



# CHAPTER 8

## Configuring Interfaces

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This chapter describes how to configure interfaces in Cisco IOS Release 12.2SX.



### Note

For complete syntax and usage information for the commands used in this chapter, see these publications:

- The Cisco IOS Master Command List, Release 12.2SX, at this URL:  
[http://www.cisco.com/en/US/docs/ios/mcl/122sxmcl/12\\_2sx\\_mcl\\_book.html](http://www.cisco.com/en/US/docs/ios/mcl/122sxmcl/12_2sx_mcl_book.html)
- The Release 12.2 publications at this URL:  
[http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products\\_installation\\_and\\_configuration\\_guides\\_list.html](http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products_installation_and_configuration_guides_list.html)



### Tip

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)

This chapter consists of these sections:

- [Understanding Interface Configuration, page 8-2](#)
- [Using the Interface Command, page 8-2](#)
- [Configuring a Range of Interfaces, page 8-4](#)
- [Defining and Using Interface-Range Macros, page 8-6](#)
- [Configuring Optional Interface Features, page 8-6](#)
- [Understanding Online Insertion and Removal, page 8-16](#)
- [Monitoring and Maintaining Interfaces, page 8-17](#)
- [Checking the Cable Status Using the TDR, page 8-19](#)

# Understanding Interface Configuration

Many features in the software are enabled on a per-interface basis. When you enter the **interface** command, you must specify the following information:

- Interface type:
  - Fast Ethernet (use the **fastethernet** keyword)
  - Gigabit Ethernet (use the **gigabithernet** keyword)
  - 10-Gigabit Ethernet (use the **tengigabithernet** keyword)




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**Note** For WAN interfaces, see the configuration note for the WAN module.

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- Slot number—The slot in which the module is installed. On switches supported by Cisco IOS Release 12.2SX, slots are numbered starting with 1 from top to bottom.
- Port number—The physical port number on the module. On switches supported by Cisco IOS Release 12.2SX, the port numbers always begin with 1. When facing the rear of the switch, ports are numbered from the left to the right.

You can identify ports from the physical location. You also can use **show** commands to display information about a specific port, or all the ports.

## Using the Interface Command




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**Note** You use the commands described in this section to configure both physical ports and logical interfaces.

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These procedures apply to all interface configuration processes. Begin the interface configuration process in global configuration mode. To use the interface command, follow these steps:

- 
- Step 1** Enter the **configure terminal** command at the privileged EXEC prompt to enter global configuration mode:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
```

- Step 2** In the global configuration mode, enter the **interfaces** command. Identify the interface type and the number of the connector or interface card.

The following example shows how to select Fast Ethernet, slot 5, interface 1:

```
Router(config)# interfaces fastethernet 5/1
Router(config-if)#
```

- Step 3** Enter the **show interfaces EXEC** command to see a list of all interfaces that are installed. A report is provided for each interface that the device supports, as shown in this display:

```
Router# show interfaces fastethernet 5/48
FastEthernet5/48 is up, line protocol is up
  Hardware is C6k 100Mb 802.3, address is 0050.f0ac.3083 (bia 0050.f0ac.3083)
  Internet address is 172.20.52.18/27
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Half-duplex, 100Mb/s
  ARP type: ARPA, ARP Timeout 04:00:00
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 1000 bits/sec, 1 packets/sec
  5 minute output rate 1000 bits/sec, 1 packets/sec
    4834677 packets input, 329545368 bytes, 0 no buffer
    Received 4796465 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    0 input packets with dribble condition detected
    51926 packets output, 15070051 bytes, 0 underruns
    0 output errors, 2 collisions, 2 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out
```

- Step 4** Enter the **show hardware EXEC** command to see a list of the system software and hardware:

```
Router# show hardware
Cisco Internetwork Operating System Software
IOS (tm) c6sup2_rp Software (c6sup2_rp-JSV-M), Version 12.1(5c)EX, EARLY DEPLOY)
Synced to mainline version: 12.1(5c)
TAC:Home:Software:Ios General:CiscoIOSRoadmap:12.1
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Wed 28-Mar-01 17:52 by hqluong
Image text-base: 0x30008980, data-base: 0x315D0000

ROM: System Bootstrap, Version 12.1(3r)E2, RELEASE SOFTWARE (fc1)
BOOTFLASH: c6sup2_rp Software (c6sup2_rp-JSV-M), Version 12.1(5c)EX, EARLY DEPL)

Router uptime is 2 hours, 55 minutes
System returned to ROM by power-on (SP by power-on)
Running default software

cisco Catalyst 6000 (R7000) processor with 114688K/16384K bytes of memory.
Processor board ID SAD04430J9K
R7000 CPU at 300Mhz, Implementation 39, Rev 2.1, 256KB L2, 1024KB L3 Cache
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
1 Virtual Ethernet/IEEE 802.3 interface(s)
48 FastEthernet/IEEE 802.3 interface(s)
2 Gigabit Ethernet/IEEE 802.3 interface(s)
381K bytes of non-volatile configuration memory.

