

# Packet OC-3 Interface Processor

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## Description

The Packet OC-3 Interface Processor (POSIP) is available on Cisco 7000 series routers with the 7000 Series Route Switch Processor (RSP7000) and 7000 Series Chassis Interface (RSP7000CI) and on Cisco 7500 series routers.

The POSIP is a fixed-configuration interface processor that uses second-generation Versatile Interface Processor (VIP2) technology. The POSIP provides a single 155.520-Mbps, OC-3 physical layer interface for packet-based traffic. This OC-3 interface is fully compatible with SONET and Synchronous Digital Hierarchy (SDH) network facilities and is compliant with RFC 1619, “PPP over SONET/SDH,” and RFC 1662, “PPP in HDLC-like Framing.” The Packet-Over-SONET specification is primarily concerned with the use of the PPP encapsulation over SONET/SDH links.

## Platforms

This feature is supported on these platforms:

- Cisco 7500 series routers
- Cisco 7000 series routers with the RSP7000 and RSP7000CI

## Configuration Tasks

For information on how to configure a POSIP interface, refer to the “Configure a Packet OC3 Interface” section in the “Configuring Interfaces” chapter in the *Configuration Fundamentals Configuration Guide*.

The commands listed in the “Configure a Packet OC3 Interface” section are the same except the command syntax changed from **posi** to **pos** for the following commands:

- **interface pos** *slotport*
- **pos framing-sdh**
- **pos internal-clock**
- **show interfaces pos** [*slotport*]

For information on other commands that can be used by the POSIP interface, refer to the Cisco IOS Release 11.2 configuration guides.

## Configuration Examples

For examples of configuring a POSIP interface, refer to the “Packet OC-3 Interface Configuration Examples” section of the “Configuring Interface” chapter in the *Configuration Fundamentals Configuration Guide*.

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**Note** The command syntax changed from **posi** to **pos** in all commands listed in the POSIP configuration examples.

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## Command Reference

This section documents modified commands. All other commands used with this feature are documented in the Cisco IOS Release 11.2 command references.

- **clear counters**
- **clear interface**
- **interface pos**
- **pos framing-sdh**
- **pos internal-clock**
- **pos scramble-atm**
- **show interfaces pos**

## clear counters

To clear the interface counters, use the **clear counters** EXEC command.

**clear counters** [*type number*]

**clear counters** [*type slot/port*] [**ethernet** | **serial**] (Cisco 4000 series or Cisco 7000 series with a LAN Extender interface)

**clear counters** [*type slot/port*] (Cisco 7000 series, Cisco 7200 series, and Cisco 7500 series with a Packet OC-3 Interface Processor)

**clear counters** [*type slot/port-adapter/port*] (Cisco 7000 series and Cisco 7500 series with ports on a VIP)

### Syntax Description

<i>type</i>	(Optional) Specifies the interface type; one of the keywords listed in Usage Guidelines.
<i>number</i>	(Optional) Specifies the interface counter displayed with the <b>show interfaces</b> command.
<b>ethernet</b>	(Optional) If the <i>type</i> is <b>lex</b> , you can clear the interface counters on the Ethernet interface.
<b>serial</b>	(Optional) If the <i>type</i> is <b>lex</b> , you can clear the interface counters on the serial interface.
<i>slot</i>	(Optional) Backplane slot number on the Cisco 7000 series and Cisco 7200 series. On the Cisco 7000 and Cisco 7200 series, the value can be 0, 1, 2, 3, or 4. On the Cisco 7010, the value can be 0, 1, or 2.
<i>port</i>	(Optional) Port number of the interface. On the Cisco 7000 series and Cisco 7200 series, the value can be 0, 1, 2, or 3 for the serial interface. For the Cisco 7500 series if the interface type is <b>pos</b> , the value must be 0. For the VIP, the port value can be the following: <ul style="list-style-type: none"> <li>• 0 for 1-port Fast Ethernet interfaces</li> <li>• 0, 1, 2, or 3 for 4-port Ethernet interfaces</li> <li>• 0, 1, 2, or 3 for 4-port serial interfaces</li> <li>• 0, 1, 2, or 3 for 4-port Token Ring interfaces</li> <li>• 0 for 1-port FDDI interfaces</li> </ul>
<i>port-adapter</i>	(Optional) On the Cisco 7000 series and Cisco 7500 series, specifies the port adapter location on a VIP. The value can be 0 or 1.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command was modified in Cisco IOS Release 11.2 P and 11.1 CA to change the **posi** keyword to **pos**.

