Configuring the Cisco uBR10012 OC-48 DPT/POS Interface Module with PRE1 and PRE2

This document describes procedures and Cisco IOS commands for configuring and monitoring the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router.

The Cisco OC-48 DPT∕ POS interface module is a dual-mode module, providing interface support for Packet over SONET (POS) or Spatial Reuse Protocol (SRP).

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Note   The Cisco OC-48 DPT∕ POS interface module supports SONET Section Data Communications Channel (SDCC) in either POS or SRP modes.

- Packet-over-SONET (POS) technology is ideally suited for Internet and IP networks, because it provides superior bandwidth utilization efficiency over other transport methods. POS can support a single connection or redundant connections to provide a robust, high-speed, high-throughput transport for IP traffic.
- Spatial Reuse Protocol (SRP) is the media-independent Media Access Control (MAC)-layer protocol that enables Cisco Dynamic Packet Transport (DPT) functionality in ring configurations. The SRP MAC protocol provides the base functionality for addressing, packet stripping, bandwidth control, and control message propagation on the packet ring.

Feature History for Cisco OC-48 DPT∕ POS Interface Module

Release	Modification
12.2(11)BC3	Support for the Cisco OC-48 DPT∕ POS interface module introduced on the Cisco uBR10012 universal broadband router with Performance Routing Engine (PRE1).
12.3(9a)BC	Support for the Cisco OC-48 DPT∕ POS interface module introduced on the Cisco uBR10012 universal broadband router with PRE2, the latest in Route Processor availability.

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at http://www.cisco.com/go/fn. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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Note   For additional release information, refer to Release Notes for Cisco uBR10012 Universal Broadband Router for Cisco IOS Release 12.2 BC.

Prerequisites for Configuring the Cisco uBR10012 OC-48 DPT/POS Interface Module

The Cisco uBR10012 router should be operational before beginning the configuration procedures in this document. The configuration of the Cisco OC-48 DPT∕ POS interface module requires that the following conditions be met:

- The Cisco uBR10012 router must be running Cisco IOS release 12.2(11)BC3 or a later release to support the Cisco OC-48 DPT∕ POS interface module.

- The Cisco uBR10012 router must be using one or two PRE1 or PRE2 processor modules to support the Cisco OC-48 DPT∕ POS interface module. The original PRE module for the Cisco uBR10012 router is not supportedwith the Cisco OC-48 DPT∕ POS interface module.

- At least one Timing, Communication, and Control Plus (TCC+) card must be installed and operational in the Cisco uBR10012 router.

- Complete a basic configuration of the Cisco uBR10012 router; this includes, at a minimum, the following tasks:

    – Configure a host name and password for the router.

    – Configure the router to support Internet Protocol (IP) operations.

    – Install and configure at least one WAN adapter to provide backbone connectivity.

    – Install at least one Cisco OC-48 DPT∕ POS interface module in an appropriate slot of the Cisco uBR10012 chassis. This is described in the online document, *Cisco uBR10012 OC-48 DPT/POS Interface Module*:

      http://www.cisco.com/en/US/docs/cable/cmts/ubr10012/installation/field_replaceable_units/ub_oc48.html

    – Bring up the router as described in the "Configuring the Cable Modem Termination System for the First Time" chapter in the *Cisco uBR10012 Universal Broadband Router Software Configuration Guide:*

- Determine a channel plan for your Cisco uBR10012 router and all of its cable interfaces.

- Verify that your headend site includes all necessary servers to support DOCSIS and Internet connectivity, including Dynamic Host Configuration Protocol (DHCP), Time-of-Day (ToD) and Trivial File Transfer Protocol (TFTP) servers.

Restrictions for Configuring the Cisco uBR10012 OC-48 DPT/POS Interface Module

The following operational considerations apply to the Cisco OC-48 DPT∕ POS interface module:

- Command-line interface (CLI) configuration commands are synchronized only with the standby Performance Routing Engine (PRE) module. Any configuration that is done with SNMP commands is not synchronized with the standby PRE module, and is not present after a switchover.

- In POS mode, the Cisco OC-48 DPT∕ POS interface module may be installed as a single- or dual-mode interface module. Only one card is required when operating in POS mode.

- In SRP mode, the Cisco OC-48 DPT∕ POS interface module cannot be installed as a single interface module. You must configure the OC-48 DPT∕ POS interface modules in pairs using adjacent slots (slots 1/0/0 and 2/0/0 together, or slots 3/0/0 and 4/0/0 together). You can also configure four interface modules as two pairs.

- For either POS or SRP mode, slot preconfiguration is required prior to configuring additional settings. Refer to the "Preconfiguring the Slots for the Cisco OC-48 DPT∕ POS Interface Module" section on page 5.

Information About the Cisco OC-48 DPT∕ POS Interface Module

- Faceplate and LED Features, page 3

Faceplate and LED Features

The Cisco OC-48 DPT∕ POS interface module has a pair of OC-48c, fiber-optic standard connector (SC) duplex ports that provide an SC connection for either the single-mode short-reach or single-mode long-reach version. Figure 1 shows the faceplate and LED features of the Cisco OC-48 DPT∕ POS interface module.
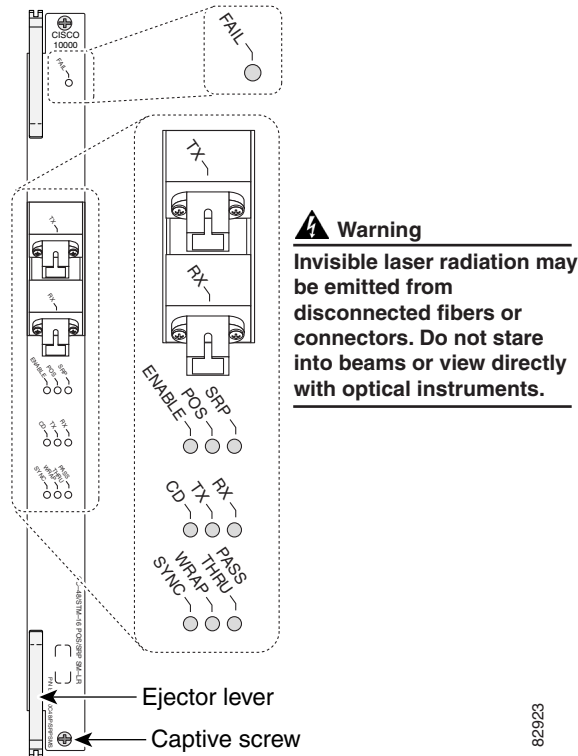
Figure 1　　　　*Cisco OC-48 DPT Interface Module Faceplate*

Warning
Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.

Ejector lever
Captive screw

Table 1　　　　*LED Status and Description*

LED	Status	Description
FAIL	Yellow Off	Line card is disabled. Line card is operational.
ENABLE	Green Off	Port is enabled. Port is disabled.
POS	Green Off	Operating in POS mode. Not operating in POS mode.
SRP	Green Off	Operating in SRP mode. Not operating in SRP mode.
CD	Green Off	Carrier detected. No carrier detected.
TX	Green Off	Packets transported No packets transported
RX	Green Off	Packets received. No packets received.
SYNC	Green Off	Card synchronized to mate card. Card not synchronized.
WRAP	Yellow Off	Interface is wrapped. Interface not wrapped.
PASS THRU	Yellow Off	DPT port line is in a pass-through state. DPT port line not in pass-through state.

How to Configure the Cisco OC-48 DPT∕ POS Interface Module

This section contains the following procedures:

Preconfiguring the Slots for the Cisco OC-48 DPT∕ POS Interface Module

This section includes the following required and optional subsections:

- SUMMARY STEPS
- DETAILED STEPS
- Examples

You must issue the **hw-module slot** *x* { **pos** | **srp** } and **card** commands to assign the supported mode to the interface module pairs and to preconfigure the slots to which the interface module pairs are assigned. Perform this preconfiguration prior to any additional POS or SRP mode configurations. Refer to the *Cisco IOS CMTS Cable Command Reference Guide* for additional command syntax information that applies to additional field-replaceable units (FRUs).

Tip When a card has been preprovisioned and is not physically present in the chassis, the **show interface** command for the corresponding slot displays the message "Hardware is not present." Some **show** commands might also list the preprovisioned line card in their displays.

Perform the following steps to preconfigure the Cisco OC-48 DPT∕ POS interface module slots to support POS or SRP.

SUMMARY STEPS

1. **enable**
2. **config t**
3. **hw-module slot** *x* { **pos** | **srp** }
4. **card** *slot/port* {**1oc48dpt-pos-1**}
5. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		- Enter your password if prompted.

Step 2	`configure terminal`
	
	Example:
	`Router# configure terminal`
		Enters global configuration mode and specifies that the console terminal will be the source of the configuration commands.

	Command or Action	Purpose
Step 3	**hw-module slot** *slot-number* { **pos** | **srp** } **no hw-module slot** *x* { **pos** | **srp** } **Example:** `Router# hw-module slot 3 pos`	Assigns the mode of operation to the interfaces. To change the mode of operation for the pairs of interface modules, first issue the **no** form of this command prior to setting it to the new mode. Refer to the **hw-module slot pos** command topic for additional command reference information. **Note** The **hw-module slot** *x* **pos** command must be issued for each interface module you want to set into POS mode. Dual-interface modules are not required for POS. **Note** The **hw-module slot** *x* **srp** command need be issued only on the odd slot of the pair.
Step 4	**card** *slot/port* {**1oc48dpt-pos-1**} **Example:** `Router# card 3/0 1oc48dpt/pos-1`	Preprovisions a slot in the Cisco uBR10012 router for a particular interface module. To remove the preprovisioning for a card, so that the physical slot reports being empty, use the **no** form of this command. **Note** Two adjacent slots must be preprovisioned to support a pair of OC-48 DPT/POS interface modules. Refer to the **card** command topic for additional command reference information.

Step 5	**copy running-config startup-config**
	
	Example:
	`Router# copy running-config`
	`startup-config`
	`[OK]`
	`Router#`
		Writes the new configuration to nonvolatile random access memory (NVRAM).
		
		The system displays an OK message when the configuration has been stored.

> ✎
> **Note** The **card** command allows system administrators to plan for future configurations, without having to wait for the physical hardware to first arrive. When the line card does arrive, the installer can bring the card online by inserting the card into the chassis and connecting the necessary cables, without having to do any further configuration using the command-line interface.

> ✎
> **Note** The type of card must be appropriate for the slot being specified. Note that 1choc12-1, 1oc12atm-1, and 6cht3-1 line cards are not supported on the Cisco uBR10012 router.

Examples

This section provides the following out put examples:

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POS Interface Preprovision Example with card Command

The following example shows a list of supported card types for Cisco IOS 12.3(9a)BC, and then shows that slot 3/0/0 is being preprovisioned for a Cisco uBR-LCP2-MC28C cable interface line card. The POS interface for slot 3/0/0 can then be configured.

```
Router(config)# card 3/0 ?

  1cable-mc14c      create a uBR10000 line card with MC14C
  1cable-mc16c      create a uBR10000 line card with MC16C
  1cable-mc16e      create a uBR10000 line card with MC16E
  1cable-mc16s      create a uBR10000 line card with MC16S
  1choc12-1         create a CHOC12_1_PORT cardtype
  1gigethernet-1    create a GE_1_PORT cardtype
  1oc12atm-1        create a OC12ATM_1_PORT cardtype
  1oc12pos-1        create a OC12POS_1_PORT cardtype
  1oc48dpt-pos-1    create a uBR10000 oc48 SRP/POS card
  2cable-mc26bnc    create a uBR10000 line card with MC26C, BNC connector
  2cable-mc26c      create a uBR10000 line card with MC26C
  2cable-mc28bnc    create a uBR10000 line card with MC28C, BNC connector
  2cable-mc28c      create a uBR10000 line card with MC28C
  2cable-tccplus    Utility Card
  2oc12srp-mm       create a uBR10000 oc12 SRP card with MM
  2oc12srp-sm-ir    create a uBR10000 oc12 SRP card with SM IR
  2oc12srp-sm-lr    create a uBR10000 oc12 SRP card with SM LR
  2oc12srp-sm-xr    create a uBR10000 oc12 SRP card with SM XR
  5cable-mc520s     create a uBR10000 line card with MC520S
  5cable-mc520s-bnc create a uBR10000 line card with MC520S-BNC
  5cable-mc520s-d   create a uBR10000 line card with MC520S-D
  6cht3-1           create a CT3_6_PORT cardtype
  ubr10k-clc-5x20s  create a uBR10000 line card with MC520S

Router(config)# card 3/0 1oc48dpt-pos-1
```

POS Interface Preprovision Examples with show interface pos Command

The following example shows the output from the **show interface** command for a preprovisioned POS interface in slot 1. The second line of the output shows hardware status.

Note When using the **show interface pos** or **show interface srp** commands to display information about the interface, be aware that the byte counters used for these commands are 32-bit counters with a maximum size of approximately 4.3 billion. These counters could wrap back to 0 if the Cisco OC-48 DPT∕ POS interface module is passing large amounts of traffic.

```
Router# show interface POS 1/0/0

POS1/0/0 is administratively down, line protocol is down
POS2/0/0 is reset, line protocol is down
  Hardware is not present
  Hardware is Skystone 4402 Sonet Framer
  MTU 4470 bytes, BW 622000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive set (10 sec)
  Scramble disabled
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 10:12:57
  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 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
            0 packets output, 0 bytes, 0 underruns
            0 output errors, 0 collisions, 0 interface resets
            0 output buffer failures, 0 output buffers swapped out
            0 carrier transitions
```

The following output displays system information when the OC-48 DPT∕ POS interface module has been inserted and configured in slot 4:

```
Router# show interface pos 4/0/0

POS4/0/0 is up, line protocol is up
  Hardware is Skystone 4402 Sonet Framer
  Internet address is 20.0.0.2/8
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 23/255, rxload 23/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive not set
  Scramble disabled
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 10:08:58
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  10 minute input rate 233831000 bits/sec, 235702 packets/sec
  10 minute output rate 233831000 bits/sec, 235702 packets/sec
     4281192169 packets input, 2586851424 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
     4281192797 packets output, 2587060701 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
Router#
```

SRP Interface Preprovision Example with show interface srp Command

The following example shows the output from the **show interface srp** command for a preprovisioned SRP interface module in slot 1/0/0:

```
Router# show interface s1/0/0

SRP1/0/0 is administratively down, line protocol is down
  Hardware is SRP over SONET, address is 0000.0048.2222 (bia 0005.00e1.44c0)
  Internet address is 48.1.1.2/24
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SRP2,
  Side A: loopback not set
  Side B: loopback not set
     3 nodes on the ring    MAC passthrough set    <== Passthrough mode
     Side A: not wrapped    IPS local: IDLE        IPS remote: IDLE
     Side B: not wrapped    IPS local: IDLE        IPS remote: IDLE
  Last input 00:00:12, output 00:00:12, output hang never
  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)
  Side A: 30 seconds output rate 0 bits/sec, 0 packets/sec
          30 seconds input rate 0 bits/sec, 0 packets/sec
  Side B: 30 seconds output rate 0 bits/sec, 0 packets/sec
          30 seconds input rate 0 bits/sec, 0 packets/sec
     51469 packets input, 2182080 bytes, 0 no buffer
     Received 0 broadcasts, 2 runts, 0 giants, 0 throttles
     5 input errors, 0 CRC, 0 frame, 0 overrun, 3 ignored, 0 abort
     56834 packets output, 3981898 bytes, 0 underruns
     0 output errors, 0 collisions, 5 interface resets
     0 output buffer failures, 0 output buffers swapped out
     Side A received errors:
        4 input errors, 0 CRC, 3 ignored,
        1 framer runts, 0 framer giants, 0 framer aborts,
        0 mac runts, 0 mac giants, 0 mac aborts
     Side B received errors:
        1 input errors, 0 CRC, 0 ignored,
        1 framer runts, 0 framer giants, 0 framer aborts,
        0 mac runts, 0 mac giants, 0 mac aborts
```

Configuring POS Interfaces on the Cisco OC-48 DPT⁄ POS Interface Module

This section provides procedures and configuration examples to configure the Cisco OC-48 DPT⁄ POS interface module. The command-line interface (CLI) allows you to configure and display parameters for both the DPT and the SONET/SDH framer.