16384K bytes of Flash internal SIMM (Sector size 512K).
Configuration register is 0x2
```

- Step 5** To begin configuring Fast Ethernet port 5/5, enter the **interface** keyword, interface type, and slot number/port number at the privileged EXEC prompt, as shown in the following example:

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# interface fastethernet 5/5
Router(config-if)#
```



**Note** You do not need to add a space between the interface type and interface number. For example, in the preceding line you can specify either *fastethernet 5/5* or *fastethernet5/5*.

- Step 6** After each **interface** command, enter the interface configuration commands your particular interface requires.

The commands you enter define the protocols and applications that will run on the interface. The commands are collected and applied to the **interface** command until you enter another **interface** command or press **Ctrl-Z** to get out of interface configuration mode and return to privileged EXEC mode.

- Step 7** After you configure an interface, check its status by using the EXEC **show** commands listed in “[Monitoring and Maintaining Interfaces](#)” section on page 8-17.

## Configuring a Range of Interfaces

The interface-range configuration mode allows you to configure multiple interfaces with the same configuration parameters. After you enter the interface-range configuration mode, all command parameters you enter are attributed to all interfaces within that range until you exit out of the interface-range configuration mode.

To configure a range of interfaces with the same configuration, perform this task:

| Command  | Purpose   |
|--|---|
| Router(config)# [ <b>no</b> ] <b>interface range</b><br>{ <b>vlan</b> <i>vlan_ID</i> - <i>vlan_ID</i> [, <b>vlan</b> <i>vlan_ID</i> - <i>vlan_ID</i> ]}<br>  { <i>type</i> <sup>1</sup> <i>slot/port</i> - <i>port</i> [, <i>type</i> <sup>1</sup> <i>slot/port</i> - <i>port</i> ]}<br>  { <i>macro_name</i> [, <i>macro_name</i> ]}} | Selects the range of interfaces to be configured. |

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

When configuring a range of interfaces, note the following information:

- For information about macros, see the “[Defining and Using Interface-Range Macros](#)” section on page 8-6.
- You can enter up to five comma-separated ranges.
- You are not required to enter spaces before or after the comma.
- You do not need to add a space between the interface numbers and the dash when using the **interface range** command.

- The **no interface range** command supports VLAN interfaces.
- The **interface range** command supports VLAN interfaces for which Layer 2 VLANs have not been created with the **interface vlan** command.

**Note**

The link state messages (LINK-3-UPDOWN and LINEPROTO-5-UPDOWN) are disabled by default. Enter the **logging event link status** command on each interface where you want the messages enabled.

This example shows how to reenable all Fast Ethernet ports 5/1 to 5/5:

```
Router(config)# interface range fastethernet 5/1 - 5
Router(config-if)# no shutdown
Router(config-if)#
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/1, changed state to up
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/2, changed state to up
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/3, changed state to up
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/4, changed state to up
*Oct 6 08:24:35: %LINK-3-UPDOWN: Interface FastEthernet5/5, changed state to up
*Oct 6 08:24:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/
5, changed state to up
*Oct 6 08:24:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/
3, changed state to up
*Oct 6 08:24:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/
4, changed state to up
Router(config-if)#
```

This example shows how to use a comma to add different interface type strings to the range to reenable all Fast Ethernet ports in the range 5/1 to 5/5 and both Gigabit Ethernet ports (1/1 and 1/2):

```
Router(config-if)# interface range fastethernet 5/1 - 5, gigabitethernet 1/1 - 2
Router(config-if)# no shutdown
Router(config-if)#
*Oct 6 08:29:28: %LINK-3-UPDOWN: Interface FastEthernet5/1, changed state to up
*Oct 6 08:29:28: %LINK-3-UPDOWN: Interface FastEthernet5/2, changed state to up
*Oct 6 08:29:28: %LINK-3-UPDOWN: Interface FastEthernet5/3, changed state to up
*Oct 6 08:29:28: %LINK-3-UPDOWN: Interface FastEthernet5/4, changed state to up
*Oct 6 08:29:28: %LINK-3-UPDOWN: Interface FastEthernet5/5, changed state to up
*Oct 6 08:29:28: %LINK-3-UPDOWN: Interface GigabitEthernet1/1, changed state to
up
*Oct 6 08:29:28: %LINK-3-UPDOWN: Interface GigabitEthernet1/2, changed state to
up
*Oct 6 08:29:29: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/
5, changed state to up
*Oct 6 08:29:29: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/
3, changed state to up
*Oct 6 08:29:29: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet5/
4, changed state to up
Router(config-if)#
```

If you enter multiple configuration commands while you are in interface-range configuration mode, each command is executed as it is entered (they are not batched together and executed after you exit interface-range configuration mode).

If you exit interface-range configuration mode while the commands are being executed, some commands may not be executed on all interfaces in the range. Wait until the command prompt reappears before exiting interface-range configuration mode.

# Defining and Using Interface-Range Macros

You can define an interface-range macro to automatically select a range of interfaces for configuration. Before you can use the **macro** keyword in the **interface range macro** command string, you must define the macro.