This command clears all the current interface counters from the interface unless the optional arguments *type* and *number* are specified to clear only a specific interface type (serial, Ethernet, Token Ring, and so on).

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**Note** This command will not clear counters retrieved using SNMP, but only those seen with the **show interface EXEC** command.

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<b>Keyword</b>	<b>Interface Type</b>
<b>async</b>	Asynchronous interface
<b>bri</b>	Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI)
<b>dialer</b>	Dialer interface
<b>ethernet</b>	Ethernet interface
<b>fast-ethernet</b>	Fast Ethernet interface
<b>fdi</b>	Fiber Distributed Data Interface (FDDI)
<b>hssi</b>	High-Speed Serial Interface (HSSI)
<b>lex</b>	LAN Extender interface
<b>loopback</b>	Loopback interface
<b>null</b>	Null interface
<b>pos</b>	Packet OC-3 interface
<b>serial</b>	Synchronous serial interface
<b>tokenring</b>	Token Ring interface
<b>tunnel</b>	Tunnel interface
<b>vg-anylan</b>	100VG-AnyLAN port adapter

### Examples

The following example clears all interface counters:

```
clear counters
```

The following example clears the Packet OC-3 interface counters on a POSIP card in slot 1 on a Cisco 7500 series router:

```
clear counters pos 1/0
```

The following example clears interface counters on the serial interface residing on a Cisco 1000 series LAN Extender:

```
clear counters lex 0 serial
```

### Related Command

**show interfaces pos**

## clear interface

To reset the hardware logic on an interface, use the **clear interface** EXEC command.

**clear interface** *type number*

**clear interface** *type slot/port* (Cisco 7000 series, Cisco 7200 series, and Cisco 7500 series with a Packet OC-3 Interface Processor)

**clear interface** [*type slot/port-adapter/port*] (Cisco 7000 series and Cisco 7500 series with ports on a VIP)

**clear interface** *type slot/port [:channel-group]* (Cisco 7000 series MIP T1 interface)

**clear interface** *type slot/port-adapter/port [:t1-channel]* (Cisco 7000 series routers with RSP7000 and Cisco 7500 series with a CT3IP)

### Syntax Description

<i>type</i>	Specifies the interface type; it is one of the keywords listed in Usage Guidelines.
<i>number</i>	Specifies the port, connector, or interface card number.
<i>slot</i>	On the Cisco 7000 series and Cisco 7200 series, specifies the backplane slot number. On the Cisco 7000, the value can be 0, 1, 2, 3, or 4. On the Cisco 7010, the value can be 0, 1, or 2. On the Cisco 7200 series, value can be 0, 1, 2, 3, 4, 5, or 6.
<i>port</i>	<p>Port number of the interface. For the Cisco 7500 series, if the interface type is <b>pos</b>, the value must be 0. On the Cisco 7000 series this argument is required, and the value can be 0, 1, 2, 3, 4, or 5 depending on the type of interface, as follows:</p> <ul style="list-style-type: none"> <li>• AIP (ATM Interface Processor) 0</li> <li>• EIP (Ethernet Interface Processor) 0, 1, 2, 3, 4, or 5</li> <li>• FIP (FDDI Interface Processor) 0</li> <li>• HIP (HSSI Interface Processor) 0</li> <li>• MIP (Multichannel Interface Processor) 0 or 1</li> <li>• TRIP (Token Ring Interface Processor) 0, 1, 2, or 3</li> </ul> <p>(Optional) Port number of the interface. For the VIP this argument is optional, and the value can be the following:</p> <ul style="list-style-type: none"> <li>• 0 for 1-port Fast Ethernet interfaces</li> <li>• 0, 1, 2, or 3 for 4-port Ethernet interfaces</li> <li>• 0, 1, 2, or 3 for 4-port serial interfaces</li> <li>• 0, 1, 2, or 3 for 4-port Token Ring interfaces</li> <li>• 0 for 1-port FDDI interfaces</li> </ul>
<i>port-adapter</i>	(Optional) On the Cisco 7000 series and Cisco 7500 series, specifies the port adapter location on a VIP. The value can be 0 or 1.
<i>:channel-group</i>	(Optional) On the Cisco 7000 series supporting channelized T1, specifies the channel from 0 to 23. This number is preceded by a colon.