This section contains the following required and optional subsections:

- Default Values in POS Mode for the Cisco OC-48 DPT⁄ POS Interface Module (optional)
- Configuring the Cisco OC-48 DPT⁄ POS Interface Modules for POS (required)
- SUMMARY STEPS (required)
- DETAILED STEPS (required)
- Examples (optional)

Default Values in POS Mode for the Cisco OC-48 DPT⁄ POS Interface Module

Table 2 lists default values for the Cisco OC-48 DPT⁄ POS interface module in POS mode. The table includes the command used for modifying a default value and indicates whether a value needs to be the same (or opposite) on the remote end of the connection.

For additional command information, refer to additional POS topics in this document and to the *Cisco IOS CMTS Cable Command Reference Guide*.

Table 2   OC-48 POS Line Card SONET Defaults

Parameter	Configuration Command Syntax	Default Setting
flag	**pos flag [c2	j0	s1s0]**	J0 -1, C2- 0xCF, s1s0- 0
framing	**pos framing [sonet	sdh]**	sonet
report	**pos report [all	b1-tca	b2-tca	b3-tca	lais	lrdi	pais	plop	prdi	sd-ber	sf-ber	slof	slos]**	SF SLOS SLOF B1-TCA B2-TCA PLOP B3-TCA
threshold	**pos threshold [b1-tca	b2-tca	b3-tca	sd-ber	sf-ber]**	b1-tca, b2-tca and b3-tca: 6 sd-ber: 6 sf-ber: 3
scramble-atm	**[no] pos scramble-atm**	No scrambling
crc	**crc [16	32]**	32
encapsulation	**encapsulation [hdlc	ppp]**	hdlc
clock source	**clock source [line	internal]**	line
keepalive	**keepalive** *period*	10

Configuring the Cisco OC-48 DPT∕ POS Interface Modules for POS

The following procedure is for creating a basic configuration, enabling a POS interface, and specifying IP routing. You might also need to enter other configuration commands, depending on the requirements of your system configuration.

A Cisco uBR10012 router identifies a POS interface address by its line-card slot number and port number, in the format *slot/subslot/port*. For example, the *slot/subslot/port* address of an POS interface on a Cisco OC-48 DPT∕ POS interface module installed in line card slot 3, subslot 0 and port 0 is 3/0/0.

Perform the following steps to initially configure two Cisco OC-48 DPT∕ POS interface modules in slot 3 and slot 4 of a Cisco uBR10012 router.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **hw-module slot** *number* **pos**
4. **ip routing**
5. **interface pos** *slot/subslot/port*
6. **ip address** *ip-address mask*
7. **clock source** {**internal** | **line**}
8. **no cdp enable**
9. **pos flag** { **c2** *value* | **j0** *value* | **s1s0** }
10. **pos framing** { **sonet** | **sdh** }
11. **pos report** *option*
12. **pos scramble-atm**
13. **pos threshold** *options*
14. **Ctrl+Z**
15. **copy running-config startup-config**
16. **show interface pos** *slot/subslot/port*

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 2	`configure terminal`
	
	Example:
	`Router# configure terminal`
		Enters global configuration mode and specifies that the console terminal will be the source of the configuration commands.

Step 3	`hw-module slot` *number* `pos`
	
	Example:
	`Router(config)# hw-module slot 3 pos`
	`Router(config)# end`
		Brings up each Cisco OC-48 DPT∕ POS interface module.
		
		Note The **hw-module slot** *x* **pos** command must be issued for each interface module you want to set into POS mode.
		
		Note Dual interface modules are not required for POS.
		
		Refer to the **hw-module slot pos** command reference topic for additional command syntax information.

	Command or Action	Purpose

Step 4	`ip routing`
	
	Example:
	`Router# ip routing`
		Enable IP routing by entering the **ip routing** command in global configuration mode.

Step 5	`interface pos` *slot/subslot/port*
	
	Example:
	`Router(config)# interface pos 3/0/0`
	`Router(config-if)#`
		At the prompt, specify the new interface to configure by entering the **interface** command, followed by the *type* (**pos**), and *slot/subslot/port* (slot number/subslot number/port number).

Step 6	`ip address` *ip-address mask*
	
	Example:
	`Router(config-if)# ip address 10.0.0.1`
	`255.255.255.0`
	`Router(config-if)#`
		Assigns an IP address and subnet mask to the POS interface.

Step 7	`clock source {internal	line}`  **Example:** `Router(config)# interface pos 1/0/0` `Router(config-if)# clock source line`	Verify that the default value for the clock source is correct. At the prompt, set the internal or line clock source by using the **clock source** command. The default is clock source internal.

Step 8	`no cdp enable`
	
	Example:
	`Router(config-if)# no cdp enable`
		Turns off the Cisco Discovery Protocol (CDP) in interface configuration mode.
		
		Note Cisco uBR10012 routers do not require CDP.

Step 9	`pos flag { c2` *value* `| j0` *value* `| s1s0 }`
	
	Example:
	`Router(config)# interface pos 5/0/0`
	`Router(config-if)# pos flag c2 0xCF`
		To select the POS flag, enter the **pos flag** *options* interface configuration command with the desired command options. This command is typically used to meet a standards requirement or to ensure interoperability with another vendor's equipment.
		
		For additional command syntax information, refer to the **pos flag** command reference section.

Step 10	`pos framing { sonet	sdh }`  **Example:** `Router(config-if)# pos framing sonet`	To select framing, enter the **pos framing** interface configuration command. For additional command syntax information, refer to the **pos framing** command reference section.
Step 11	`pos report` *option* **Example:** `Router1(config-if)# pos report all`	To select a POS alarm report, enter the **pos report** *option* interface configuration command. For additional command syntax information, refer to the **pos report** command reference section.

Step 12	`pos scramble-atm`
	
	Example:
	`Router(config)# interface pos 5/0/0`
	`Router(config-if)# pos scramble-atm`
		Set the line card to scramble the POS synchronous payload envelope (SPE) using the **pos scramble-atm** command. SONET payload scrambling applies a self-synchronous scrambler to the SPE of the interface to ensure sufficient bit transition density. The default is no POS SPE scrambling. Use the **no** form of the command to disable scrambling.
		
		For additional command syntax information, refer to the **pos scramble-atm** command reference section.

	Command or Action	Purpose
Step 13	**pos threshold** *options* **Example:** `Router(config-if)# pos threshold b1-tca sf-ber 3`	To select POS alarm thresholds, enter the **pos threshold** interface configuration command. **Note** Default values follow: • 6 for b1-tca, b2-tca, b3-tca, and sd-ber • 3 for sf-ber

Step 14	`Ctrl-Z`
	
	Example:
	`Router(config-if)# Ctrl-Z`
		When you have included all of the configuration commands to complete the configuration, press **Ctrl-Z** (press the Control key while you press Z) to exit configuration mode.

Step 15	**copy running-config startup-config**
	
	Example:
	`Router# copy running-config startup-config`
	`[OK]`
	`Router#`
		Writes the new configuration to nonvolatile random access memory (NVRAM).
		
		The system displays an OK message when the configuration has been stored.

Step 16	**show interface pos** *slot*/*subslot*/*port*
	
	Example:
	`Router# show interface pos 3/0/0`
	`POS3/0/0 is up, line protocol is up`
	`.`
	`.`
	`.`
		Use the **show interface pos** *slot*/*subslot*/*port* command to monitor stages of the Cisco IOS download to the line cards.
		
		For additional command information, refer to the **show interface pos** command reference section.

Note When the Cisco IOS software is successfully downloaded, the LED status on the interface module faceplate is "IOS RUN."

Examples

This section provides the following output examples:

• Cisco OC-48 DPT∕ POS Interface Module POS Configuration Example

Cisco OC-48 DPT∕ POS Interface Module POS Configuration Example

Use the **show interface pos** *slot*/*subslot*/*port* command to display the status of the POS requests.

Note When using the **show interface pos** or **show interface srp** commands to display information about the interface, be aware that the byte counters used for these commands are 32-bit counters with a maximum size of approximately 4.3 billion. These counters could wrap back to 0 if the Cisco OC-48 DPT∕ POS interface module is passing large amounts of traffic.

```
Router# show interface pos 3/0/0

POS3/0/0 is up, line protocol is up
  Hardware is Skystone 4402 Sonet Framer
  Internet address is 50.0.0.2/8
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
      reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive not set
  Scramble disabled
  Last input 00:00:32, output never, output hang never
  Last clearing of "show interface" counters 12:04:52
  Input queue: 0/0/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     725 packets input, 247950 bytes, 0 no buffer
     Received 725 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     733 packets output, 247717 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

Configuring SRP Interfaces on the Cisco OC-48 DPT∕ POS Interface Module

This section provides procedures and configuration examples to configure the Cisco OC-48 DPT∕ POS interface module. The command-line interface (CLI) is provided to configure and display parameters for both the DPT and the SONET/SDH framer.

This section contains the following procedures:

Default Values in SRP Mode for the Cisco OC-48 DPT∕ POS Interface Module

Table 3 lists default values for the Cisco OC-48 DPT∕ POS interface module in SRP mode. The table includes the command used for modifying a default value and indicates whether a value needs to be the same (or opposite) on the remote end of the connection.

For additional command information, refer to additional POS topics in this document and to the *Cisco IOS CMTS Cable Command Referenc Guide*.

Table 3   Cisco OC-48 DPT∕ POS Interface Module Configuration Default Values for SRP Mode

Parameter	Configuration Command	Default Value
Cisco Discovery Protocol (CDP)	**[no] cdp enable**	cdp enable
Framing	**srp framing {sdh	sonet} [a	b]**	SONET OC-48c
Bandwidth	**[no] bandwidth** *Gbps*	2.5 Gbps
SONET overhead	**srp flag {c2	j0	s1s0}** *value* **[a	b]**	c2 set to 0x16; j0 set to 0xCC; s1s0 set to 0
Clock source	**srp clock-source {internal	line} [a	b]**	Internal SRP clock source.

Configuring the Cisco OC-48 DPT∕ POS Interface Modules for SRP

The following procedure is for creating a basic configuration, enabling an SRP interface, and specifying IP routing. You might also need to enter other configuration commands depending on the requirements of your system configuration.

The Cisco uBR10012 router identifies an SRP interface address by its line-card slot number and port number, in the format *slot/port*. For example, the *slot/port* address of an SRP interface on a Cisco OC-48 DPT∕ POS interface module installed in line card slot 3, subslot 0 and port 0 is 3/0/0.

Note Both Cisco OC-48 DPT∕ POS interface modules in the pair must be configured to support SRP. You must execute the **hw-module slot** *n* **srp** command in privileged EXEC mode to enable the paired modules. Refer to the "Preconfiguring the Slots for the Cisco OC-48 DPT∕ POS Interface Module" section on page 5.

When two Cisco OC-48 POS/DPT interface modules are to be configured for SRP mode, they must be inserted in slot pairs (1 and 2) or (3 and 4). The line cards are referenced as side A and side B. One interface exists for the two line cards and the layer. The SRP protocol determines which line card on which the interface transmits data, and this is dependent upon the ring topology. The interface resides on the lower slot of the SRP line card pair. Therefore, all configuration commands are referenced using the lower slot number.

✎ **Note** Side A is automatically the left-most (odd-numbered) slot of the pair of Cisco OC-48 DPT⁄ POS interface modules. The SRP interface cannot reside on an even-numbered slot number.

Perform the following steps to configure two Cisco OC-48 DPT⁄ POS interface modules in slot 3 and slot 4 of a Cisco uBR10012 router for the first time.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **hw-module slot** *slot-number* **srp**
4. **end**
5. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 2	`configure terminal`
	
	Example:
	`Router# configure terminal`
		Enters global configuration mode and specifies that the console terminal will be the source of the configuration commands.

Step 3	`hw-module slot `*slot-number*` srp`
	`no hw-module slot `*x*` srp`
	
	Example:
	`Router(config)# hw-module slot 3 srp`
		Assigns the mode of operation to the interfaces. To change the mode of operation for the pairs of interface modules, first issue the **no** form of this command prior to setting it to the new mode (**srp**).
		
		Note The **hw-module slot** *x* **srp** command need be issued only on the odd slot of the pair.
		
		For additional command syntax information, refer to the **hw-module slot srp** command reference section.

Step 4	`end`
	
	Example:
	`Router(config)# end`
	`Router#`
		Returns you to privileged EXEC mode.

Step 5	`copy running-config startup-config`
	
	Example:
	`Router# copy running-config`
	`startup-config`
	`[OK]`
	`Router#`
		Writes the new configuration to nonvolatile random access memory (NVRAM). The system displays an OK message when the configuration has been stored.

Configuring the Interface to Support SRP

The following procedure is for creating a basic configuration—enabling an interface and specifying IP routing. You might also need to enter other configuration commands, depending on the requirements of your system configuration.

A Cisco uBR10012 router identifies an interface address by its line-card slot number and port number, in the format *slot/port*. For example, the slot/port address of an interface on a Cisco OC-48 DPT∕ POS interface module installed in line card slot 1 and chassis port 0 is 1/0. Even though the card contains only one port, you must use the *slot/port* notation.

Use the **configure terminal** command to enter the configuration mode if you want to change the default configuration values on the Cisco OC-48 DPT∕ POS interface module. Be prepared with the information you will need, such as the IP address (see Table 3).

Use the following procedure to configure the Cisco OC-48 DPT∕ POS interface module. Press the **Return** key after each configuration step, unless otherwise noted.

SUMMARY STEPS

1. **enable**
2. **show version**
3. **show interface srp** *slot/subslot/port*
4. **configure terminal**
5. **ip routing**
6. **interface srp slot/subslot/port**
7. **ip address ip-address mask**
8. **srp clock-source line n**
9. **no cdp enable**
10. **srp framing**
11. **srp topology-timer**
12. **srp tx-traffic-rate**
13. **srp priority-map transmit**
14. **srp priority-map transmit value**
15. Additional interface configurations, as required
16. **Ctrl-Z**
17. **copy running-config startup-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**show version** **Example:** Router# show version	Confirms that the system recognizes the cards. For sample output, refer to the **show version** command reference section.
Step 3	**show interface srp** *slot/subslot/port* **Example:** Router# show interface srp 3/0/0 Router#	Check the status of each port using the **show interface srp** command in global configuration mode. For sample output, refer to the **show interface srp** command reference section.
Step 4	**configure terminal** **Example:** Router# configure terminal Router(config)#	Enters global configuration mode and specifies that the console terminal will be the source of the configuration commands.
Step 5	**ip routing** **Example:** Router(config)# ip routing Router(config)#	Enables IP routing.
Step 6	**interface srp** *slot/subslot/port* **Example:** Router(config)# interface srp 3/0/0 Router(config-if)#	Specifies the new interface to configure, followed by interface *type* (**srp**), and *slot/subslot/port* (line card slot number/subslot number/port number).
Step 7	**ip address** *ip-address mask* **Example:** Router(config-if)# ip address 10.0.0.1 255.255.255.0 Router(config-if)#	Assigns an IP address and subnet mask to the SRP interface.
Step 8	**srp clock-source line** *n* **Example:** Router(config-if)# srp clock-source line a Router(config-if)# Router(config-if)# srp clock-source line b Router(config-if)#	Verifies that the default value for the clock source is correct, where *n* is the source line. The default setting is **clock source internal**. Typically, when two Cisco uBR10012 routers are connected back to back, or are connected over dark fiber, where no external clocking is available, set the clock source on each device to **internal**. If a router is connected to a SONET/SDH add/drop multiplexer (ADM), configure the clock-source for the clock source line on side A and side B.

	Command or Action	Purpose

Step 9	`no cdp enable`
	
	Example:
	`Router(config-if)# no cdp enable`
		Turns off the Cisco Discovery Protocol (CDP) in interface configuration mode.
		
		Note Cisco uBR10012 routers do not require CDP.

Step 10	`srp framing`
	
	Example:
	`Router1(config-if)# srp framing sdh`
	`Router1(config-if)#`
		Selects SRP framing for the interface.

Step 11	`srp topology-timer`
	
	Example:
	`Router1(config-if)# srp topology-timer 60`
	`Router1(config-if)#`
		Sets the topology timer frequency in seconds for the specified interface.
		
		Note Cisco recommends that all nodes on the SRP ring have the same wait-to-restore, topology timer and IPS values.

Step 12	`srp tx-traffic-rate`
	
	Example:
	`Router1(config-if)# srp tx-traffic-rate high 622`
	`Router1(config-if)# srp tx-traffic-rate low 1866`
		Defines the amount of high and low priority traffic a node can transmit onto the SRP ring. For additional command syntax information, refer to the srp TX-traffic-rate command reference section.

Step 13	`srp priority-map transmit`
	
	Example:
	`Router1(config-if)# srp priority-map transmit 5`
	`Router1(config-if)#`
		Controls which IP packets get queued in the high and low priority transmit queues, with precedence values of 5 to 7 to be queued in the high priority transmit queue, and precendence values of 0 to 4 to be queued in the low priority transmit queue.
		
		The **no** form of this command removes the **tx-traffic-rate** from the configuration.

Step 14	`srp priority-map transmit` *value* **Example:** `Router(config-if)# srp priority-map transmit 5`	Maps SRP packets to a specific SRP priority (greater than or equal to the value setting to the high priority queue). **Note** The **no** form of this command sets the default mapping to 6.
Step 15	Additional interface configurations.	Add any other interface configurations as you require, such as enabling routing protocols or adjusting interface characteristics.
Step 16	`Ctrl-z` **Example:** Ctrl-Z	When you have included all of the configuration commands to complete the configuration, enter **^Z** (press the Control key while you press Z) to exit configuration mode.

Step 17	`copy running-config startup-config`
	
	Example:
	`Router# copy running-config startup-config`
	`[OK]`
	`Router#`
		Writes the new configuration to nonvolatile random access memory (NVRAM).
		
		The system displays an OK message when the configuration has been stored.

Configuring the SRP IPS Command Options

This section explains how to use **srp ips** command options to insert switches or remove automatic and user-configured switches:

- Automatic SRP IPS modes take effect when the DPT ring detects an event, fiber cut, or node failure. The SRP IPS modes remain in effect until the default wait-to-restore (wtr) value expires.

- User-configured SRP IPS modes take effect as soon as you enter the commands. The SRP IPS modes remain in effect until you override it with an SRP IPS request with higher priority, or enter the **no** form of the SRP IPS request to negate the command.

Note Before any physical manipulation to the line card, add an **srp ips request forced-switch** to the side of the ring that is to be changed.

For example, you can enter a forced-switch command to force data traffic to one side of the ring when a Cisco OC-48 DPT∕ POS interface module is removed from a router slot, or in response to an event. Table 4 provides an explanation of the SRP IPS requests in the order of priority, from highest to lowest.

Table 4　　　*Explanation of SRP IPS Modes*

SRP IPS Request	Explanation
Forced-Switch	Adds a high-priority protection switch wrap on each end of a specified span by entering the **srp ips request forced-switch** command.
Manual-Switch	Adds a low-priority protection switch wrap on each end of a specified span by entering the **srp ips request manual-switch** command.

If a protection switch is requested for a given span on the ring, the node that receives the protection request issues a protection request to the node on the other end of the span using both the short path over the failed span, as the failure may be unidirectional, and the long path, around the ring.

As the protection requests travel around the ring, the protection hierarchy is applied. For example, if a high-priority signal fail (SF) request enters the ring, it overrides a pre-existing lower-priority signal degrade (SD) request. If an event or a user-configured command enters a low-priority request, it is not allowed if a high-priority request is present on the ring.

Note An exception is that multiple signal fail and forced-switch requests can coexist on the SRP ring.

All protection switches are performed bidirectionally and enter wraps at both ends of a span for transmit and receive directions, even if a failure is only unidirectional.

To enter user-configured SRP IPS requests when they are needed, perform the following steps.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface srp** *slot/subslot/port*
4. **srp ips request manual-switch** or **no srp ips request forced-switch**
5. **srp ips wait-to-restore timer** *seconds*
6. **srp ips timer** *seconds*
7. **end**
8. **copy running-config startup-config**
9. **show srp** *slot/subslot/port*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** Router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** Router# configure terminal	Enters global configuration mode.
Step 3	**interface srp** *slot/subslot/port* **Example:** Router(config)# **interface srp 1/0/0** Router(config-if)#	Specifies the new SRP interface to configure. The prompt changes to interface configuration mode.
Step 4	**srp ips request manual-switch** or **no srp ips request forced-switch** **Example:** Router(config-if)# srp ips request manual-switch a Router(config-if)# or Router(config-if)# srp ips request forced-switch a Router(config-if)#	Enters a user-configured manual-switch or forced-switch wrap. • To enter a manual-switch wrap, enter the **srp ips request manual-switch** interface configuration command and specify side A or side B. The manual switch wrap will disappear when the default wait-to-restore expires. **Note** A manual-switch does not appear in the **show running configuration** command output. • To enter a forced-switch wrap state, enter the **srp ips request forced-switch** interface configuration command and specify side A or side B. To disable a forced-switch wrap, enter the **no srp ips request forced-switch** interface configuration command and specify side A or side B. **Note** A forced-switch will override a signal degrade.
Step 5	**srp ips wait-to-restore timer** *seconds* **Example:** Router(config-if)# srp ips wtr-timer 60	Sets a non-default value of the wait-to-restore request in *seconds*. **Note** All nodes on the SRP ring should have the same wait-to-restore timer, topology timer and IPS values.
Step 6	**srp ips timer** *seconds* **Example:** Router(config-if)# srp ips timer 30 Router(config-if)#	Sets a non-default value for the frequency of IPS messages to display. Specify the value in *seconds*.
Step 7	**end** **Example:** Router(config-if)# end Router#	Type **end** until you return to the privileged EXEC mode.

	Command or Action	Purpose

Step 8	`copy running-config startup-config`
	
	Example:
	`Router# copy running-config`
	`startup-config`
	`[OK]`
	`Router#`
		Writes the new configuration to nonvolatile random access memory (NVRAM).
		
		The system displays an OK message when the configuration has been stored.

Step 9	`show srp` *slot/subslot/port*
	
	Example:
	`Router# show srp 1/0/0`
	`Router#`
		Use the **show srp** *slot/subslot/port* EXEC command to display the status of the SRP IPS requests.

Examples

The following example illustrates configuration for a Cisco uBR10012 router with SRP interfaces in slot 1/subslot 0/port 0.