To define an interface-range macro, perform this task:

| Command   | Purpose   |
|---|---|
| Router(config)# <b>define interface-range</b> <i>macro_name</i><br>{ <b>vlan</b> <i>vlan_ID</i> - <i>vlan_ID</i> }   { <i>type</i> <sup>1</sup> <i>slot/port</i> - <i>port</i> }<br>[, { <i>type</i> <sup>1</sup> <i>slot/port</i> - <i>port</i> }] | Defines the interface-range macro and save it in NVRAM. |

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

This example shows how to define an interface-range macro named `enet_list` to select Fast Ethernet ports 5/1 through 5/4:

```
Router(config)# define interface-range enet_list fastethernet 5/1 - 4
```

To show the defined interface-range macro configuration, perform this task:

| Command                            | Purpose  |
|------------------------------------|--|
| Router# <b>show running-config</b> | Shows the defined interface-range macro configuration. |

This example shows how to display the defined interface-range macro named `enet_list`:

```
Router# show running-config | include define  
define interface-range enet_list FastEthernet5/1 - 4  
Router#
```

To use an interface-range macro in the **interface range** command, perform this task:

| Command  | Purpose   |
|--|---|
| Router(config)# <b>interface range macro</b> <i>macro_name</i> | Selects the interface range to be configured using the values saved in a named interface-range macro. |

This example shows how to change to the interface-range configuration mode using the interface-range macro `enet_list`:

```
Router(config)# interface range macro enet_list  
Router(config-if)#
```

## Configuring Optional Interface Features

These sections describe optional interface features:

- [Configuring Ethernet Interface Speed and Duplex Mode, page 8-7](#)
- [Configuring Jumbo Frame Support, page 8-10](#)
- [Configuring IEEE 802.3x Flow Control, page 8-13](#)

- [Configuring the Port Debounce Timer, page 8-15](#)
- [Adding a Description for an Interface, page 8-16](#)

## Configuring Ethernet Interface Speed and Duplex Mode

These sections describe how to configure Ethernet port speed and duplex mode:

- [Speed and Duplex Mode Configuration Guidelines, page 8-7](#)
- [Configuring the Ethernet Interface Speed, page 8-7](#)
- [Setting the Interface Duplex Mode, page 8-8](#)
- [Configuring Link Negotiation on Gigabit Ethernet Ports, page 8-8](#)
- [Displaying the Speed and Duplex Mode Configuration, page 8-9](#)

### Speed and Duplex Mode Configuration Guidelines

You usually configure Ethernet port speed and duplex mode parameters to auto and allow ports to negotiate the speed and duplex mode. If you decide to configure the port speed and duplex modes manually, consider the following information:

- If you set the Ethernet port speed to auto, the switch automatically sets the duplex mode to auto.
- If you enter the **no speed** command, the switch automatically configures both speed and duplex to auto.
- If you configure an Ethernet port speed to a value other than auto (for example, 10, 100, or 1000 Mbps), configure the connecting port to match. Do not configure the connecting port to negotiate the speed.
- If you manually configure the Ethernet port speed to either 10 Mbps or 100 Mbps, the switch prompts you to also configure the duplex mode on the port.



#### Note

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A LAN port cannot automatically negotiate Ethernet port speed and duplex mode if the connecting port is configured to a value other than auto.

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#### Caution

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Changing the Ethernet port speed and duplex mode configuration might shut down and reenable the interface during the reconfiguration.

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### Configuring the Ethernet Interface Speed



#### Note

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If you configure the Ethernet port speed to **auto** on a 10/100-Mbps or 10/100/1000-Mbps Ethernet port, both speed and duplex are autonegotiated. 10-Gigabit Ethernet ports do not support autonegotiation.

---

To configure the port speed for a 10/100 or a 10/100/1000-Mbps Ethernet port, perform this task:

|        | Command  | Purpose   |
|--------|--|---|
| Step 1 | Router(config)# <b>interface fastethernet</b> <i>slot/port</i>                     | Selects the Ethernet port to be configured.     |
| Step 2 | Router(config-if)# <b>speed</b> {10   100   1000   { <b>auto</b> [10 100 [1000]]}} | Configures the speed of the Ethernet interface. |

When configuring the port speed for a 10/100/1000-Mbps Ethernet port, note the following:

- Enter the **auto 10 100** keywords to restrict the negotiated speed to 10-Mbps or 100-Mbps.
- The **auto 10 100 1000** keywords have the same effect as the **auto** keyword by itself.

This example shows how to configure the speed to 100 Mbps on the Fast Ethernet port 5/4:

```
Router(config)# interface fastethernet 5/4
Router(config-if)# speed 100
```

## Setting the Interface Duplex Mode



### Note

- 10-Gigabit Ethernet and Gigabit Ethernet are full duplex only. You cannot change the duplex mode on 10-Gigabit Ethernet or Gigabit Ethernet ports or on a 10/100/1000-Mbps port configured for Gigabit Ethernet.
- If you set the port speed to auto on a 10/100-Mbps or a 10/100/1000-Mbps Ethernet port, both speed and duplex are autonegotiated. You cannot change the duplex mode of autonegotiation ports.

To set the duplex mode of an Ethernet or Fast Ethernet port, perform this task:

|        | Command  | Purpose                                     |
|--------|--|---|
| Step 1 | Router(config)# <b>interface fastethernet</b> <i>slot/port</i> | Selects the Ethernet port to be configured. |
| Step 2 | Router(config-if)# <b>duplex</b> [auto   full   half]          | Sets the duplex mode of the Ethernet port.  |

This example shows how to set the duplex mode to full on Fast Ethernet port 5/4:

```
Router(config)# interface fastethernet 5/4
Router(config-if)# duplex full
```

## Configuring Link Negotiation on Gigabit Ethernet Ports



### Note

Link negotiation does not negotiate port speed.