***:t1-channel*** (Optional) For the CT3IP, the T1 channel is a number between 1 and 28. T1 channels on the CT3IP are numbered 1 to 28 rather than the more traditional zero-based scheme (0 to 27) used with other Cisco products. This is to ensure consistency with telco numbering schemes for T1 channels within channelized T3 equipment.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

This command was modified in Cisco IOS Release 11.2 P and 11.1 CA to change the keyword **posi** to **pos**.

Under normal circumstances, you do not need to clear the hardware logic on interfaces.

Keyword	Interface Type
<b>async</b>	Async interface
<b>atm</b>	Asynchronous Transfer Mode (ATM) interface
<b>bri</b>	Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI)
<b>ethernet</b>	Ethernet interface
<b>fddi</b>	Fiber Distributed Data Interface (FDDI)
<b>hssi</b>	High-Speed Serial Interface (HSSI)
<b>loopback</b>	Loopback interface
<b>null</b>	Null interface
<b>pos</b>	Packet OC-3 Interface Processor
<b>serial</b>	Synchronous serial interface
<b>tokenring</b>	Token Ring interface
<b>tunnel</b>	Tunnel interface
<b>vg-anylan</b>	100VG-AnyLAN port adapter

### Examples

The following example resets the interface logic on HSSI interface 1:

```
clear interface hssi 1
```

The following example resets the interface logic on Packet OC-3 interface 0 on the POSIP in slot 1:

```
clear interface pos 1/0
```

The following example resets the interface logic on T1 0 on the CT3IP in slot 9:

```
clear interface serial 9/0/0:0
```

## interface pos

To specify the interface on a Packet OC-3 Interface Processor (POSIP) and enter interface configuration mode, use the **interface pos** global configuration command.

**interface pos** *slot/port-adapter/port* (on VIPs in Cisco 7000 series and Cisco 7500 series)

### Syntax Description

<i>slot</i>	Specifies the backplane slot number. On the Cisco 7000, the slot number can be 0, 1, 2, 3, or 4. On the Cisco 7010, the slot number can be 0, 1, or 2. The slots are numbered from left to right. On the Cisco 7505, the slot number can be 0, 1, 2, or 3 from bottom to top. On the Cisco 7507, the slot number can be 0 or 1 (CyBus0) and 4 through 6 (Cybus1), from left to right. On the Cisco 7513, the slot numbers are 0 through 5 (CyBus 0) and 8 through 12 (CyBus 1), from left to right.
<i>port-adapter</i>	On Cisco 7000 series and Cisco 7500 series routers, specifies the ports on a VIP card. The value must be 0.
<i>port</i>	Port number on the interface. The value must be 0.

### Default

None

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command was modified in Cisco IOS Release 11.2 P and 11.1 CA to change the **interface posi** command to **interface pos**.

Each POSIP provides a single Packet OC-3 interface; as a consequence, the port number in this command is always 0.