```
Router# show running-config interface srp 1/0/0

ip address 10.0.0.1 255.255.255.0
no shutdown
no cdp enable
no ip mroute-cache
```

Configuring SDCC Interfaces on the Cisco OC-48 DPT∕ POS Interface Module

This section describes how to configure and activate SDCC network interfaces to permit remote management and interoperability with the Cisco OC-48 DPT∕ POS interface module.This topic lists the commands that are available when you configure a SONET Section Data Communications Channel (SDCC) interface on the router.

Note   The Cisco OC-48 DPT∕ POS interface module allows for SONET Section Data Communications Channel (SDCC) in either POS or SRP modes.

Perform the following steps to enable, configure and verify the SDCC interface.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **sdcc enable**
4. **interface sdcc** *slot/subslot/port* then **no shutdown**
5. **loopback**
6. **crc { 16 | 32 }**

7. **mtu** *mtu bytes*

8. **hold-queue** *number* **in**

9. **Ctrl-Z**

10. **show interface sdcc** *slot/subslot/port*

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		• Enter your password if prompted.

Step 2	`configure terminal`
	
	Example:
	`Router# configure terminal`
		Enters global configuration mode.

Step 3	`sdcc enable`
	
	Example:
	`Router(config)# sdcc enable`
	`.`
	`.`
	`.`
		You must first enable the SDCC interface configuration mode before attempting to configure any SDCC commands. The **sdcc enable** command enables SDCC configuration on the router in global configuration mode. The default setting is disabled.
		
		⚠ **Caution** If you enter the **no sdcc enable** command after configuring an SDCC interface, the interface is removed from the interface list in the configuration.
		
		Refer to the "sdcc enable" section on page 47 for complete command information and example.

Step 4	`interface sdcc` *slot/subslot/port*
	
	then
	
	`no shutdown`
	
	Example:
	`Router(config)# interface sdcc 8/0/0`
	`Router (config-if)# no shutdown`
		To administratively enable an SDCC interface, use the **no shutdown** command from the interface configuration prompt for the specified interface. The default state of an SDCC interface is adminstratively up.

Step 5	`interface sdcc` *slot/subslot/port*
	
	Example:
	`Router(config)# interface sdcc 2/0/0`
	`Router(config-if)#`
		Prepares for SDCC interface configuration by selecting an interface, where *slot* is 1 to 4, *subslot* is 0, and *port* is 0.

	Command or Action	Purpose

Step 6	`loopback`
	[`no`] `loopback`
	
	Example:
	`Router(config-if)# loopback`
		Configures an SDCC interface for an internal loopback test in interface configuration mode. With an internal loopback, packets that are received by the line card from the Route Processor are looped back to the Route Processor without being sent to the line.
		
		Use the **no** form of the command to stop the loopback test.
		
		The default setting is none.

Step 7	`crc { 16	32 }`  **Example:** `Router(config-if)# crc 16`	Configures the CRC size for HDLC encapsulation on an SDCC interface to 16 or 32 bits. For command syntax information and configuration examples, refer to the **crc** command reference section. • **16**—Sets the CRC to 16 bits. • **32**—Sets the CRC to 32 bits. The default setting is 32.
Step 8	`mtu` *mtu bytes* **Example:** `Router(config-if)# mtu 1000`	Configures the Maximum Transmission Unit (MTU) that a particular interface can handle (in bytes). The default setting is 1500. **Note** The MTU size does not include the 4 bytes for the HDLC header, or the 2 or 4 bytes of the CRC. For additional command syntax information and configuration examples, refer to the **mtu** command reference section.

Step 9	`hold-queue` *number* `in`
	
	Example:
	`Router(config-if)# hold-queue 60 in`
		Configures a hold queue on an SDCC interface for packets received from the line. For additional command syntax information and configuration examples, refer to the **hold-queue** command reference section.

Step 10	`Ctrl-Z`
	
	Example:
	`Router(config-if)# ^Z`
		When you have included all of the configuration commands to complete the configuration, enter **^Z** (press the Control key while you press Z) to exit configuration mode.

Step 11	`show interface sdcc` *slot/subslot/port*
	
	Example:
	`Router# show interface sdcc2/0/0`
	`SDCC2/0/0 is up, line protocol is up`
		Verifies an SDCC interface configuration on a Cisco uBR10012 router.
		
		For additional display information about the **show interface sdcc** command, refer to the "show interface sdcc" section on page 61.

r

Additional References

Related Documents

Related Topic	Document Title
Cisco uBR10012 Router Installation and Configuration	• *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide* http://www.cisco.com/en/US/docs/cable/cmts/ubr10012/installation/guide/hig.html • *Cisco uBR10012 Universal Broadband Router Software Configuration Guide* http://www.cisco.com/en/US/docs/cable/cmts/ubr10012/configuration/guide/scg.html • *Cisco uBR10012 Universal Broadband Router Software Features* http://www.cisco.com/en/US/products/hw/cable/ps2209/tsd_products_support_series_home.html • *Cisco uBR10000 Series Universal Broadband Router Release Notes* http://www.cisco.com/en/US/products/hw/cable/ps2209/prod_release_notes_list.html • *Cisco Cable Modem Termination System Feature Guide* http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/cmtsfg.html
Cisco OC-48 DPT/ POS Interface Module Installation	• *Cisco uBR10012 OC-48 DPT/POS Interface Module* http://www.cisco.com/en/US/docs/cable/cmts/ubr10012/installation/field_replaceable_units/ub_oc48.html • *Installing the Cisco uBR10012 OC-48 DPT/POS Interface Module* http://www.cisco.com/en/US/docs/cable/cmts/ubr10012/installation/field_replaceable_units/ub_oc48.html
High Availability (N+1 Redundancy)	• *N+1 Tips and Configuration for the Cisco uBR10012 Router with the Cisco uBR10-MC5x20S Cable Interface Line Card* http://www.cisco.com/en/US/products/hw/cable/ps2209/prod_tech_notes_list.html • *Cisco CMTS Feature Guide*: "N+1 Redundancy for the Cisco Cable Modem Termination System" http://www.cisco.com/en/US/docs/cable/cmts/feature/guide/uFGnpls1.html
Packet Over SONET (POS)	• *Troubleshooting "Line Protocol is Down" Problems on POS Interfaces* http://www.cisco.com/en/US/tech/tk482/tk607/technologies_white_paper09186a0080094699.shtml

Standards

Standards
- DOCSIS ITU J.112 standard and ITU J.83 Annex B
- CableLabs ECR; RFI-R-98036

MIBs

No new or modified MIBs are supported by this feature. To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

RFCs

No new or modified RFCs are supported by this feature.

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/cisco/web/support/index.html

Command Reference

This section describes the following Cisco IOS commands and messages that pertain to the configuration and monitoring of the Cisco OC-48 DPT∕ POS interface module:

- card
- crc
- hold-queue
- hw-module slot pos
- hw-module slot srp
- loopback
- mtu
- pos flag
- pos framing
- pos report
- pos scramble-atm
- sdcc enable
- show controller pos
- show controllers cable
- show controllers sdcc
- show controllers srp
- show diag
- show interface pos
- show interface sdcc
- show interface srp
- show protocols
- show running-config
- show srp
- show srp ips
- show srp rate-limit
- show srp topology
- show version
- srp clock-source
- srp flag
- srp framing
- srp ips request forced-switch
- srp ips request manual-switch
- srp ips timer
- srp ips wts-timer
- srp loopback
- srp priority-map
- srp shutdown
- srp topology-timer
- srp TX-traffic-rate

card

To preprovision a slot in the Cisco uBR10012 router for a particular interface card, so that you can configure the interface without it being physically present in the slot, use the **card** command in global configuration mode. To remove the preprovisioning for a card, so that the physical slot reports being empty, use the **no** form of this command.

> **card** *slot*/*port* {**1cable-mc16c** | **1cable-mc16e** | **1gigethernet-1** | **1oc12pos**-1 | **2cable-mc28bnc** | **2cable**-**mc28c** | **2oc12srp-sm-lr**}

> **no card** *slot*/*port*

Syntax Description

slot	Cisco CMTS chassis slot number for the card. The valid range is 1 to 8.
port	Cisco CMTS port number for the card. The valid values are 0 or 1, depending on the slot number.
1cable-mc16c	Preprovisions a slot for a Cisco uBR-LCP-MC16C or Cisco uBR-LCP2-MC16C cable interface line card.
1cable-mc16e	Preprovisions a slot for a Cisco uBR-LCP-MC16E or Cisco uBR-LCP2-MC16E cable interface line card.
1gigethernet-1	Preprovisions a slot for a Cisco uBR10-1GE Gigabit Ethernet (GE) uplink line card.
1oc12pos-1	Preprovisions a slot for a Cisco uBR10-1OC12/P-SMI OC-12 POS uplink line card.
1oc48dpt-pos-1	Preprovisions a slot for a Cisco OC-48 DPT⁄ POS interface module.
2cable-mc28bnc	Preprovisions a slot for a Cisco uBR-LCP-MC28C-BNC or Cisco uBR-LCP2-MC28C-BNC cable interface line card.
2cable-mc28c	Preprovisions a slot for a Cisco uBR-LCP-MC28C or Cisco uBR-LCP2-MC28C cable interface line card.
2oc12srp-sm-lr	Preprovisions a slot for a Cisco uBR10-SRP-OC12SML DPT WAN uplink line card.

Note The list of supported card types depends on the Cisco IOS software release being used. See the release notes for your release for the complete list of cards that are supported.

Defaults An empty card slot is not preprovisioned and cannot be configured or displayed.

Command Modes Global configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT⁄ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   This command preprovisions a slot in the Cisco uBR10012 router to accept a particular line card, so that you can configure the interface without the card being physically present in the chassis. This command allows system administrators to plan for future configurations, without having to wait for the physical hardware to first arrive. When the line card does arrive, the installer can bring the card online by inserting the card into the chassis and connecting the necessary cables, without having to do any further configuration using the command-line interface.

The type of card must be appropriate for the slot being specified. Slots 1/0 through 4/0 are reserved for network uplink line cards. Slot 5/0 through 8/1 are reserved for cable interface line cards. Slot 0/0 is reserved for the FastEthernet interface on the PRE1 module and cannot be specified in this command.

Tip   When a card has been preprovisioned and is not physically present in the chassis, the show interface command for that slot displays the message "Hardware is not present." Some show commands might also list the preprovisioned card in their displays.

Examples   The following example shows a list of supported card types for Cisco IOS Release 12.2(8)BC1, and then shows that slot 8/0 is being preprovisioned for a Cisco uBR-LCP2-MC28C cable interface line card. The cable interface for slot 8/0 can then be configured.