On Gigabit Ethernet ports, link negotiation exchanges flow-control parameters, remote fault information, and duplex information. Link negotiation is enabled by default.

The ports on both ends of a link must have the same setting. The link will not come up if the ports at each end of the link are set inconsistently (link negotiation enabled on one port and disabled on the other port).

Table 8-1 shows the four possible link negotiation configurations and the resulting link status for each configuration.

**Table 8-1 Link Negotiation Configuration and Possible Link Status**

| Link Negotiation State |             | Link Status |             |
|------------------------|-------------|-------------|-------------|
| Local Port             | Remote Port | Local Port  | Remote Port |
| Off                    | Off         | Up          | Up          |
| On                     | On          | Up          | Up          |
| Off                    | On          | Up          | Down        |
| On                     | Off         | Down        | Up          |

To configure link negotiation on a port, perform this task:

|               | Command  | Purpose                            |
|---------------|--|------------------------------------|
| <b>Step 1</b> | Router(config)# <b>interface gigabitethernet slot/port</b> | Selects the port to be configured. |
| <b>Step 2</b> | Router(config-if)# <b>speed nonegotiate</b>                | Disables link negotiation.         |

This example shows how to enable link negotiation on Gigabit Ethernet port 5/4:

```
Router(config)# interface gigabitethernet 5/4
Router(config-if)# no speed nonegotiate
```

## Displaying the Speed and Duplex Mode Configuration

To display the speed and duplex mode configuration for a port, perform this task:

| Command  | Purpose   |
|--|---|
| Router# <b>show interfaces type<sup>1</sup> slot/port [transceiver properties]</b> | Displays the speed and duplex mode configuration. To display autonegotiation status for speed and duplex, add the <b>transceiver properties</b> option. |

1. *type* = fastethernet, gigabitethernet, or tengigabitethernet

This example shows how to display the speed and duplex mode of Fast Ethernet port 5/4:

```
Router# show interfaces fastethernet 5/4
FastEthernet5/4 is up, line protocol is up
  Hardware is Cat6K 100Mb Ethernet, address is 0050.f0ac.3058 (bia 0050.f0ac.3058)
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:33, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
```

```

5 minute output rate 0 bits/sec, 0 packets/sec
  1238 packets input, 273598 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 input packets with dribble condition detected
  1380 packets output, 514382 bytes, 0 underruns
  0 output errors, 0 collisions, 2 interface resets
  0 babbles, 0 late collision, 0 deferred
  0 lost carrier, 0 no carrier
  0 output buffer failures, 0 output buffers swapped out
Router#

```

This example shows how to display the speed and duplex autonegotiation status for Gigabit Ethernet port 3/1:

```

Router# show interfaces GigabitEthernet 3/1 transceiver properties
Name : Gi3/1   Admin Speed Nego : Enable ,   Admin Duplex Nego : Enable
Router#

```

## Configuring Jumbo Frame Support

These sections describe jumbo frame support:

- [Understanding Jumbo Frame Support, page 8-10](#)
- [Configuring MTU Sizes, page 8-12](#)



### Caution

The following switching modules support a maximum ingress frame size of 8092 bytes:

- WS-X6516-GE-TX when operating at 100 Mbps
- WS-X6148-RJ-45, WS-X6148-RJ-45V and WS-X6148-RJ21, WS-X6148-RJ21V
- WS-X6248-RJ-45 and WS-X6248-TEL
- WS-X6248A-RJ-45 and WS-X6248A-TEL
- WS-X6348-RJ-45, WS-X6348-RJ45V and WS-X6348-RJ-21, WX-X6348-RJ21V

When jumbo frame support is configured, these modules drop ingress frames larger than 8092 bytes.



### Note

The WS-X6548-GE-TX, WS-X6548V-GE-TX, WS-X6148-GE-TX, and WS-X6148V-GE-TX do not support jumbo frames.

## Understanding Jumbo Frame Support

These sections describe jumbo frame support:

- [Jumbo Frame Support Overview, page 8-11](#)
- [Ethernet Ports, page 8-11](#)
- [VLAN Interfaces, page 8-12](#)

## Jumbo Frame Support Overview

A jumbo frame is a frame larger than the default Ethernet size. You enable jumbo frame support by configuring a larger-than-default maximum transmission unit (MTU) size on a port or VLAN interface and configuring the global LAN port MTU size.

**Note**

- Jumbo frame support fragments routed traffic in software on the route processor (RP).
- Jumbo frame support does not fragment bridged traffic.

**Bridged and Routed Traffic Size Check at Ingress 10, 10/100, and 100 Mbps Ethernet and 10-Gigabit Ethernet Ports**

Jumbo frame support compares ingress traffic size with the global LAN port MTU size at ingress 10, 10/100, and 100 Mbps Ethernet and 10-Gigabit Ethernet LAN ports that have a nondefault MTU size configured. The port drops traffic that is oversized. You can configure the global LAN port MTU size (see the [“Configuring the Global Egress LAN Port MTU Size”](#) section on page 8-13).

