxy interface	Specifies the interface capable of learning the topology to use as a proxy for CDP. Only OSC wave interfaces and ethernetdcc interfaces can be used as proxy interfaces.
------------------------	--

Defaults

Topology discovery enabled when a valid proxy interface is available.

For wdm interfaces, the OSC wave interface patched to the oscfilter interface on an OADM module is the default proxy interface.

For tengigethernetphy interfaces, the ethernetdcc interface on the same 10-Gbps uplink card is the default proxy interface.

Command Modes

Interface configuration

Command History

This table includes the following release-specific history entries:

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

EV-Release	Modification
12.1(10)EV2	This command was introduced.
12.1(12c)EV	Updated to support 10-Gbps uplink card.
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

CDP learns about the neighboring nodes in the network topology. For CDP discovery to function properly the OSC or the in-band message channel, and CDP must be present and configured on the system. For wdm interfaces, use the **proxy** option to specify either an OSC wave interface or an ethernetdcc interface on a 10-Gbps ITU trunk card. These types of interfaces are capable of learning the topology using CDP.

**Note**

The tengigethernetphy interfaces can only use the ethernetdcc interface on the same 10-Gbps uplink card as its proxy interface.

**Note**

To use the default proxy interface for wdm interfaces, you must correctly configure the patch connections between the OADM modules and the OSC modules using the **patch** command.

You can use the **topology neighbor** command to statically add a wdm or tengigethernetphy interface to the network topology, but you must first disable CDP on the interface. To configure a client side interface as part of the network topology, use the **topology neighbor** command.

**Note**

When a patch connection between a wdm interface on an OADM module and a wdmrelay interface on a PSM is configured, topology learning on the wdm interface is disabled.

Examples

The following example shows how to enable CDP on a wdm interface.

```
Switch# configure terminal
Switch(config)# interface wdm 0/0
Switch(config-if)# topology neighbor cdp proxy wave 2/0
```

Related Commands

Command	Description
patch	Configures the patch connections between the OADM modules.
show topology neighbor	Displays the topology configuration.
snmp-server enable traps topology	Enables SNMP trap notifications for the network topology.
topology neighbor	Adds a static entry for an interface to the network topology.
topology neighbor disable	Removes the interface from the network topology.

topology neighbor disable

To remove an interface from the network topology, use the **topology neighbor disable** command.

topology neighbor disable

Syntax Description This command has no other arguments or keywords.

Defaults None

Command Modes Interface configuration

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

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

EV-Release	Modification
12.1(10)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 remove an interface from the network topology, whether it was added with the **topology neighbor** command or the **topology neighbor cdp** command.

Examples The following example shows how to remove an interface from the network topology.

```
Switch# configure terminal
Switch(config)# interface wdm 0/2
Switch(config-if)# topology neighbor disable
```

Related Commands	Command	Description
	show topology neighbor	Displays the system connections.
	topology neighbor	Adds a static entry for an interface to the network topology.
	topology neighbor cdp	Enables CDP on the interface.



A

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