### Example

The following example specifies the single Packet OC-3 interface on the POSIP in slot 2:

```
interface pos 2/0
```

### Related Commands

**pos framing-sdh**  
**pos internal-clock**

## pos framing-sdh

To select SDH STM-1 framing on a Packet OC-3 interface in Cisco 7000 series routers with the RSP7000 and RSP7000CI or in Cisco 7500 series routers, use the **pos framing-sdh** interface configuration command. To revert to the default SONET STS-3c framing, use the **no** form of this command.

**pos framing-sdh**  
**no pos framing-sdh**

### Syntax Description

This command has no keywords or arguments.

### Default

SONET STS-3c framing

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command was modified in Cisco IOS Release 11.2 P and 11.1 CA to change the **posi framing-sdh** command to **pos framing-sdh**.

### Example

In the following example, the interface is configured for SDH STM-1 framing:

```
interface pos 3/0
pos framing-sdh
no shutdown
```

### Related Commands

**interface pos**  
**pos internal-clock**

## pos internal-clock

To set the internal clock as the transmission clock source on a Packet OC-3 interface in Cisco 7000 series routers with the RSP7000 and RSP7000CI or in Cisco 7500 series routers, use the **pos internal-clock** interface configuration command. To revert to the default recovered receive clock as the transmission clock source, use the **no** form of this command.

**pos internal-clock**  
**no pos internal-clock**

### Syntax Description

This command has no keywords or arguments.

### Default

The recovered receive clock

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command was modified in Cisco IOS Release 11.2 P and 11.1 CA to change the **posi internal-clock** command to **pos internal-clock**.

### Example

The following command reverts to the default recovered receive clock:

```
interface pos 3/0
no pos internal-clock
```

### Related Commands

**interface pos**  
**pos framing-sdh**

## pos scramble-atm

To enable SONET payload scrambling on a POS interface, use the **pos scramble-atm** interface command. To disable scrambling, use the **no** form of this command.

```
pos scramble-atm  
no pos scramble-atm
```

### Syntax Description

This command has no keywords or arguments.

### Default

Scrambling is disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command was added in Cisco IOS Release 11.2 P and 11.1 CA.

SONET payload scrambling applies a self-synchronous scrambler ( $x^{43+1}$ ) to the Synchronous Payload Envelope (SPE) of the interface to ensure sufficient bit transition density.

Both ends of the connection must use the same scrambling algorithm.

When enabling POS scrambling on a VIP2 POSIP on the Cisco 7500 series that has a hardware revision of 1.5 or higher, you can specify CRC 16 only (that is, CRC 32 is currently not supported). To determine the hardware revision of the POSIP, use the **show diag** command.

To determine whether scrambling is enabled on the interface, use the **show interface pos** command or **show startup-config** command.

### Example

The following example enables scrambling on the interface:

```
Router(config)# interface pos 3/0  
Router(config-if)# pos scramble-atm  
Router(config-if)# no shutdown  
Router(config-if)# end  
Router#
```

### Related Commands

```
interface pos  
show interface pos
```

## show interfaces pos

To display information about the Packet OC-3 interface in Cisco 7000 series routers with the RSP7000 and RSP7000CI or in Cisco 7500 series routers, use the **show interfaces pos** EXEC command.

**show interfaces pos** [*slot/port-adapter/port*] (on a VIP in Cisco 7000 series and Cisco 7500 series routers)

### Syntax Description

<i>slot</i>	(Optional) On the Cisco 7000 series, specifies the backplane slot number. On the 7000, the slot number can be 0, 1, 2, 3, or 4. On the Cisco 7010, the slot number can be 0, 1, or 2. The slots are numbered from left to right. On the Cisco 7505, the slot number can be 0, 1, 2, or 3 from bottom to top. On the Cisco 7507, the slot number can be 0 or 1 (CyBus0) and 4 through 6 (Cybus1), from left to right. On the Cisco 7513, the slot numbers are 0 through 5 (CyBus 0) and 8 through 12 (CyBus 1), from left to right.
<i>port-adapter</i>	On the Cisco 7000 series and Cisco 7500 series, specifies the ports on a VIP. The value must be 0.
<i>port</i>	Port number on the interface. The value must be 0.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command was modified in Cisco IOS Release 11.2 P and 11.1 CA to change the **show interface posi** command to **show interface pos** and to update the sample output.