**Bridged and Routed Traffic Size Check at Ingress Gigabit Ethernet Ports**

Gigabit Ethernet LAN ports configured with a nondefault MTU size accept frames containing packets of any size larger than 64 bytes. With a nondefault MTU size configured, Gigabit Ethernet LAN ports do not check for oversize ingress frames.

**Routed Traffic Size Check on the PFC**

For traffic that needs to be routed, Jumbo frame support on the PFC compares traffic sizes to the configured MTU sizes and provides Layer 3 switching for jumbo traffic between interfaces configured with MTU sizes large enough to accommodate the traffic. Between interfaces that are not configured with large enough MTU sizes, if the “do not fragment bit” is not set, the PFC sends the traffic to the RP to be fragmented and routed in software. If the “do not fragment bit” is set, the PFC drops the traffic.

**Bridged and Routed Traffic Size Check at Egress 10, 10/100, and 100 Mbps Ethernet Ports**

10, 10/100, and 100 Mbps Ethernet LAN ports configured with a nondefault MTU size transmit frames containing packets of any size larger than 64 bytes. With a nondefault MTU size configured, 10, 10/100, and 100 Mbps Ethernet LAN ports do not check for oversize egress frames.

**Bridged and Routed Traffic Size Check at Egress Gigabit Ethernet and 10-Gigabit Ethernet Ports**

Jumbo frame support compares egress traffic size with the global egress LAN port MTU size at egress Gigabit Ethernet and 10-Gigabit Ethernet LAN ports that have a nondefault MTU size configured. The port drops traffic that is oversized. You can configure the global LAN port MTU size (see the [“Configuring the Global Egress LAN Port MTU Size”](#) section on page 8-13).

## Ethernet Ports

These sections describe configuring nondefault MTU sizes on Ethernet ports:

- [Ethernet Port Overview](#), page 8-12
- [Layer 3 Ethernet Ports](#), page 8-12
- [Layer 2 Ethernet Ports](#), page 8-12

**Ethernet Port Overview**

Configuring a nondefault MTU size on a 10, 10/100, or 100 Mbps Ethernet port limits ingress packets to the global LAN port MTU size and permits egress traffic of any size larger than 64 bytes.

Configuring a nondefault MTU size on a Gigabit Ethernet port permits ingress packets of any size larger than 64 bytes and limits egress traffic to the global LAN port MTU size.

Configuring a nondefault MTU size on a 10-Gigabit Ethernet port limits ingress and egress packets to the global LAN port MTU size.

Configuring a nondefault MTU size on an Ethernet port limits routed traffic to the configured MTU size.

You can configure the MTU size on any Ethernet port.

**Layer 3 Ethernet Ports**

On a Layer 3 port, you can configure an MTU size on each Layer 3 Ethernet port that is different than the global LAN port MTU size.

**Note**

Traffic through a Layer 3 Ethernet LAN port that is configured with a nondefault MTU size is also subject to the global LAN port MTU size (see the [“Configuring the Global Egress LAN Port MTU Size” section on page 8-13](#)).

**Layer 2 Ethernet Ports**

On a Layer 2 port, you can only configure an MTU size that matches the global LAN port MTU size (see the [“Configuring the Global Egress LAN Port MTU Size” section on page 8-13](#)).

**VLAN Interfaces**

You can configure a different MTU size on each Layer 3 VLAN interface. Configuring a nondefault MTU size on a VLAN interface limits traffic to the nondefault MTU size. You can configure the MTU size on VLAN interfaces to support jumbo frames.

**Configuring MTU Sizes**

These sections describe how to configure MTU sizes:

- [Configuring MTU Sizes, page 8-12](#)
- [Configuring the Global Egress LAN Port MTU Size, page 8-13](#)

**Configuring the MTU Size**

To configure the MTU size, perform this task:

|               | Command  | Purpose                             |
|---------------|--|-------------------------------------|
| <b>Step 1</b> | Router(config)# <b>interface</b> {{ <b>vlan</b> <i>vlan_ID</i>   {{ <i>type</i> <sup>1</sup> <i>slot/port</i>   { <b>port-channel</b> <i>port_channel_number</i> <i>slot/port</i> }} | Selects the interface to configure. |
| <b>Step 2</b> | Router(config-if)# <b>mtu</b> <i>mtu_size</i>  | Configures the MTU size.            |

|        | Command   | Purpose                             |
|--------|---|-------------------------------------|
| Step 3 | Router(config-if)# <b>end</b>   | Exits configuration mode.           |
| Step 4 | Router# <b>show running-config interface</b><br>[ <b>{gigabitethernet   tengigabitethernet}</b> ]<br><i>slot/port</i> | Displays the running configuration. |

1. *type* = fastethernet, gigabitethernet, tengigabitethernet, or ge-wan

When configuring the MTU size, note the following information:

- For VLAN interfaces and Layer 3 Ethernet ports, supported MTU values are from 64 to 9216 bytes.
- For Layer 2 Ethernet ports, you can configure only the global egress LAN port MTU size (see the “Configuring the Global Egress LAN Port MTU Size” section on page 8-13).