```
Router# config t

Router(config)# card 5/0 ?

1cable-mc16c create a uBR10000 line card with MC16C
1cable-mc16e create a uBR10000 line card with MC16E
1gigethernet-1 create a GE_1_PORT cardtype
1oc12pos-1 create a OC12POS_1_PORT cardtype
2cable-mc28bnc create a uBR10000 line card with MC28C, BNC connector
2cable-mc28c create a uBR10000 line card with MC28C
2oc12srp-sm-lr create a uBR10000 oc12 SRP card with SM LR
Router(config)# card 8/0 2cable-mc28c

Router(config)# int c8/0

Router(config-if)#
```

The following example shows the output from the **show interface** command for a preprovisioned cable interface. The second line of the output shows that the hardware is not present.

```
Router# show interface c8/0/0

Cable8/0/0 is initializing, line protocol is down
Hardware is not present
Hardware is UBR10000 CLC, address is 0001.6440.d160 (bia 0001.6440.d160)
MTU 1500 bytes, BW 27000 Kbit, DLY 1000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation MCNS, loopback not set
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, 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
Queueing strategy: fifo
Output queue :0/40 (size/max)
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
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
0 output buffer failures, 0 output buffers swapped out
Router#
```

For additional command information, refer to the *Cisco IOS CMTS Cable Command Reference Guide*.

crc

To configure the cyclic redundancy check (CRC) size for high-level data link control (HDLC) encapsulation on a cable interface, and to improve data integrity, use the **crc** command in interface configuration mode. To disable this feature, use the **no** form of this command.

crc { 16 | 32 }

no crc { 16 | 32 }

Syntax Description		
16	Sets the CRC to 16 bits.	
32	Sets the CRC to 32 bits. The default setting is 32.	

Defaults The CRC size is set to 32 bits by default.

Command Modes Interface configuration mode (cable interface only)

Command History	Release	Modification
	12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
	12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples The following two **show interface** command examples illustrate the configuration of CRC on POS interfaces:

```
Router# show interface pos2/0/0

POS2/0/0 is up, line protocol is up
  Hardware is Skystone 4402 Sonet Framer
  Internet address is 10.13.1.1/24
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive not set
  Scramble disabled
  Last input never, output 00:00:08, output hang never
  Last clearing of "show interface" counters 00:04:14
  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 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, 4 runts, 0 giants, 0 throttles
     741 input errors, 479 CRC, 0 frame, 3 overrun, 255 ignored, 0 abort
     7 packets output, 2591 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
     1 carrier transitions
```

```
Router# show interface p3/0/0

POS3/0/0 is initializing, line protocol is down
  Hardware is unresponsive or is initializing
  Hardware is Skystone 4402 Sonet Framer
  Internet address is 11.1.1.2/24
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive set (10 sec)
  Scramble disabled
  Last input never, output never, output hang never
  Last clearing of "show interface" counters 00:00:33
  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 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
     0 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

The following two **show interface** command examples illustrate the configuration of CRC on SRP interfaces:

```
Router# show interface srp3/0/0

SRP3/0/0 is up, line protocol is up
  Hardware is SRP over SONET, address is 0001.6381.1324 (bia 0001.6381.1324)
  Internet address is 10.3.1.1/24
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SRP2,      Side A loopback not set    Side B loopback not set
     0 nodes on the ring   MAC passthrough not set
     Side A: not wrapped   IPS local: IDLE       IPS remote: IDLE
     Side B: not wrapped   IPS local: IDLE       IPS remote: IDLE
  Last input 00:00:01, output 00:00:01, output hang never
  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)
  Side A: 30 seconds output rate 53 bits/sec, 0 packets/sec
          30 seconds input rate 0 bits/sec, 0 packets/sec
  Side B: 30 seconds output rate 0 bits/sec, 0 packets/sec
          30 seconds input rate 0 bits/sec, 0 packets/sec
     20 packets input, 768 bytes, 0 no buffer
     Received 0 broadcasts, 59 runts, 0 giants, 0 throttles
     81 input errors, 20 CRC, 0 frame, 0 overrun, 0 ignored, 2 abort
     77 packets output, 8087 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 output buffer failures, 0 output buffers swapped out
     Side A received errors:
        38 input errors, 10 CRC, 0 ignored,
        23 framer runts, 0 framer giants, 0 framer aborts,
        4 mac runts, 0 mac giants, 1 mac aborts
     Side B received errors:
        43 input errors, 10 CRC, 0 ignored,
        30 framer runts, 0 framer giants, 0 framer aborts,
        2 mac runts, 0 mac giants, 1 mac aborts
```

```
Router# show interface srp3/0/0

SRP3/0/0 is up, line protocol is up
  Hardware is SRP over SONET, address is 0002.0002.0002 (bia 0005.00e6.57a0)
  Internet address is 11.1.1.2/24
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SRP2,      Side A loopback not set   Side B loopback not set
     2 nodes on the ring   MAC passthrough not set
     Side A:     wrapped   IPS local: IDLE      IPS remote: IDLE
     Side B: not wrapped   IPS local: SF        IPS remote: IDLE
  Last input 00:00:01, output 00:00:00, output hang never
  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)
  Side A: 5 minutes output rate 0 bits/sec, 0 packets/sec
          5 minutes input rate 0 bits/sec, 0 packets/sec
  Side B: 5 minutes output rate 0 bits/sec, 0 packets/sec
          5 minutes input rate 0 bits/sec, 0 packets/sec
     2703700 packets input, 489982906 bytes, 0 no buffer
     Received 0 broadcasts, 13 runts, 5 giants, 0 throttles
     107 input errors, 87 CRC, 0 frame, 0 overrun, 0 ignored, 2 abort
     3345501 packets output, 509236961 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 output buffer failures, 0 output buffers swapped out
     Side A received errors:
        4 input errors, 2 CRC, 0 ignored,
        0 framer runts, 2 framer giants, 0 framer aborts,
        0 mac runts, 0 mac giants, 0 mac aborts
     Side B received errors:
        103 input errors, 85 CRC, 0 ignored,
        13 framer runts, 3 framer giants, 1 framer aborts,
        0 mac runts, 0 mac giants, 1 mac aborts
```

The following two **show interface** command examples illustrate the configuration of CRC on SDCC interfaces:

```
Router# show interface sdcc3/0/0

SDCC3/0/0 is up, line protocol is up
  Hardware is M8260/SKY4402
  Internet address is 10.13.30.1/24
  MTU 1500 bytes, BW 192 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive set (10 sec)
  Last input 00:00:01, output 00:00:01, output hang never
  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 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     30 packets input, 2515 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
     33 packets output, 3764 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 output buffer failures, 0 output buffers swapped out
     3 carrier transitions
```

```
Router# show interface sdcc 3/0/0

SDCC3/0/0 is up, line protocol is up
  Hardware is M8260/SKY4402
  Internet address is 10.57.1.1/24
  MTU 1500 bytes, BW 192 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive set (10 sec)
  Last input 00:00:05, output 00:00:03, output hang never
  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 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     137 packets input, 10762 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
     139 packets output, 11282 bytes, 0 underruns        <--------------
     0 output errors, 0 collisions, 1 interface resets
     0 output buffer failures, 0 output buffers swapped out
     1 carrier transitions
```

hold-queue

To configure a hold queue on an SDCC interface for packets received from the line, use the **hold-queue** command in SDCC interface configuration mode.

hold-queue *number* **in**

Syntax Description		
number		The maximum number of packets that the line card will hold in the hold queue, from zero to 80. The default hold queue size is 40 packets.

Defaults

The default hold queue size is set to 40 packets by default.

Command Modes

Interface configuration mode (cable interface only)

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

The following example sets the hold queue at 60 packets for the selected SDCC interface.

```
Router> enable
Router# config t
Router(config)# interface sdcc3/0/0
Router(config-if)# hold-queue 60 in
```

hw-module slot pos

To configure a line card slot for Packet over SONET (POS) operation, use the **hw-module slot pos** command in global configuration mode. To remove the configuration for a line card slot, use the **no** form of this command.

> **hw-module slot** *slot-number* **pos**

> **no hw-module slot** *slot-number* **pos**

Syntax Description	*slot slot-number*	Resets the line cards that are physically present in the specified slot number. Valid range is 1 to 8.
	pos	Keyword is required to set the slot for POS.

Defaults Line card slots are not defined, by default, and must be set to either POS or SRP mode.

Command Modes Global configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines You must first use the **hw-module slot pos** command to preconfigure a line card slot for POS operation of the Cisco uBR10012 OC-48 DPT card before you can configure the card with any further commands. You must also use the card 1oc48dpt-pos-1 command to configure the card slot for the proper card type.

✎

Note If you have previously used the **hw-module slot srp** command to configure line card slots for Spatial Reuse Protocol (SRP) operation, you must first cancel that configuration using the **no hw-module slot srp** command before you can configure the slots for POS operation using the **hw-module slot pos** command.

Examples The following example shows the Cisco uBR10012 OC-48 DPT line card in slot 3 being configured for POS operation:

```
Router(config)# hw-module slot 3 pos

Router(config)# card 3/0 1oc48dpt-pos-1
```

The following example shows the Cisco uBR10012 OC-48 DPT line cards in slots 3 and 4 being reconfigured from SRP operation to POS operation:

```
Router(config)# no hw-module slot 3 srp

Router(config)# no hw-module slot 4 srp

Router(config)# hw-module slot 3 pos

Router(config)# card 3/0 1oc48dpt-pos-1

Router(config)# hw-module slot 4 pos

Router(config)# card 4/0 1oc48dpt-pos-1
```

hw-module slot srp

To configure a line card slot for Spatial Reuse Protocol (SRP) operation, use the **hw-module slot srp** command in global configuration mode. To remove the configuration for a line card slot, use the **no** form of this command.

> **hw-module** *slot slot-number* **srp**

> **no hw-module** *slot slot-number* **srp**

Syntax Description		
	slot slot-number	The physical slot in which the line card is located. Valid range is from 1-8. Start with the left-most interface module, or side A.
	srp	Allocates the selected slot to support SRP mode. In SRP mode there is one interface for each pair of interface modules (1/0/0 and 2/0/0 or 3/0/0 and 4/0/0). The interface resides on the odd slot of the pair and is referenced as such.

Defaults   Line card slots are not defined, by default, and must be set to either POS or SRP mode.

Command Modes   Global configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT⁄ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.
12.2(33)SCB	This command is obsolete.

Usage Guidelines   You must first use the **hw-module slot srp** command to preconfigure a line card slot for SRP operation of a pair of Cisco uBR10012 OC-48 DPT cards before you can configure the cards with any further commands. You must also use the **card 1oc48dpt-pos-1** command to configure each card slot for the proper card type.

Tip   The Cisco uBR10012 OC-48 DPT line cards support SRP operation only when installed in adjacement odd- and even-numbered slots (such as slots 1 and 2 or 3 and 4). You need to use the **hw-module slot srp** command only for the lower-numbered (odd-numbered) slot to preconfigure both slots of the SRP pair.

Note   If you have previously used the hw-module slot pos command to configure line card slots for Packet over SONET (POS) operation, you must first cancel that configuration using the **no hw-module slot pos** command before you can configure the slots for POS operation using the **hw-module slot srp** command.

Examples   The following example shows the Cisco uBR10012 OC-48 DPT line cards in slots 1 and 2 being configured for POS operation:

```
Router(config)# hw-module slot 1 srp
Router(config)# card 1/0/0 1oc48dpt-pos-1
Router(config)# card 2/0/0 1oc48dpt-pos-1
```

The following example shows the Cisco uBR10012 OC-48 DPT line cards in slots 3 and 4 being reconfigured from POS operation to SRP operation:

```
Router(config)# no hw-module slot 3 pos
Router(config)# no hw-module slot 4 pos
Router(config)# hw-module slot 3 srp
Router(config)# card 3/0/0 1oc48dpt-pos-1
Router(config)# card 4/0/0 1oc48dpt-pos-1
```

loopback

To enable loopback testing on an SDCC interface, in which data is transmitted from the PRE1 or PRE2 module to the OC-48 line card and back, use the **loopback** command in interface configuration mode. To stop a loopback test, use the **no** form of this command.

> **loopback** [**line** | **internal**]
>
> [**no**] **loopback** [**line** | **internal**]

Syntax Description		
line		This keyword loops the packets received from the line back onto the line at the line card level without being processed in the Route Processor.
internal		This keyword loops the packets received from the route processor back into the line card to the route processor without being sent to the line.

Defaults Loopback testing is disabled by default.

Command Modes Interface configuration mode

Command History	Release	Modification
	12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
	12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples In the following example, a loopbacktest is set for the OC-48 DPT∕ POS line card in slot 5:

```
Router(config)# interface pos 5/0/0
Router(config-if)# loopback line
```

For more information about troubleshooting with loopback testing, refer to the *Cisco uBR10012 Universal Broadband Router Performance Routing Engine Module* on Cisco.com:

> http://www.cisco.com/en/US/docs/interfaces_modules/cable/performance_routing_engine/installation/guide/pre5096.html

mtu

To define the Maximum Transmission Unit (MTU) that a particular interface can handle (in bytes), use the **mtu** command in interface configuration mode.

mtu *mtu bytes*

Syntax Description	*mtu bytes*	The MTU size in bytes from zero to 1500.
	Note	The MTU size does not include the four bytes for the HDLC header, or the two or four bytes of the CRC.

Defaults

The default setting is 1500 bytes.