### Sample Display

The following is sample output from the **show interfaces pos** command on a Cisco 7513 router with one Packet OC-3 Interface Processor (POSIP):

```
Router# show interfaces pos 2/0/0
POS2/0/0 is up, line protocol is up
  Hardware is cyBus Packet over Sonet
  Description: PRI-T1 net to zippy (4K) to Pac-Bell
  Internet address is 1.1.1.1/27
  MTU 4470 bytes, BW 1000 Kbit, DLY 40000 usec, rely 255/255, load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (3 sec)
  Last input 00:00:00, output 00:00:00, output hang never
  Last clearing of "show interface" counters 00:23:09
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 1 packets/sec
  5 minute output rate 1000 bits/sec, 1 packets/sec
    1046 packets input, 54437 bytes, 0 no buffer
    Received 485 broadcasts, 0 runts, 0 giants, 0 parity
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
```

```

4013 packets output, 1357412 bytes, 0 underruns
0 output errors, 0 applique, 0 interface resets
0 output buffer failures, 0 output buffers swapped out
0 carrier transitions
    
```

Table 51 describes significant fields in this output.

**Table 51 Show Interfaces Pos Field Descriptions**

Field	Description
POS2/0/0 is up, line protocol is up	Indicates whether the interface hardware is currently active and can transmit and receive or if it has been taken down by an administrator.
Hardware is cyBus Packet over Sonet	Hardware type.
Internet address is	Internet address and subnet mask.
MTU	Maximum transmission unit of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes. The calculation uses the value from the <b>bandwidth</b> interface configuration command.
Encapsulation	Encapsulation method assigned to interface.
loopback	Indicates whether loopbacks are set.
keepalive	Indicates whether keepalives are set.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed.
(Last) output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.
Queueing strategy	First-in, first-out queueing strategy (other queueing strategies you might see are priority-list, custom-list, and weighted fair).
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped because a queue was full.
5 minute input rate 5 minute output rate	Average number of bits and packets received or transmitted per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.
bytes (input)	Total number of bytes, including data and MAC encapsulation, in the error-free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
broadcasts	Total number of broadcast or multicast packets received by the interface.
runt	Number of packets that are discarded because they are smaller than the medium's minimum packet size.

**Table 51 Show Interfaces Pos Field Descriptions (Continued)**

<b>Field</b>	<b>Description</b>
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
parity	Report of the parity errors on the interface.
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so that this sum might not balance with the other counts.
CRC	Cyclic redundancy checksum generated by the originating LAN station or far-end device does not match the checksum calculated from the data received. On a LAN, this usually indicates noise or transmission problems on the LAN interface or the LAN bus itself. A high number of CRCs is usually the result of collisions or a station transmitting bad data. On a serial link, CRCs usually indicate noise, gain hits or other transmission problems on the data link.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets. On a serial line, this is usually the result of noise or other transmission problems.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different than the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be incremented.
abort	Illegal sequence of one bits on the interface.
packets output	Total number of messages transmitted by the system.
bytes (output)	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times that the far-end transmitter has been running faster than the near-end router's receiver can handle.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this might not balance with the sum of the enumerated output errors, as some datagrams can have more than one error, and others can have errors that do not fall into any of the specifically tabulated categories.
applique	Indicates an unrecoverable error has occurred on the POSIP applique. The system then invokes an interface reset.
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for transmission were not sent within a certain interval. If the system notices that the carrier detect line of an interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an unrecoverable interface processor error occurred, or when an interface is looped back or shut down.
carrier transitions	Number of times the carrier detect signal of the interface has changed state.

**Related Command**  
**interface pos**

## What to Do Next

For more information on POSIP, refer to *Packet OC-3 Interface Processor (POSIP) Installation and Configuration* publication.