This example shows how to configure the MTU size on Gigabit Ethernet port 1/2:

```
Router# configure terminal
Router(config)# interface gigabitethernet 1/2
Router(config-if)# mtu 9216
Router(config-if)# end
```

This example shows how to verify the configuration:

```
Router# show interface gigabitethernet 1/2
GigabitEthernet1/2 is administratively down, line protocol is down
  Hardware is C6k 1000Mb 802.3, address is 0030.9629.9f88 (bia 0030.9629.9f88)
  MTU 9216 bytes, BW 1000000 Kbit, DLY 10 usec,
<...Output Truncated...>
Router#
```

## Configuring the Global Egress LAN Port MTU Size

To configure the global egress LAN port MTU size, perform this task:

|        | Command  | Purpose   |
|--------|--|---|
| Step 1 | Router(config)# <b>system jumbomtu</b> <i>mtu_size</i> | Configures the global egress LAN port MTU size.<br><br><b>Note</b> Because it would change all the interface MTU sizes to the default (1500), rather than to any configured nondefault interface MTU size, do not use the system jumbomtu command to set the MTU size to 1500. (CSCtg52016) |
| Step 2 | Router(config)# <b>end</b>                             | Exits configuration mode.   |

## Configuring IEEE 802.3x Flow Control

Gigabit Ethernet and 10-Gigabit Ethernet ports use flow control to stop the transmission of frames to the port for a specified time; other Ethernet ports use flow control to respond to flow-control requests.

If a Gigabit Ethernet or 10-Gigabit Ethernet port receive buffer becomes full, the port can be configured to transmit an IEEE 802.3x pause frame that requests the remote port to delay sending frames for a specified time. All Ethernet ports can be configured to respond to IEEE 802.3x pause frames from other devices.

To configure flow control on an Ethernet port, perform this task:

|               | Command   | Purpose  |
|---------------|---|--|
| <b>Step 1</b> | Router(config)# <b>interface</b> <i>type</i> <sup>1</sup> <i>slot/port</i>  | Selects the port to configure.                         |
| <b>Step 2</b> | Router(config-if)# <b>flowcontrol</b> { <b>receive</b>   <b>send</b> }<br>{ <b>desired</b>   <b>off</b>   <b>on</b> } | Configures a port to send or respond to pause frames.  |
| <b>Step 3</b> | Router# <b>show interfaces</b> [ <i>type</i> <sup>1</sup> <i>slot/port</i> ]<br><b>flowcontrol</b>                    | Displays the flow-control configuration for all ports. |

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

When configuring flow control, note the following information:

- Because auto negotiation does not work on 10 Gigabit Ethernet fiber optic ports, they respond to pause frames by default. On 10 Gigabit Ethernet fiber optic ports, the flow-control operational mode is always the same as administrative mode.
- You cannot configure how WS-X6502-10GE 10-Gigabit Ethernet ports respond to pause frames. WS-X6502-10GE 10-Gigabit Ethernet ports are permanently configured to respond to pause frames.
- When configuring how a port responds to pause frames, note the following information:
  - For a Gigabit Ethernet port, when the configuration of a remote port is unknown, you can use the **receive desired** keywords to configure the Gigabit Ethernet port to respond to received pause frames. (Supported only on Gigabit Ethernet ports.)
  - Use the **receive on** keywords to configure a port to respond to received pause frames.
  - Use the **receive off** keywords to configure a port to ignore received pause frames.
- When configuring transmission of pause frames on a port, note the following information:
  - For a Gigabit Ethernet port, when the configuration of the remote ports is unknown, you can use the **send desired** keywords to configure the Gigabit Ethernet port to send pause frames. (Supported only on Gigabit Ethernet ports.)
  - Use the **send on** keywords to configure a port to send pause frames.
  - Use the **send off** keywords to configure a port not to send pause frames.

This example shows how to turn on receive flow control and how to verify the flow-control configuration:

```
Router# configure terminal
Router(config)# interface gigabitethernet 1/2
Router(config-if)# flowcontrol receive on
Router(config-if)# end
Router# show interfaces flowcontrol

Interface Send      Receive
Gi1/1      Desired          OFF
Gi1/2      Desired          ON
Fa5/1      Not capable     OFF
<output truncated>
```

## Configuring the Port Debounce Timer

The port debounce timer delays notification of a link change. Delayed notification of a link change can decrease traffic loss due to network reconfiguration.

If the status of a link changes quickly from up to down and then back to up, the port debounce timer suppresses the link status notification. If the link transitions from up to down, but does not come back up, the port debounce timer delays the link status notification.

Delayed link status notification allows a quick port status change and recovery to occur without triggering any of the changes that are necessary when a port stays down. The normal operation of DWDM links sometimes includes quick port status changes and recoveries. Delayed link status notification can also be used to mitigate link flaps because of bad cabling.

You can configure the port debounce timer separately on each LAN port.



### Caution

Enabling the port debounce timer causes link down detections to be delayed, resulting in loss of traffic during the debouncing period. This situation might affect the convergence and reconvergence of some Layer 2 and Layer 3 protocols.