Command Modes

Global configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

The following **show interface** command example illustrates an MTU byte size of 1500:

```
Router# show interface sdcc3/0/0

SDCC3/0/0 is up, line protocol is up
  Hardware is M8260/SKY4402
  Internet address is 10.13.30.1/24
  MTU 1500 bytes, BW 192 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive set (10 sec)
  Last input 00:00:01, output 00:00:01, output hang never
  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 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     30 packets input, 2515 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
     33 packets output, 3764 bytes, 0 underruns
     0 output errors, 0 collisions, 2 interface resets
     0 output buffer failures, 0 output buffers swapped out
     3 carrier transitions
```

pos flag

To assign values for specific elements of the SONET frame header and corresponding overhead, use the **pos flag** command in interface configuration mode. This command is typically used to meet a standards requirement or to ensure interoperability with another vendor's equipment. To restore the default values, use the **no** form of this command.

pos flag [**c2** *value*] [**j0** *value*] [**s1s0** *value*]

[**no**] **pos flag** [**c2** *value*] [**j0** *value*] [**s1s0** *value*]

Syntax Description		
c2 *value*	Path signal identifier, with *value* being one of the following:	
	• 0xCF for PPP or HDLC without scrambling	
	• 0x16 for PPP or HDLC with scrambling	
j0 *value*	Section trace byte, with *value* being 0x01 for interoperability with some Synchronous Digital Hierarchy (SDH) devices in Japan.	
s1s0 *value*	Part of the payload pointer byte, and value is 0 for OC-3c and 2 for AU-4.	

Defaults

The default values are as follows:

- **c2** value is set to 0xCF.
- **j0** value is set to 0x01.
- **s1s0** value is set to 0.

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

In the following example, the c2 bit is set to 0xCF.

```
Router(config)# interface pos 4/0/02
Router(config-if)# pos flag c2 0xCF
```

pos framing

To set framing to SONET Optical Carrier (OC) or SDH STM, use the **pos framing** command in interface configuration mode. To restore the default framing mode, use the **no** form of the command.

> **pos framing** [**sdh** | **sonet**]

> [**no**] **pos framing**

Syntax Description

sdh	Selects SDH framing.
sonet	Selects SONET framing (default).

One difference between SONET and SDH framing is the value of the s0 and s1 bits (s is for size), which are bits 5 and 6 in SONET's H1 byte. SDH uses these bits to form the Administrative Unit (AU) field. The ITU-T G.709 standard (or G.707, which combines G.707, G.708, and G.709) describe the AU pointer. There are two major AU types, listed below:

- AU-3—Operates in similar fashion to three sets of H1, H2 and H3 pointers in channelized STS-3 frames.

- AU-4—Operates in similar fashion to a single set of pointers in Synchronous Transport Signal-3c (STS-3c) concatenated frames.

The s1s0 bits or flag is unused in SONET. A transmitting POS interface configured with SONET framing sends ss = 00; a receiving SONET device ignores these bits, because they are used to indicate payload mapping type information—which is communicated using other fields. A POS interface configured with SDH framing typically sends ss = 10.

The following table illustrates well-known values for these bits.

Binary Value	Description
00	SONET
11	Reserved
01	Used in older add/drop multiplexers (ADMs).
10	AU3/4. Most implementations in Europe use 3.

Defaults

The framing is set to SONET by default.

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT⁄ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

In the following example, the framing type is set to SONET:

```
Router(config)# interface pos 5/0/1

Router(config-if)# no pos framing
```

pos report

To permit console logging of selected SONET alarms, use the **pos report** command in interface configuration mode.

> **pos report** {**b1-tca** | **b2-tca** | **b3-tca** | **lais** | **lrdi** | **pais** | **plop** | **prdi** | **plm-p** | **sd-ber** | **sf-ber** | **slof** | **slos** | **uneq-p**}

Syntax Description

The alarms are as follows:

b1-tca	B1 bit error rate [BER] threshold crossing alarm
b2-tca	B2 BER threshold crossing alarm
b3-tca	B3 BER threshold crossing alarm
lais	Line alarm indication signal
lrdi	Line remote defect indication
pais	Path alarm indication signal
plop	Path loss of pointer
prdi	Path remote defect indication
plm-p	Payload label, C2 mismatch alarm
sd-ber	LBIP BER in excess of threshold
sf-ber	Signal failure BER
slof	Section loss of frame
slos	Section loss of signal
uneq-p	Sath unequipped C2 alarm

Defaults

The following errors are reported by default:

- **b1-tca**
- **b2-tca**
- **b3-tca**
- **sf-ber**
- **slof**
- **slos**

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   Reporting an alarm means that the alarm can be logged to the console. Just because an alarm is permitted to be logged does not guarantee that it is logged. SONET alarm hierarchy rules dictate that only the most severe alarm of an alarm group is reported. Whether an alarm is reported or not, you can view the current state of a defect by checking the "Active Defects" line from the **show controller pos** command output. A defect is a problem indication that is a candidate for an alarm.

For B1, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B1 byte of the following frame. Differences indicate that section level bit errors have occurred.

For B2, the bit interleaved parity error report is calculated by comparing the BIP-8/24 code with the BIP-8 code extracted from the B2 byte of the following frame. Differences indicate that line level bit errors have occurred.

For B3, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B3 byte of the following frame. Differences indicate that path level bit errors have occurred.

PAIS is sent by line terminating equipment (LTE) to alert the downstream path terminating equipment (PTE) that it has detected a defect on its incoming line signal.

PLOP is reported as a result of an invalid pointer (H1, H2) or an excess number of new data flag (NDF) enabled indications.

SLOF is detected when a severely error framing (SEF) defect on the incoming SONET signal persists for 3 milliseconds.

SLOS is detected when an all-zeros pattern on the incoming SONET signal lasts 19 plus or minus 3 microseconds or longer. This defect might also be reported if the received signal level drops below the specified threshold.

To determine the alarms that are reported on the interface, use the show controllers pos command.

Examples   The following example enables reporting of SD-BER and LAIS alarms on the interface:

```
Router(config)# interface pos 3/0/0

Router(config-if)# pos report sd-ber

Router(config-if)# pos report lais

Router(config-if)# end

Router#
```

Related Commands

Command	Description
interface	Defines the IP addresses of the server, configures an interface type, and enters interface configuration mode.
show controller pos	Displays information about the POS controllers.

pos scramble-atm

To enable SONET payload scrambling, use the **pos scramble-atm** command in interface configuration mode. To disable SONET payload scrambling, use the **no** form of this command.

> **pos scramble-atm**
>
> **no pos scramble-atm**

Syntax Description This command has no additional keywords or arguments.

Defaults POS scrambling is disabled by default.

Command Modes Global configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples To enable SONET payload scrambling, use the following command sequence:

```
Router(config)# interface pos 3/0/0

Router(config-if)# pos scramble-atm

Router(config-if)# no shutdown

Router(config-if)# end
```

To verify that SONET payload scrambling is enabled on an interface, enter the **show running-config** command. If scrambling is enabled, the following line is displayed in the interface configuration:

```
pos scramble-atm
```

pos threshold

To set the bit error rate (BER) threshold values of the specified alarms for a POS interface, use the **pos threshold** command in interface configuration mode. To return to the default setting, use the **no** form of this command.

> **pos threshold** {**b1-tca** | **b2-tca** | **b3-tca** | **sd-ber** | **sf-ber**} *rate*
>
> **no pos threshold** {**b1-tca** | **b2-tca** | **b3-tca** | **sd-ber** | **sf-ber**} *rate*

Syntax Description   Options include:

b1-tca	Sets B1 BER threshold crossing alarm.
b2-tca	Sets B2 BER threshold crossing alarm.
b3-tca	Sets B3 BER threshold crossing alarm.
sd-ber	Sets Signal Degrade BER threshold.
sf-ber	Sets Signal Fail BER threshold.
rate	Bit error rate from 3 to 9 (10-n).

Defaults   Default values follow:

- 6 for b1-tca, b2-tca, b3-tca, and sd-ber
- 3 for sf-ber (that is, 10e-3)

Command Modes   Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   For B1, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B1 byte of the following frame. Differences indicate that section level bit errors have occurred.

For B2, the bit interleaved parity error report is calculated by comparing the BIP-8/24 code with the BIP-8 code extracted from the B2 byte of the following frame. Differences indicate that line level bit errors have occurred.

For B3, the bit interleaved parity error report is calculated by comparing the BIP-8 code with the BIP-8 code extracted from the B3 byte of the following frame. Differences indicate that path level bit errors have occurred.

SF-BER and SD-BER are sourced from B2 BIP-8 error counts (as is B2-TCA). However, SF-BER and SD-BER feed into the APS machine and can lead to a protection switch (if APS is configured).

B1-TCA, B2-TCA, and B3-TCA do nothing more than print a log message to the console (if reports for them are enabled).

To determine the BER thresholds configured on the interface, use the show controllers pos command.

Examples

The following example configures thresholds on the interface:

```
Router(config)# interface pos 3/0/0
Router(config-if)#  pos threshold sd-ber 8
Router(config-if)#  pos threshold sf-ber 4
Router(config-if)#  pos threshold b1_tca 4
Router(config-if)# end

Router#
```

The following example returns the POS sf-ber threshold back to the default (of 3).

```
Router(config-if)# pos threshold b1-tca sf-ber 3
```

sdcc enable

To enable SDCC before configuring additional SDCC interface settings, use the **sdcc enable** command in global configuration mode. To disable SDCC mode on the interface and to remove the SDCC interface from the interface list in the configuration, use the **no** form of this command.

> **sdcc enable**

> **no sdcc enable**

Note This command must be used before configuring any additional SDCC interface settings.

Syntax Description This command requires no additional keywords or arguments.

Defaults TheSDCC mode is disabled by default.

Command Modes Global configuration mode.

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples The following example enables SDCC on the Cisco uBR10012 router, and then enters SDCC interface configuration mode:

```
Router(config)# sdcc enable

*Sep 17 15:01:31.047: %LINK-3-UPDOWN: Interface SDCC3/0/0, changed state to up
*Sep 17 15:01:31.047: %SNMP-5-LINK_UP: LinkUp:Interface SDCC3/0/0 changed state to up
*Sep 17 15:01:31.047: %LINK-3-UPDOWN: Interface SDCC4/0/0, changed state to up
*Sep 17 15:01:31.047: %SNMP-5-LINK_UP: LinkUp:Interface SDCC4/0/0 changed state to up
*Sep 17 15:01:32.047: %LINEPROTO-5-UPDOWN: Line protocol on Interface SDCC3/0/0, changed
state to up
*Sep 17 15:01:32.047: %LINEPROTO-5-UPDOWN: Line protocol on Interface SDCC4/0/0, changed
state to up
Router(config)# interface sdcc
```

Note After enabling SDCC, you make additional SDCC configurations using interface configuration mode with the **interface sdcc** command.

Related Commands For additional commands and procedures for configuring SDCC interface settings, refer to the "Configuring SDCC Interfaces on the Cisco OC-48 DPT/ POS Interface Module" section on page 22.

show controllers cable

To display information about the interface controllers for a cable interface on the Cisco universal broadband router, use the **show controllers cable** command in privileged EXEC mode.

show controllers cable {*slot/port* | *slot/subslot/port*} [**downstream** | **upstream** [*port*]]

Syntax Description		
	slot/port	Cable interface and downstream port on the Cisco uBR7100 series and Cisco uBR7200 series routers.
	slot/subslot/port	Cable interface on the Cisco uBR10012 router. The following are the valid values:
		• slot—5 to 8
		• subslot—0 or 1
		• port—0 to 4 (depending on the cable interface)
	downstream	(Optional) Displays downstream interface status.
	upstream	(Optional) Displays upstream interface status.
	port	(Optional) Desired upstream port. Valid values start with 0 for the first upstream port on the cable interface line card.

Defaults   This command has no default behavior or values.

Command Modes   Privileged EXEC mode

Command History	Release	Modification
	12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
	12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples   The following is sample output from the **show controllers cable upstream** command for a Cisco CMTS router with a cable interface card located in slot 4, port 0:

```
Router# show controllers cable 4/0 upstream 2

Cable4/0 Upstream 2 is administratively down
Frequency 5.008 MHz, Channel Width 0.200 MHz, QPSK Symbol Rate 0.160 Msps
Spectrum Group 4
SNR 27.2340
Nominal Input Power Level 5 dBmV, Tx Timing Offset 0
Ranging Backoff Start 16, Ranging Backoff End 16, Tx Backoff Start 16
Tx Backoff End 16, Modulation Profile Group 1
part_id=0x3137, rev_id=0x01, rev2_id=0xFF
nb_agc_thr=0x0000, nb_agc_nom=0x0000
Range Load Reg Size=0x58
Request Load Reg Size=0x0E
Minislot Size in number of Timebase Ticks is = 8
Minislot Size in Symbols =8
Bandwidth Requests = 0x0
Piggyback Requests = 0x0
Invalid BW Requests= 0x0
Minislots Requested= 0x0
Minislots Granted = 0x0
Minislot Size in Bytes = 2
UCD Count = 0
DES Ctrl Reg#0 = C00C0C43, Reg#1 = 0
```

Table 5 describes the fields shown in the **show controllers cable upstream** display.

Table 5   show controllers cable upstream Command Field Descriptions

Field	Description
Cable	Slot number and port number indicating the location of the Cisco cable interface line card.
Upstream is up/administratively down	Administrative state of the upstream (whether it is shutdown or not).
Frequency	Transmission frequency of the RF upstream channel. **Note** Cisco cable interface line cards always program the upstream's center frequency in 16-KHz increments, and this is the frequency displayed by the lines added to the router's configuration and by the **show controllers cable upstream** command. For example, if you use the **cable upstream frequency** command to specify a center frequency of 27 MHz (cable upstream x frequency 27000000), the actual center frequency will be 27.008 MHz, which is the next highest 16-KHz boundary.
Channel Width	Width of the RF upstream channel.
QPSK Symbol Rate	Modulation technique for upstream transmission.
Spectrum Group 4	Spectrum group associated with this slot and port.
SNR	Estimate for the overall signal-to-noise ratio (SNR) for the upstream.
Nominal Input Power level	Desired power level coming into the receiver.
Tx Timing Offset	Largest ranging offset reported by cable modems on the upstream.
Ranging Backoff Start	Number of ranging slots to back off before resending the ranging bursts after an upstream collision. Expressed as exponents of 2. See also "Ranging Backoff End."
Ranging Backoff End	Number of ranging slots to back off before resending the ranging bursts after an upstream collision. Expressed as exponents of 2. Also see Ranging Backoff Start.
Tx Backoff Start	Starting exponential backoff value for data collisions.
Tx Backoff End	Ending exponential backoff value for data collisions.
Modulation Profile Group	Set of burst profiles defining an upstream range.
part_id=	Part number of the PHY chip. FFFF means the PHY chip is turned off.
rev_id=	PHY chip revision number.
rev2_id=	PHY chip subrevision number.
nb_agc_thr=	Threshold used to control gain.
nb_agc_nom=	Used to accelerate convergence of input power level.
Range Load Reg Size=	Size, indicated by number of symbols, for range request bursts.
Request Load Reg Size=	Size, indicated by number of symbols, for request bursts.
Minislot Size in number of Timebase Ticks is	Size in tick units of upstream minislot. A tick is 6.25 microseconds.

Table 5   show controllers cable upstream Command Field Descriptions (continued)

Field	Description
Minislot Size in Symbols	Size in symbols of the upstream minislot.
Bandwidth Requests	Number of successful bandwidth requests received in the contention minislots.
Piggyback Requests	Number of successful bandwidth requests piggybacked with regular data transmissions.
Invalid BW Requests	Number of invalid bandwidth (BW) requests. (An example of an invalid bandwidth request is a modem using a nonexistent service identifier (SID) to request bandwidth.
Minislots Requested	Total number of minislots requested.
Minislots Granted	Total number of minislots granted.
Minislot Size in Bytes	Size of the minislot in bytes.
UCD Count	Number of Upstream Channel Descriptors (UCDs) sent for this upstream.
DES Ctrl Reg # =	Interval data encryption standard (DES) controller register dump.

The following is sample output for the downstream connection for slot 3 on port 0 on Cisco CMTS router from the show controllers cable downstream command:

```
Router# show controllers cable 3/0/0 downstream

Cable 3/0/0 Downstream is up
Frequency not set, Channel Width 6 MHz, 64-QAM, Symbol Rate 5.056941 Msps
FEC ITU-T J.83 Annex A, R/S Interleave I=12, J=17
```

Table 6 describes the fields displayed by the show controllers cable downstream command.