To configure the debounce timer on a port, perform this task:

|        | Command   | Purpose  |
|--------|---|--|
| Step 1 | Router(config)# <b>interface</b> <i>type</i> <sup>1</sup> <i>slot/port</i>      | Selects the port to configure.   |
| Step 2 | Router(config-if)# <b>link debounce</b><br>[ <b>time</b> <i>debounce_time</i> ] | Configures the debounce timer.<br><br><b>Note</b> The default port debounce timer values provide appropriate link change notification delay on DWDM links. |
| Step 3 | Router# <b>show interfaces debounce</b>   | Verifies the configuration.  |

1. *type* = fastethernet, gigabitethernet, or tengigabitethernet

When configuring the debounce timer on a port, note the following information:

- The **time** keyword is supported only on fiber Gigabit Ethernet ports. With the **time** keyword, you can increase the port debounce timer value in increments of 100 milliseconds up to 5000 milliseconds on ports operating at 1000 Mbps over copper media.
- The debounce timer recognizes 10-Gbps copper media and detects media-only changes.

Table 8-2 lists the time delay that occurs before notification of a link change.

**Table 8-2** Default Port Debounce Timer Delay Times

| Port Type                               | Debounce Timer Disabled | Debounce Timer Enabled |
|---|-------------------------|------------------------|
| Ports operating at 10 Mbps or 100 Mbps: | 300 milliseconds        | 3100 milliseconds      |
| Ports operating at 1000 Mbps            |                         |                        |
| Copper media ports:                     | 300 milliseconds        | 3100 milliseconds      |
| Fiber media ports:                      | 10 milliseconds         | 100 milliseconds       |

**Table 8-2** Default Port Debounce Timer Delay Times

| Port Type  | Debounce Timer Disabled | Debounce Timer Enabled |
|--|-------------------------|------------------------|
| Ports operating at 10 Gbps:  |                         |                        |
| <b>Note</b> The show interfaces debounce command does not display the default value for 10-GigabitEthernet ports when the port debounce timer is disabled. |                         |                        |
| Except WS-X6502-10GE ports:  | 10 milliseconds         | 1000 milliseconds      |
| WS-X6502-10GE ports:   | 1000 milliseconds       | 3100 milliseconds      |

This example shows how to enable the port debounce timer on Fast Ethernet port 5/12:

```
Router(config)# interface fastethernet 5/12
Router(config-if)# link debounce
Router(config-if)# end
```

This example shows how to display the port debounce timer settings:

```
Router# show interfaces debounce | include enable
Fa5/12 enable 3100
```

## Adding a Description for an Interface

You can add a description about an interface to help you remember its function. The description appears in the output of the following commands: **show configuration**, **show running-config**, and **show interfaces**.

To add a description for an interface, perform this task:

| Command   | Purpose                              |
|---|--------------------------------------|
| Router(config-if)# <b>description</b> <i>string</i> | Adds a description for an interface. |

This example shows how to add a description on Fast Ethernet port 5/5:

```
Router(config)# interface fastethernet 5/5
Router(config-if)# description Channel-group to "Marketing"
```

## Understanding Online Insertion and Removal

The online insertion and removal (OIR) feature supported on the Catalyst 6500 series switches allows you to remove and replace modules while the system is online. You can shut down the modules before removal and restart it after insertion without causing other software or interfaces to shut down.



### Note

Do not remove or install more than one module at a time. After you remove or install a module, check the LEDs before continuing. For module LED descriptions, see the *Catalyst 6500 Series Switch Installation Guide*.

When a module has been removed or installed, the Catalyst 6500 series switch stops processing traffic for the module and scans the system for a configuration change. Each interface type is verified against the system configuration, and then the system runs diagnostics on the new module. There is no disruption to normal operation during module insertion or removal.

The switch can bring only an identical replacement module online. To support OIR of an identical module, the module configuration is not removed from the running-config file when you remove a module.

If the replacement module is different from the removed module, you must configure it before the switch can bring it online.

Layer 2 MAC addresses are stored in an EEPROM, which allows modules to be replaced online without requiring the system to update switching tables and data structures. Regardless of the types of modules installed, the Layer 2 MAC addresses do not change unless you replace the supervisor engine. If you do replace the supervisor engine, the Layer 2 MAC addresses of *all* ports change to those specified in the address allocator on the new supervisor engine.

## Monitoring and Maintaining Interfaces

You can perform the tasks in the following sections to monitor and maintain interfaces:

- [Monitoring Interface Status, page 8-17](#)
- [Clearing Counters on an Interface, page 8-18](#)
- [Resetting an Interface, page 8-18](#)
- [Shutting Down and Restarting an Interface, page 8-19](#)

### Monitoring Interface Status

The software contains commands that you can enter at the EXEC prompt to display information about the interface including the version of the software and the hardware and statistics about interfaces. The following table lists some of the interface monitoring commands. (You can display the complete list of **show** commands by using the **show ?** command at the EXEC prompt.) These commands are described in the *Cisco IOS Interface Command Reference* publication.

To display information about the interface, perform these tasks:

| Command  | Purpose   |
|--|---|
| Router# <b>show ibc</b>                                  | Displays current internal status information.                               |
| Router# <b>show eobc</b>                                 | Displays current internal out-of-band information.                          |
| Router# <b>show interfaces</b> [ <i>type slot/port</i> ] | Displays the status and configuration of all or a specific interface.       |
| Router# <b>show running-config</b>                       | Displays the currently running configuration.                               |
| Router# <b>show rif</b>                                  | Displays the current contents of the routing information field (RIF) cache. |

| Command   | Purpose   |
|---|---|
| Router# <b>show protocols</b> [ <i>type slot/port</i> ] | Displays the global (system-wide) and interface-specific status of any configured protocol.                               |
| Router# <b>show version</b>                             | Displays the hardware configuration, software version, the names and sources of configuration files, and the boot images. |

This example shows how to display the status of Fast Ethernet port 5/5:

```
Router# show protocols fastethernet 5/5
FastEthernet5/5 is up, line protocol is up
Router#
```

## Clearing Counters on an Interface

To clear the interface counters shown with the **show interfaces** command, perform this task:

| Command  | Purpose                    |
|--|----------------------------|
| Router# <b>clear counters</b> {{ <b>vlan</b> <i>vlan_ID</i> }   { <i>type</i> <sup>1</sup> <i>slot/port</i> }   { <b>port-channel</b> <i>channel_ID</i> }} | Clears interface counters. |

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

This example shows how to clear and reset the counters on Fast Ethernet port 5/5:

```
Router# clear counters fastethernet 5/5
Clear "show interface" counters on this interface [confirm] y
Router#
*Sep 30 08:42:55: %CLEAR-5-COUNTERS: Clear counter on interface FastEthernet5/5
```

The **clear counters** command clears all the current counters from the interface unless the optional arguments specify a specific interface.



### Note

The **clear counters** command clears counters displayed with the EXEC **show interfaces** command, not counters retrieved using SNMP.

## Resetting an Interface

To reset an interface, perform this task:

| Command  | Purpose              |
|--|----------------------|
| Router# <b>clear interface</b> <i>type</i> <sup>1</sup> <i>slot/port</i> | Resets an interface. |

1. *type* = **fastethernet**, **gigabitethernet**, or **tengigabitethernet**

This example shows how to reset Fast Ethernet port 5/5:

```
Router# clear interface fastethernet 5/5
Router#
```

## Shutting Down and Restarting an Interface

You can shut down an interface, which disables all functions on the specified interface and shows the interface as unavailable on all monitoring command displays. This information is communicated to other network servers through all dynamic routing protocols. The interface is not included in any routing updates.

To shut down an interface and then restart it, perform this task:

|               | Command   | Purpose                                 |
|---------------|---|---|
| <b>Step 1</b> | Router(config)# <b>interface</b> {{vlan vlan_ID}   {type <sup>1</sup> slot/port}   {port-channel channel_ID}} | Selects the interface to be configured. |
| <b>Step 2</b> | Router(config-if)# <b>shutdown</b>  | Shuts down the interface.               |
| <b>Step 3</b> | Router(config-if)# <b>no shutdown</b>   | Reenables the interface.                |

1. *type* = fastethernet, gigabitethernet, or tengigabitethernet

This example shows how to shut down Fast Ethernet port 5/5:

```
Router(config)# interface fastethernet 5/5
Router(config-if)# shutdown
Router(config-if)#
*Sep 30 08:33:47: %LINK-5-CHANGED: Interface FastEthernet5/5, changed state to
administratively down
```

This example shows how to reenabte Fast Ethernet port 5/5:

```
Router(config-if)# no shutdown
Router(config-if)#
*Sep 30 08:36:00: %LINK-3-UPDOWN: Interface FastEthernet5/5, changed state to up
```

To check if an interface is disabled, enter the EXEC **show interfaces** command. An interface that has been shut down is shown as administratively down in the **show interfaces** command display.

## Checking the Cable Status Using the TDR

You can check the status of copper cables using the time domain reflectometer (TDR). The TDR detects a cable fault by sending a signal through the cable and reading the signal that is reflected back to it. All or part of the signal can be reflected back by any number of cable defects or by the end of the cable itself.

Use the TDR to determine if the cabling is at fault if you cannot establish a link. This test is especially important when replacing an existing switch, upgrading to Gigabit Ethernet, or installing new cables.

**Note**

- TDR can test cables up to a maximum length of 115 meters.
- For information about which modules support the TDR, see this document:  
[http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol\\_14271.html](http://www.cisco.com/en/US/docs/switches/lan/catalyst6500/ios/12.2SX/release/notes/ol_14271.html)
- TDR results are not meaningful for a link that is operating successfully.
- The port must be up before running the TDR test. If the port is down, you cannot enter the **test cable-diagnostics tdr** command successfully, and the following message is displayed:

```
Router# test cable-diagnostics tdr interface gigabitethernet2/12
% Interface Gi2/12 is administratively down
% Use 'no shutdown' to enable interface before TDR test start.
```

To start or stop the TDR test, perform this task:

| Command  | Purpose                       |
|--|-------------------------------|
| <code>test cable-diagnostics tdr interface {interface interface_number}</code> | Starts or stops the TDR test. |

This example shows how to run the TDR-cable diagnostics:

```
Router # test cable-diagnostics tdr interface gigabitethernet2/1
TDR test started on interface Gi2/1
A TDR test can take a few seconds to run on an interface
Use 'show cable-diagnostics tdr' to read the TDR results.
Router #
```

**Tip**

For additional information about Cisco Catalyst 6500 Series Switches (including configuration examples and troubleshooting information), see the documents listed on this page:

[http://www.cisco.com/en/US/products/hw/switches/ps708/tsd\\_products\\_support\\_series\\_home.html](http://www.cisco.com/en/US/products/hw/switches/ps708/tsd_products_support_series_home.html)