Table 6   show controllers cable downstream Field Descriptions

Field	Description
Cable	Slot number/port number indicating the location of the Cisco cable interface line card.
Downstream is up	RF downstream interface is enabled.
Frequency	Transmission frequency of the RF downstream. (This information may not match the current transmission frequency, which is external on CMTS platforms that use an external upconverter.)
Channel Width	Width of the RF downstream channel.
QAM	Modulation scheme.
Symbol Rate	Transmission rate (in number of symbols per second).
FEC ITU-T	Motion Picture Experts Group (MPEG) framing standard.
R/S Interleave I/J	Indicates Reed Solomon framing based on ITU S.83-B.

show controller pos

To display details of the POS framer state, use the **show controller pos** command in privileged EXEC mode.

> **show controller pos** { *slot*/*subslot*/*port* | **details** | **pm** }

Syntax Description

slot/*subslot*/*port*	(Optional) Router slot and port number of a specific SRP interface; otherwise, the command displays information about all SRP interfaces in the router.
details	(Optional) All the details for the interface.
pm	SONET PM statistics.

Defaults
This command has no default behavior or values.

Command Modes
Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

```
Router# show controller pos 3/0/0

Redundancy Enabled on interface

Redundancy Summary (* denotes active channel):
  Primary card is active
 * POS3/0/0  Primary   Good
   POS4/0/0  Secondary  Good


POS3/0/0
SECTION
  LOF = 0          LOS   = 0                       BIP(B1) = 0
LINE
  AIS = 0          RDI   = 0        FEBE = 1127     BIP(B2) = 0
PATH
  AIS = 0          RDI   = 0        FEBE = 23       BIP(B3) = 0
  LOP = 0

Active Defects: None
Active Alarms:  None
Alarm reporting enabled for: SF SLOS SLOF B1-TCA B2-TCA PLOP B3-TCA

Framing: SONET
APS
  COAPS = 0        PSBF = 0
  State: PSBF_state = False
  ais_shut = FALSE
  Rx(K1/K2): 0x00/0x00  S1S0 = 0x02, C2 = 0xCF
```

```
Receive Clock is in Range

PATH TRACE BUFFER : STABLE
  Remote hostname : R7582-ubr10k-east
  Remote interface: POS3/0/0
  Remote IP addr  : 66.0.0.2
  Remote Rx(K1/K2): 0x00/0x00  Tx(K1/K2): 0x00/0x00

BER thresholds:  SF = 10e-3  SD = 10e-6
TCA thresholds:  B1 = 10e-6  B2 = 10e-6  B3 = 10e-6
Optics Type : Single Mode Short Reach


POS4/0/0
SECTION
  LOF = 0          LOS    = 0                          BIP(B1) = 0
LINE
  AIS = 0          RDI    = 0        FEBE = 0          BIP(B2) = 0
PATH
  AIS = 0          RDI    = 0        FEBE = 0          BIP(B3) = 0
  LOP = 0

Active Defects: None
Active Alarms:  None
Alarm reporting enabled for: SF SLOS SLOF B1-TCA B2-TCA PLOP B3-TCA

Framing: SONET
APS
  COAPS = 0        PSBF = 0
  State: PSBF_state = False
  ais_shut = FALSE
  Rx(K1/K2): 0x00/0x00  S1S0 = 0x00, C2 = 0xCF

Receive Clock is in Range

PATH TRACE BUFFER : STABLE
  Remote hostname : R7582-ubr10k-east
  Remote interface: POS4/0/0
  Remote IP addr  : 0.0.0.0
  Remote Rx(K1/K2): 0x00/0x00  Tx(K1/K2): 0x00/0x00

BER thresholds:  SF = 10e-3  SD = 10e-6
TCA thresholds:  B1 = 10e-6  B2 = 10e-6  B3 = 10e-6
Optics Type : Single Mode Short Reach

Router#
```

show controllers sdcc

To display Synchronous Optical Network (SONET) Data Communications Channel (SDCC) parameters for all interfaces on the router, use the **show controllers sdcc** command in privileged EXEC mode. To display the SDCC parameters for a specific interface, use *the slot/subslot/port* option.

show controllers sdcc {*slot*/*subslot*/*port*}

Syntax Description	*slot/subslot/port*	(Optional) Router slot, subslot and port number of a specific SDCC interface; otherwise, the command displays information about all SDCC interfaces in the router.

Defaults   This command has no default behavior or values.

Command Modes   Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples   The following example shows the display for interface 3/0/0:

```
Router# show controllers sdcc3/0/0

Interface SDCC3/0/0 (idb 0x64767AD4)
Hardware is M8260/SKY4402
Flowbit period is 16 and offset is 15
Slot is not in APS mode.  Slot is not APS active.

SCC Registers:
General [GSMR]=0x00000000:0x00000030, Protocol-specific [PSMR]=0x0800
Events [SCCE]=0x0000, Mask [SCCM]=0x0000, Status [SCCS]=0x03
Transmit on Demand [TODR]=0x0000, Data Sync [DSR]=0x7E7E
Interrupt Registers:
Config [SICR]=0x00000000, Pending [SIPNR]=0x00030000:0x00008000
Mask   [SIMR]=0x80007800:0x00E00010
Command register [CR]=0x29600000
Port A [PADIR]=0xFF43FC3F, [PAPAR]=0x00C00000, [PASOR]=0x00000000
       [PAODR]=0x00000000, [PADAT]=0x00C40100
Port B [PBDIR]=0x0FFCFFCF, [PBPAR]=0x008B0008, [PBSOR]=0x00880008
       [PBODR]=0x00000000, [PBDAT]=0x04B9CC80
Port C [PCDIR]=0x7F7CF3D3, [PCPAR]=0x00030C3C, [PCSOR]=0x00000010
       [PCODR]=0x00000000, [PCDAT]=0x80820C0C

SCC GENERAL PARAMETER RAM (at 0xAFF08100)
Rx BD Base [RBASE]=0x1E8, Fn Code [RFCR]=0x18
Tx BD Base [TBASE]=0x200, Fn Code [TFCR]=0x18
Max Rx Buff Len [MRBLR]=1512
Rx State [RSTATE]=0x180095B0, BD Ptr [RBPTR]=0x1E8
Tx State [TSTATE]=0x180016AC, BD Ptr [TBPTR]=0x200

SCC HDLC PARAMETER RAM (at 0xAFF08138)
```

```
CRC Preset [C_PRES]=0xFFFFFFFF, Mask [C_MASK]=0xDEBB20E3
Errors: CRC [CRCEC]=0, Aborts [ABTSC]=0, Discards [DISFC]=0
Nonmatch Addr Cntr [NMARC]=0
Retry Count [RETRC]=0
Max Frame Length [MFLR]=1508
Rx Int Threshold [RFTHR]=1, Frame Cnt [RFCNT]=1
User-defined Address 0000/0000/0000/0000
User-defined Address Mask 0x0000

Tx 492 frames (35075 bytes)
Rx 492 frames (37043 bytes)
Rx ring with 3 buffers at 0xAFF001E8:
00 buf=0xC08384 flags=9000 length=0
01 buf=0xC07D7C flags=9000 length=0
02 buf=0xC07774 flags=B000 length=0

Tx ring with 3 buffers at 0xAFF00200:
00 buf=0xC0B65C flags=0000 length=343
01 buf=0xC0B65C flags=0000 length=24
02 buf=0xC0B65C flags=2000 length=24
```

show controllers srp

To display information about the traffic on the side A and side B rings, use the
show controllers srp *slot*/*subslot*/*port* command in privileged EXEC mode.

> **show controllers srp** [*slot*/*subslot*/*port*] [**details**]

Syntax Description		
	slot/subslot/port	(Optional) Router slot, subslot and port number of a specific SRP interface; otherwise, the command displays information about all SRP interfaces in the router.
	details	Shows all the details for the interface.

Defaults   This command has no default behavior or values.

Command Modes   Privileged EXEC mode

Command History	Release	Modification
	12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
	12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   This command applies to SRP interfaces only.

Examples   The following example shows the line card in slot 3, subslot 0 and port 0.

```
Router# show controllers srp 3/0/0

Router1# show controllers srp 3/0/0
SRP3/0/0
SRP3/0/0 - Side A (Outer RX, Inner TX)
SECTION
LOF = 0 LOS = 0 BIP(B1) = 0
LINE
AIS = 0 RDI = 0 FEBE = 0 BIP(B2) = 0
PATH
AIS = 0 RDI = 0 FEBE = 0 BIP(B3) = 0
LOP = 0 NEWPTR = 0 PSE = 0 NSE = 0
Active Defects:None
Active Alarms: None
Alarm reporting enabled for:SLOS SLOF PLOP
Framing :SONET
RX SONET/SDH bytes:(K1/K2) = 0/0 S1S0 = 0 C2 = 0x16
TX SONET/SDH bytes:(K1/K2) = 0/0 S1S0 = 0 C2 = 0x16 J0 = 0xCC
Clock source :Internal
Framer loopback :None
Path trace buffer :Stable
Remote hostname :Router2
```

```
Remote interface:SRP3/0/0
Remote IP addr :10.1.2.2
Remote side id :B
BER thresholds: SF = 10e-3 SD = 10e-6
TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6
SRP1/0/0 - Side B (Inner RX, Outer TX)
SECTION
LOF = 0 LOS = 0 BIP(B1) = 0
LINE
AIS = 0 RDI = 0 FEBE = 0 BIP(B2) = 0
PATH
AIS = 0 RDI = 0 FEBE = 0 BIP(B3) = 0
LOP = 0 NEWPTR = 0 PSE = 0 NSE = 0
Active Defects:None
Active Alarms: None
Alarm reporting enabled for:SLOS SLOF PLOP
Framing :SONET
RX SONET/SDH bytes:(K1/K2) = 0/0 S1S0 = 0 C2 = 0x16
TX SONET/SDH bytes:(K1/K2) = 0/0 S1S0 = 0 C2 = 0x16 J0 = 0xCC
Clock source :Internal
Framer loopback :None
Path trace buffer :Stable
Remote hostname :Router4
Remote interface:SRP3/0/0
Remote IP addr :10.1.2.4
Remote side id :A
BER thresholds: SF = 10e-3 SD = 10e-6
TCA thresholds: B1 = 10e-6 B2 = 10e-6 B3 = 10e-6
Router2#
```

show diag

To display the revision-level information for a Cisco Cable Modem Termination System (CMTS) cable interface, use the **show diag** command in privileged EXEC mode.

show diag [*slot*]

Syntax Description

slot	(Optional) Identifies the Cisco CMTS chassis slot number to be displayed.

Defaults

This command has no default behavior or values.

Command Modes

Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

Following is an example of the **show diag** *slot* command for a Cisco OC-48 DPT/ POS interface module installed in slot 3/0.

```
Router# show diag 3/0

Slot/Subslot 3/0:
        1oc48dpt-pos-1 card, 1 port
        Card is full slot size
        Card is analyzed
        Card detected 10:07:51 ago
        Card uptime 0 days, 12 hours, 35 minutes, 39 seconds
        Card idle time 0 days, 10 hours, 36 minutes, 47 seconds
        Voltage status: 3.3V Nominal 2.5V Nominal
EEPROM contents, slot 3/0:
        Hardware Revision      : 1.0
        Top Assy. Part Number  : 800-12346-03
        Board Revision         : 12
        Deviation Number       : 0-0
        Fab Version            : 03
        PCB Serial Number      : CAB063313US
        RMA Test History       : 00
        RMA Number             : 0-0-0-0
        RMA History            : 00
        CLEI Code              :
        Unknown Field (type 02FF): FF FF FF FF FF FF FF FF
                                   FF FF FF FF FF FF FF FF
                                   FF FF FF FF FF FF FF FF
                                   FF FF FF FF FF FF FF FF
                                   FF FF FF FF FF FF FF FF
                                   FF FF FF FF FF FF FF FF
                                   FF FF FF FF FF FF FF FF
                                   FF FF FF FF FF FF FF
LCMON version, slot 3/0
        LCDOS (C10000 PowerQUICC-II Line Card MONitor Image Version 2 : Release
branch:c10k_lc_bgp_r
eorg 20011120:145454)
        Built by richv at Tue Nov 20 17:00:15 2001.
        Reset reason 0x00000003/0x2 (PRE hard reset).
```

```
Operational Image version, slot 3/0
        LCDOS (C10000 1 Port OC-48 Quicksilver Line Card Image : DEVELOPMENT BUILD
prampate-bb-cr1 /
vob/lcdos/obj-c10k-oc48srppos 101) major version 1037024976.
        Built by prampate at Mon Nov 11 09:29:41 2002.
```

show interface pos

To display information about the interface in POS mode, use the **show interface pos** command in privileged EXEC mode.

show interface pos *slot*/*subslot*/*port options*

✎
Note When using the **show interface pos** or **show interface srp** commands to display information about the interface, be aware that the byte counters used for these commands are 32-bit counters with a maximum size of approximately 4.3 billion. These counters could wrap back to 0 if the Cisco OC-48 DPT/ POS interface module is passing large amounts of traffic.

Syntax Description

slot/subslot/port	(Optional) Specifies the router slot and port number of a specific SRP interface; otherwise, the command displays information about all SRP interfaces in the router.

Options include:

accounting	Displays interface accounting information.
crb	Displays interface routing/bridging information.
dampening	Displays interface dampening information.
description	Displays the interface description.
irb	Displays interface routing/bridging information.
mac-accounting	Displays interface MAC accounting information.
mpls-exp	Displays interface MPLS experimental accounting information.
precedence	Displays interface precedence accounting information.
rate-limit	Displays interface rate-limit information.
summary	Displays a summary of interface information.
switching	Interface switching information.

Defaults This command has no default behavior or values.

Command Modes Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples Router# **show interface pos 3/0/0**

```
POS3/0/0 is up, line protocol is up
  Hardware is Skystone 4402 Sonet Framer
  Internet address is 50.0.0.2/8
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
```

```
     Keepalive not set
     Scramble enabled
     Last input 00:39:36, output never, output hang never
     Last clearing of "show interface" counters 13:12:56
     Input queue: 0/0/0/0 (size/max/drops/flushes); Total output drops: 0
     Queueing strategy: fifo
     Output queue :0/40 (size/max)
     5 minute input rate 0 bits/sec, 0 packets/sec
     5 minute output rate 0 bits/sec, 0 packets/sec
        754 packets input, 257868 bytes, 0 no buffer
        Received 754 broadcasts, 0 runts, 39 giants, 0 throttles
        0 input errors, 39 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
        803 packets output, 271017 bytes, 0 underruns
        0 output errors, 0 collisions, 1 interface resets
        0 output buffer failures, 0 output buffers swapped out
        1 carrier transitions
Router#
```

show interface sdcc

To verify a Synchronous Optical Network (SONET) Data Communications Channel (SDCC) interface configuration on a Cisco uBR10012 router, use the **show interface sdcc** command in privileged EXEC mode.

> **show interface sdcc** *slot/subslot/port options*

Syntax Description	

slot/subslot/port	(Optional) Router slot, subslot and port number of a specific SDCC interface; otherwise, the command displays information about all SDCC interfaces in the router.

Options include:

accounting	Interface accounting.
crb	Interface routing/bridging information.
dampening	Interface dampening information.
description	Interface description.
irb	Interface routing/bridging information.
mpls-exp	Interface MPLS experimental accounting information.
precedence	Interface precedence accounting information.
rate-limit	Interface rate-limit information.
summary	Summary of interface status information.
switching	Displays interface switching.

Defaults This command has no default behavior or values.

Command Modes Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

```
Router# show interface sdcc2/0/0

SDCC2/0/0 is up, line protocol is down
  Hardware is M8260/SKY4402
  MTU 1500 bytes, BW 192 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 32, loopback not set
  Keepalive set (10 sec)
  Last input never, output 00:00:06, output hang never
  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 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
   265 packets output, 10196 bytes, 0 underruns
   0 output errors, 0 collisions, 3 interface resets
   0 output buffer failures, 0 output buffers swapped out
   3 carrier transitions
```

show interface srp

To show information about a Spatial Reuse Protocol (SRP) interface, use the **show interfaces srp** command in privileged EXEC mode.

> **show interfaces srp** *slot*/*subslot*/*port options*

✎

Note When using the **show interface pos** or **show interface srp** commands to display information about the interface, be aware that the byte counters used for these commands are 32-bit counters with a maximum size of approximately 4.3 billion. These counters could wrap back to 0 if the Cisco OC-48 DPT∕ POS interface module is passing large amounts of traffic.

Syntax Description

slot/*subslot*/*port*	(Optional) Router slot and port number of a specific SRP interface; otherwise, the command displays information about all SRP interfaces in the router.

Options include:

accounting	Interface accounting information
crb	Interface routing/bridging information
dampening	Interface dampening information
description	Interface description
irb	Interface routing/bridging information
mac-accounting	Interface MAC accounting information
mpls-exp	Interface MPLS experimental accounting information
precedence	Interface precedence accounting information
rate-limit	Interface rate-limit information
summary	Summary of interface information
switching	Interface switching information

Defaults This command has no default behavior or values.

Command Modes Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples   Following is sample output from the **show interface srp** command for slot 1, subslot 0 and port 0 of a three-node SRP ring:

```
Router# sh interface s1/0/0

SRP1/0/0 is up, line protocol is up
  Hardware is SRP over SONET, address is 0000.0048.2222 (bia 0005.00e1.44c0)
  Internet address is 48.1.1.2/24
  MTU 4470 bytes, BW 2488000 Kbit, DLY 100 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation SRP2,
  Side A: loopback not set
  Side B: loopback not set
     3 nodes on the ring   MAC passthrough not set
     Side A: not wrapped   IPS local: IDLE      IPS remote: IDLE
     Side B: not wrapped   IPS local: IDLE      IPS remote: IDLE
  Last input 00:00:00, output 00:00:00, output hang never
  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)
  Side A: 30 seconds output rate 208540 bits/sec, 396 packets/sec
          30 seconds input rate 0 bits/sec, 0 packets/sec
  Side B: 30 seconds output rate 0 bits/sec, 0 packets/sec
          30 seconds input rate 0 bits/sec, 0 packets/sec
     21958 packets input, 3096506 bytes, 0 no buffer
     Received 0 broadcasts, 581 runts, 2 giants, 0 throttles
     2328 input errors, 1689 CRC, 0 frame, 0 overrun, 0 ignored, 56 abort
     2172087 packets output, 133956638 bytes, 0 underruns
     0 output errors, 0 collisions, 7 interface resets
     0 output buffer failures, 0 output buffers swapped out
     Side A received errors:
         220 input errors, 71 CRC, 0 ignored,
         115 framer runts, 0 framer giants, 2 framer aborts,
         25 mac runts, 0 mac giants, 7 mac aborts
     Side B received errors:
         2108 input errors, 1618 CRC, 0 ignored,
         403 framer runts, 2 framer giants, 15 framer aborts,
         38 mac runts, 0 mac giants, 32 mac aborts

### 400 packets through interface g4/0/0 network 218.1.1.1
```

show protocols

To display either the global (system-wide) or the interface-specific status of any configured Level 3 protocol, use the **show protocols** command in privileged EXEC mode.

> **show protocols** *options*

Syntax Description

slot/subslot/port	(Optional) Router slot and port number of a specific interface; otherwise, the command displays protocol information about all interfaces in the router.

Options include

Async	Async interface
BVI	Bridge-Group Virtual Interface
CTunnel	CTunnel interface
Cable	CMTS interface
Dialer	Dialer interface
Ethernet	IEEE 802.3
FastEthernet	Fast Ethernet IEEE 802.3
GigabitEthernet	Gigabit Ethernet IEEE 802.3z
Lex	Lex interface
Loopback	Loopback interface
MFR	Multilink Frame Relay bundle interface
Multilink	Multilink-group interface
Null	Null interface
POS	Packet over Sonet
Tunnel	Tunnel interface
Vif	PGM Multicast Host interface
Virtual-Template	Virtual Template interface
Virtual-TokenRing	Virtual Token Ring

Defaults   This command has no default behavior or values.

Command Modes   Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples   The following example illustrates typical information from the **show protocols** command:

```
Router# show protocols

Global values:
  Internet Protocol routing is enabled
Ethernet0/0/0 is up, line protocol is up
  Internet address is 127.0.0.254/8
FastEthernet0/0/0 is up, line protocol is up
  Internet address is 1.8.35.12/8
POS1/0/0 is administratively down, line protocol is down
POS3/0/0 is up, line protocol is up
  Internet address is 50.0.0.2/8
POS4/0/0 is up, line protocol is up
  Internet address is 20.0.0.2/8
Cable6/1/0 is up, line protocol is up
Cable6/1/1 is up, line protocol is up
Loopback0 is up, line protocol is up
  Internet address is 75.0.0.1/8
Router#
```

show running-config

To display the currently running configuration in RAM, use the **show running-config** command in privileged EXEC mode.

show running-config

Syntax Description This command has no arguments or keywords.

Defaults This command has no default behavior or values.

Command Modes Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT⁄ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

```
Router# show running-config

Building configuration...

Current configuration : 2545 bytes
!
version 12.2
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service internal
!
hostname "R7582-ubr10k-UUT"
!
boot system flash bootflash:ubr10k-k8p6-mz.oc48.11Nov02
no logging console
enable password poPPee
!
redundancy
 main-cpu
  auto-sync standard
facility-alarm intake-temperature major 49
facility-alarm intake-temperature minor 40
facility-alarm intake-temperature critical 67
facility-alarm core-temperature major 53
facility-alarm core-temperature minor 45
facility-alarm core-temperature critical 85
hw-module slot 3 pos
hw-module slot 4 pos
card 1/0 1oc12pos-1
card 1/1 2cable-tccplus
card 3/0 1oc48dpt-pos-1
card 4/0 1oc48dpt-pos-1
card 6/1 2cable-mc28c
no cable qos permission create
no cable qos permission update
cable qos permission modems
ip subnet-zero
!
packetcable element_id 474
!
interface Loopback0
 ip address 75.0.0.1 255.0.0.0
!
interface FastEthernet0/0/0
 ip address 1.8.35.12 255.0.0.0
 ip accounting precedence input
 ip accounting precedence output
!
interface POS1/0/0
 no ip address
```

```
 shutdown
 crc 32
 pos report lais
 pos report lrdi
 pos report pais
 pos report prdi
 pos report sd-ber
!
interface POS3/0/0
 ip address 50.0.0.2 255.0.0.0
 no keepalive
 crc 32
 pos scramble-atm
 pos threshold sf-ber 3
 hold-queue 0 in
!
interface POS4/0/0
 ip address 20.0.0.2 255.0.0.0
 load-interval 600
 no keepalive
 crc 32
 pos threshold sf-ber 3
!
interface Cable6/1/0
 no ip address
 cable downstream annex B
 cable downstream modulation 64qam
 cable downstream interleave-depth 32
 cable downstream channel-id 0
 cable upstream 0 shutdown
 cable upstream 1 shutdown
 cable upstream 2 shutdown
 cable upstream 3 shutdown
!
interface Cable6/1/1
 no ip address
 cable downstream annex B
 cable downstream modulation 64qam
 cable downstream interleave-depth 32
 cable downstream channel-id 1
 cable upstream 0 shutdown
 cable upstream 1 shutdown
 cable upstream 2 shutdown
 cable upstream 3 shutdown
!
router rip
 network 10.0.0.0
 network 75.0.0.0
!
ip default-gateway 1.8.0.1
ip classless
ip route 1.8.0.0 255.255.0.0 FastEthernet0/0/0
ip route 30.0.0.0 255.0.0.0 11.1.1.3
ip route 223.255.254.0 255.255.255.0 1.8.0.1
ip route 223.255.254.254 255.255.255.255 1.8.0.1
no ip http server
!
cdp run
snmp-server community public RO
snmp-server community private RW
snmp-server enable traps tty
tftp-server bootflash:srp-config 1
!
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 exec-timeout 0 0
 password lab
 no login
 length 0
!
end

Router#
```

show srp

To display Intelligence Protection Switching (IPS) information about each interface, use the **show srp** *slot/subslot/port* command in privileged EXEC mode. The output tells you whether an automatic protection switch is enabled or idle.

> **show srp** *slot/subslot/port options*

Syntax Description

slot/subslot/port	(Optional) Router slot, subslot and port number of a specific Spatial Reuse Protocol (SRP) interface; otherwise, the command displays information about all SRP interfaces in the router.

Options include

counters	Per side traffic and error counters
failures	Self detected failures
ips	IPS information
source-counters	Source counter information
srr	SRR information
topology	Topology map
transit	Per side transit buffer delay counters

Defaults This command has no default behavior or values.

Command Modes Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples The following example produces output that displays the IPS, source-counter, and topology status of the SRP interface by using the **show srp** *slot/port* command:

```
Router# show srp

IPS Information for Interface SRP2/0
 MAC Addresses
   Side A (Outer ring RX) neighbor 0012.3456.0004
   Side B (Inner ring RX) neighbor 0012.3456.0002
   Node MAC address 0012.3456.0001
 IPS State
   Side A not wrapped
   Side B not wrapped
   Side A (Inner ring TX) IPS pkt. sent every 1 sec. (next pkt. after 0 sec.)
   Side B (Outer ring TX) IPS pkt. sent every 1 sec. (next pkt. after 0 sec.)
   IPS WTR period is 60 sec. (timer is inactive)
   Node IPS State IDLE
```

```
IPS Self Detected Requests     IPS Remote Requests
  Side A IDLE                      Side A IDLE
  Side B IDLE                      Side B IDLE
IPS messages received
  Side A (Outer ring RX) {0012.3456.0002,IDLE,S}, TTL 128
  Side B (Inner ring RX) {0012.3456.0004,IDLE,S}, TTL 128
IPS messages transmitted
  Side A (Inner ring TX) {0012.3456.0001,IDLE,S}, TTL 128
  Side B (Outer ring TX) {0012.3456.0001,IDLE,S}, TTL 128


Source Address Information for Interface SRP2/0
   0012.3456.0001, index 1, pkt. count 409847
   0012.3456.0002, index 2, pkt. count 2479330
   0012.3456.0003, index 3, pkt. count 724384
   0012.3456.0004, index 4, pkt. count 1472439

Topology Map for Interface SRP2/0
 Topology pkt. sent every 10 sec. (next pkt. after 5 sec.)
 Last received topology pkt. 00:00:04
 Nodes on the ring:4
 Hops (outer ring)       MAC        IP Address      Wrapped Name
     0             0012.3456.0001 10.1.2.1          No    Router1
     1             0012.3456.0002 10.1.2.2          No    Router2
     2             0012.3456.0003 10.1.2.3          No    Router3
     3             0012.3456.0004 10.1.2.4          No    Router4
Router#
```

Table 7 describes selected fields from the **show srp** command output.

Table 7   ***show srp Command Output Fields***

Field	Description
IPS Information for Interface SRP2/0	IPS (Intelligent Protection Switching) identifies the status of an SRP interface on the SRP ring. The IPS field in the show srp command output is also produced by the show srp ips command output.
MAC Addresses Side A (Outer ring RX) neighbor 0012.3456.0002	MAC address of the next SRP node on the outer ring.
MAC Addresses Side B (Inner ring RX) neighbor 0012.3456.0002	MAC address of the next SRP node on the inner ring.
Node MAC address 0012.3456.0001	MAC address of this SRP node.
IPS State	Reports whether or not a wrap exists on side A or side B of the SRP ring.
IPS WTR period is 60 seconds (timer is inactive)	Current Wait-to-Restore (WTR) timer value. If a timer is active, the time remaining before the timer expires will also be given.
Node IPS State IDLE	Displays the current IPS state of the node. IDLE is the normal state. Other states are WRAPPED and PASSTHRU.

Field	Description
`IPS self-detected requests`	Indicates any locally generated requests.
	Indicates any remotely generated requests.
	Displays local IPS requests, as well as IDLE status.
	Possible requests include the following:
	• FS — Forced Switch
	• SF — Signal Fail
	• SD — Signal Degrade
	• MS — Manual Switch
	• WTR — Wait to Restore
`IPS remote requests`	Indicates any locally generated requests.
	Indicates any remotely generated requests.
	Displays remote IPS requests, as well as IDLE status.
	Possible requests include the following:
	• FS — Forced Switch
	• SF — Signal Fail
	• SD — Signal Degrade
	• MS — Manual Switch
	• WTR — Wait to Restore
`IPS messages received`	Indicates IPS messages received on side A {0012.3456.0002,IDLE,S}, TTL 128.
	Indicates IPS messages received on side B {0012.3456.0004,IDLE,S}, TTL 128.
	Provides details of the last IPS messages received. Fields within the braces ({}) are the MAC addresses of the sending node and the APS state (IDLE, LO, FS, and so on). It also indicates either a short (S) or long (L) path.
`IPS messages transmitted`	Indicates IPS messages received on side A {0012.3456.0001,IDLE,S}, TTL 128.
	Indicates IPS messages received on side B {0012.3456.0001,IDLE,S}, TTL 128.
	Provides details of the last IPS messages transmitted, in the format used for received messages.
`Source address information for interface SRP2/0`	SRP source-counter information that identifies the SRP interface. This section of the **show srp** command output is also produced by **show srp source-counters** command output.
`0012.3456.0001, index 1, packet count 409847`	Initial number of the MAC address of the SRP node whose packets are being counted. The index refers to an internal detail of the SRP implementation and has no operational significance. Packet count indicates that packets from the MAC address are being counted, and the actual count will follow.

Field	Description
`Topology map for interface SRP2/0`	SRP topology information that identifies the SRP interface. This section of the show srp command output is also produced by show srp topology command output.
`Topology packet sent every 10 seconds (next packet after 5 seconds)`	Interval between successive topology packets sent from this node and the time until the next one is to be sent (rounded down to the nearest second).
`Last received topology packet 00:00:04`	Time since the last topology packet was received at this node.
`Nodes on the ring: 4`	Number of nodes in the current ring topology.
`Hops`	Number of hops to the destination node, beginning with the assumption that the node is traveling on side A. The local node is at hop count zero.
`MAC`	MAC address of the node.
`IP Address`	IP address of the SRP interface on the node. If the address is not known, the text string "unknown" will be displayed.
	Note that the IP address information is gathered by the ARP table. When a ring is first established, it is normal for the IP address of a node to remain unknown until some time after the MAC address is known. If the topology continues to display unknown for the IP address after a reasonable length of time, there is probably a problem with address resolution protocol.
`Wrapped`	Indicates whether the SRP ring is wrapped at that node, by either Yes or No.
`Name`	Host name of the router. If the name is not known, this field is left blank.
	Note that the host name is obtained from information that is broadcast on the ring at a slower rate than other topology information. When a ring is first established, it is normal for the host name of a remote node to remain unknown until some time after the MAC address is known.

Related Commands

Command	Description
show controllers srp	Displays the current controller configuration on an SRP interface.
show interface srp	Displays the configuration on an SRP interface.
show srp ips	Displays the Intelligent Protection Switching (IPS) status.
show srp rate-limit	Displays the current SRP rate-limit configuration for high and low priority traffic.
show srp topology	Identifies the nodes on the ring.

show srp ips

To display the status of the Intelligence Protection Switching (IPS) protocol, use the **show srp ips** command in privileged EXEC mode.

show srp ips

Syntax Description   This command has no additional arguments or keywords.

Defaults   This command has no default behavior or values.

Command Modes   Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   This command displays information such as the direct neighbors' address, the wrap state, the failures state and the latest transmitted and received IPS packets of the SRP node. It also indicates that the interface is administratively up and not in PASS-THRU mode.

Examples

```
Router# sh srp ips

IPS Information for Interface SRP3/0/0
MAC Addresses
  Side A (Outer ring RX) neighbor 0000.0048.2222
  Side B (Inner ring RX) neighbor 0000.0048.1111
  Node MAC address 0000.0048.3333
IPS State
  Side A not wrapped
  Side B not wrapped
  Side A (Inner ring TX) IPS pkt. sent every 1 sec. (next pkt. after 1 sec.)
  Side B (Outer ring TX) IPS pkt. sent every 1 sec. (next pkt. after 1 sec.)
  inter card bus enabled
  IPS WTR period is 60 sec. (timer is inactive)
  Node IPS State: idle
IPS Self Detected Requests          IPS Remote Requests
  Side A IDLE                           Side A IDLE
  Side B IDLE                           Side B IDLE
  Side A Failures: none
  Side B Failures: none
IPS messages received
  Side A (Outer ring RX) {0000.0048.2222,IDLE,SHORT}, TTL 255
  Side B (Inner ring RX) {0000.0048.1111,IDLE,SHORT}, TTL 255
IPS messages transmitted
  Side A (Inner ring TX) {0000.0048.3333,IDLE,SHORT}, TTL 255
  Side B (Outer ring TX) {0000.0048.3333,IDLE,SHORT}, TTL 255
```

Related Commands

Command	Description
show controllers srp	Displays the current controller configuration on an SRP interface.
show interface srp	Displays the configuration on an SRP interface.
show srp	Displays IPS information about each interface.

Command	Description
show srp rate-limit	Displays the current SRP rate-limit configuration for high and low priority traffic.
show srp topology	Identifies the nodes on the ring.

show srp rate-limit

To display the current Spatial Reuse Protocol (SRP) rate-limit configuration for high and low priority traffic, use the **show srp rate-limit srp** *slot*/*subslot*/*port* command in privileged EXEC mode.

> **show srp rate-limit srp** *slot*/*subslot*/*port*

Syntax Description	*slot/subslot/port*	(Optional) Router slot, subslot and port number of a specific SRP interface; otherwise, the command displays information about all SRP interfaces in the router.

Defaults　This command has no default behavior or values.

Command Modes　Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples　The following example shows output from the **show srp rate-limit srp** *slot*/*subslot*/*port* command.

```
Router# show srp rate-limit srp 3/0/0

Router#
Rate Limit Information for Interface SRP3/0/0
Rate limit of high priority outgoing traffic: 622 Mbps
Rate limit of low priority outgoing traffic: 1866 Mbps
Minimum SRP priority value of high priority outgoing/transit traffic: 5
Router#
```

Related Commands

Command	Description
show controllers srp	Displays the current controller configuration on an SRP interface.
show interface srp	Displays the configuration on an SRP interface.
show srp	Displays IPS information about each interface.
show srp ips	Displays the Intelligent Protection Switching (IPS) status.
show srp topology	Identifies the nodes on the ring.

show srp topology

To identify the nodes on the Spatial Reuse Protocol (SRP) ring, use the **show srp topology** command in privileged EXEC mode.

> **show srp topology** {**srp** *slot*/*subslot*/*port*}

Syntax Description	**srp** *slot*/*subslot*/*port* (Optional) Router slot, subslot and port number of a specific SRP interface; otherwise, the command displays information about all SRP interfaces in the router.

Defaults   This command has no default behavior or values.

Command Modes   Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples   The following sequence of commands displays the nodes on the SRP ring.

```
Router# show srp topology srp 1/0/0

 Topology Map for Interface SRP1/0/0
  Topology pkt. sent every 5 sec. (next pkt. after 3 sec.)
  Last received topology pkt. 00:00:01
  Last topology change was 00:01:16 ago.
  Nodes on the ring: 3
  Hops (outer ring)      MAC        IP Address      Wrapped SRR   Name
      0             0000.0048.2222 48.1.1.2           No    -    SRP-10K
      1             0000.0048.3333 Unknown            No    -    R7557-HC
      2             0000.0048.1111 48.1.1.1           No    -    GSR
Router# ping 48.1.1.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 48.1.1.3, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/1/1 ms
Router# show srp topology srp 1/0/0

 Topology Map for Interface SRP1/0/0
  Topology pkt. sent every 5 sec. (next pkt. after 3 sec.)
  Last received topology pkt. 00:00:01
  Last topology change was 00:01:31 ago.
  Nodes on the ring: 3
  Hops (outer ring)      MAC        IP Address      Wrapped SRR   Name
      0             0000.0048.2222 48.1.1.2           No    -    SRP-10K
      1             0000.0048.3333 48.1.1.3           No    -    R7557-HC
      2             0000.0048.1111 48.1.1.1           No    -    GSR
```

```
Router# show srp topology srp 3/0/0

 Topology Map for Interface SRP3/0/0
  Topology pkt. sent every 5 sec. (next pkt. after 1 sec.)
  Last received topology pkt. 00:00:03
  Last topology change was 00:16:38 ago.
  Nodes on the ring: 3
  Hops (outer ring)       MAC         IP Address      Wrapped SRR    Name
      0              0000.0048.3333 48.1.1.3            No      -    R7557-HC
      1              0000.0048.1111 48.1.1.1            No      -    GSR
      2              0000.0048.2222 48.1.1.2            No      -    SRP-10K
```

Related Commands	Command	Description
	show controllers srp	Displays the current controller configuration on an SRP interface.
	show interface srp	Displays the configuration on an SRP interface.
	show srp	Displays IPS information about each interface.
	show srp ips	Displays the Intelligent Protection Switching (IPS) status.
	show srp rate-limit	Displays the current SRP rate-limit configuration for high and low priority traffic.

show version

To display the configuration of the system hardware (the number of each line card type installed), the Cisco IOS software version, the names and sources of configuration files, and the boot images, use the **show version** command in privileged EXEC mode.

     show version

Syntax Description	This command has no arguments or keywords.
Defaults	This command has no default behavior or values.
Command Modes	Privileged EXEC mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Examples

The following **show version** command return provides an example of support for POS mode.

```
Router# show version

Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-K8P6-M), Experimental Version 12.2(20021115:194156)
[REL-ftp_p2_clip
per_srp.ios-weekly 103]
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Fri 15-Nov-02 18:05 by richv
Image text-base: 0x60008940, data-base: 0x61A80000

ROM: System Bootstrap, Version 12.0(9r)SL2, RELEASE SOFTWARE (fc1)

R7582-ubr10k-UUT uptime is 10 hours, 14 minutes
System returned to ROM by power-on
System image file is "bootflash:ubr10k-k8p6-mz.oc48.15Nov02"

cisco uBR10012 (PRE1-RP) processor with 393215K/131072K bytes of memory.
Processor board ID TBA05080267
R7000 CPU at 262Mhz, Implementation 39, Rev 2.1, 256KB L2, 2048KB L3 Cache
Backplane version 1.0, 8 slot

Last reset from power-on
Toaster processor tmc0 is running.
Toaster processor tmc1 is running.
1 OC12 POS controller (1 POS)
1 TCCplus card(s)
1 FastEthernet/IEEE 802.3 interface(s)
1 Gigabit Ethernet/IEEE 802.3 interface(s)
3 Packet over SONET network interface(s)
2 Cable Modem network interface(s)
509K bytes of non-volatile configuration memory.

46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
32768K bytes of Flash internal SIMM (Sector size 256KB).
Configuration register is 0x0

Router#
```

The following **show version** command return provides an example of support for SRP mode.

```
Router# sh version

Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-K8P6-M), Experimental Version 12.2(20021028:080725)
[REL-ftp_p2_clipper_srp.ios-weekly 103]
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Mon 28-Oct-02 08:27 by richv
Image text-base: 0x60008940, data-base: 0x61A80000

ROM: System Bootstrap, Version 12.0(9r)SL2, RELEASE SOFTWARE (fc1)

R7557-HC uptime is 1 hour, 3 minutes
System returned to ROM by power-on
System image file is "disk0:ubr10k-k8p6-mz.oc48.28Oct02"

cisco uBR10012 (PRE1-RP) processor with 393215K/131072K bytes of memory.
Processor board ID TBA06060422
R7000 CPU at 262Mhz, Implementation 39, Rev 2.1, 256KB L2, 2048KB L3 Cache
Backplane version 1.1, 8 slot

Last reset from power-on
Toaster processor tmc0 is running.
Toaster processor tmc1 is running.
2 OC12 POS controllers (2 POS)
2 TCCplus card(s)
1 FastEthernet/IEEE 802.3 interface(s)
2 Packet over SONET network interface(s)
1 SRP network interface(s)
5 Cable Modem network interface(s)
509K bytes of non-volatile configuration memory.

46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
32768K bytes of Flash internal SIMM (Sector size 256KB).
Secondary is up
Secondary has 524288K bytes of memory.

Configuration register is 0x0
```

srp clock-source

To configure the clock source, use the **srp clock-source** command in interface configuration mode. To restore the default srp clock-source, use the **no** form of this command .

srp clock-source [**line** | **internal**] [**a** | **b**]

no srp clock-source [**line** | **internal**] [**a** | **b**]

Syntax Description		
line	Clock source as line. Used when connecting a router to SONET/SDH ADM.	
internal	Clock source as internal. Used when connecting between two routers over dark fiber or over a Wavelength Division Multiplexing (WDM) system.	
a	Clock source on side A of the router.	
b	Clock source on side B of the router.	

Defaults The default setting is both interfaces set to internal. This is recommended for optimal clocking.

Command Modes Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines This command applies to Spatial Reuse Protocol (SRP) interfaces only.

When you configure a connection between two Cisco 10700 Series Internet Routers, you can configure the SRP interfaces for clock source as follows:

- You can set both interfaces to internal. This is the default setting and is recommended for optimal clocking.
- Setting both SRP interfaces to line is not supported.
- You can configure the SRP interface on one side of the connection as internal and the SRP interface on the other side as line. This is available for installations in which line timing is desirable, such as add/drop multiplexer (ADM) and wavelength division multiplexing (WDM).

Examples The following is an example of how to use the **srp clock-source** command to select line as a clock source on side A:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp clock-source line a
Router(config-if)#
```

srp flag

To specify SONET/Synchronous Digital Hierarchy (SDH) overhead values for the frame header, use the **srp flag** command in interface configuration mode. Use the **no** form of this command to restore the default SRP flag.

>   **srp flag** [**c2** | **j0**] **value** [**a** | **b**]

>   **no srp flag** [**c2** | **j0**] **value** [**a** | **b**]

Syntax Description

c2 value	Path signal label byte.
j0 value	Section trace byte. For interoperability with some SDH equipment in Japan, use the value 0x1.
a	Side of a node that has outer ring receive fiber is identified as side A.
b	Side of a node that has inner ring receive fiber is identified as side B.

Defaults The default c2 value is 0x16, and the default j0 value is 0xCC.

Command Modes Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT∕ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines This command applies to SRP interfaces only. Note that the j0 0x1 flag is specified indirectly by the choice of SONET or SDH framing in the **srp framing** command.

Examples The following example shows how to use the **srp flag** command to specify the SONET/SDH overhead values on an SRP interface:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp flag j0 0x1
Router(config-if)#
```

srp framing

To specify Spatial Reuse Protocol (SRP) framing for the packet header and trailer to ensure synchronization and error control, use the **srp framing** command in interface configuration mode. To restore the default value for SRP framing, use the **no** form of this command .

srp framing [**sdh** | **sonet**] [**a** | **b**]

no srp framing [**a** | **b**]

Syntax Description		
sdh	Selects SDH framing and s1s0=2.
sonet	Selects SONET framing and s1s0=0 (default)
a	Side of a node that has outer ring receive fiber identified as side A.
b	Side of a node that has inner ring receive fiber identified as side B.

Defaults   SRP framing is disabled by default.

Command History	Release	Modification
	12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT⁄ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
	12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   This command applies to SRP interfaces only.

Examples   The following example shows you how to set framing to SDH by using the **srp framing** command:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp framing sdh
```

srp ips request forced-switch

To initiate a forced-switch wrap on a ring, use the **srp ips request forced-switch** command in interface configuration mode. Use the **no** form of this command to remove the wrap.

> **srp ips request forced-switch** [**a** | **b**]

> **no srp ips request forced-switch** [**a** | **b**]

Syntax Description

a	Side of a node that has outer ring receive fiber identified as side A.
b	Side of a node that has inner ring receive fiber identified as side B.

Defaults

By default, wrapping is disabled.

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines

This command applies to SRP interfaces only.

Examples

The following example shows how to insert a forced-switch wrap on side A of the interface by entering the **srp ips request forced-switch a** command:

```
Router# configure terminal
Router(config)# interface srp1/0/0
Router(config-if)# srp ips request forced-switch a
Router(config-if)#
```

srp ips request manual-switch

To insert a manual-switch wrap on the ring fiber, use the **srp ips request manual-switch** command in interface configuration mode. To remove the wrap, use the **no** form of the command .

srp ips request manual-switch [**a** | **b**]

no srp ips request manual-switch [**a** | **b**]

Syntax Description		
	a	Side of a node that has outer ring receive fiber identified as side A.
	b	Side of a node that has inner ring receive fiber identified as side B.

Defaults

No default behavior or values.

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines

This command applies to SRP interfaces only.

Note The **srp ips request manual-switch** command is applied to the Spatial Reuse Protocol (SRP) interface, but may be overridden by higher-priority events. If such cases, the manual-switch is discarded. The manual-switch is not saved to running-config and will not persist across reloads.

Examples

The following example shows how to enter a manual-switch wrap on side B of the interface by using the **srp ips request manual-switch b** command:

```
Router# configure terminal
Router(config)# interface srp1/0/0
Router(config-if)# srp ips request manual-switch b
Router(config-if)#
```

srp ips timer

To control the frequency of the transmission of ips requests, use the **srp ips timer** command in interface configuration mode. To restore the default value, use the **no** form of this command.

> **srp ips timer** *<value>* [**a** | **b**]

> **no srp ips timer** [**a** | **b**]

Examples

value	1 to 60 seconds.
a	Side of a node that has outer ring receive fiber identified as side A.
b	Side of a node that has inner ring receive fiber identified as side B.

Defaults The default setting of the IPS timer is 1 second.

Command Modes Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines This command applies to SRP interfaces only. If a node (side A or side B) is not specified in the command, the IPS timer value is applied to both sides.

Examples The following example shows how to use the **srp ips timer** command to set the frequency of IPS request transmission to 5 seconds on side A:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp ips timer 5 a
Router(config-if)#
```

srp ips wts-timer

To change the Spatial Reuse Protocol (SRP) Intelligent Protection Switching (IPS) wait-to-restore timer from its default value, use the **srp ips wtr-timer** command in interface configuration mode. To restore the default value of 60 seconds, use the **no** form of this command .

srp ips wtr-timer *value*

no srp ips wtr-timer

Syntax Description	*value* Timer value, in seconds.

Defaults   The timer is set to 60 seconds by default.

Command Modes   Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT⁄ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   When the cause of a wrap is removed, the wrap remains in place for a length of time determined by the SRP wait-to-restore timer. This mechanism prevents oscillations on the SRP ring. Cisco recommends that the **srp ips wrt-timer** command value be the same for all nodes on a ring. Therefore, if one node's **srp ips wrt-timer** command value is changed, the value for all other nodes on a ring should change to the same value.

Examples   The following example shows how to use the **srp ips wtr-timer** command to change the SRP IPS wait-to-restore timer to 10 seconds on SRP interface 1/0/0:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp ips wtr-timer 10
Router(config-if)# end
```

srp loopback

To configure the framer into loopback mode, use the **srp loopback** command in interface configuration mode. To restore the default value, use the **no** form of this command.

srp loopback [**internal** | **line**] [**a** | **b**]

no srp loopback [**internal** | **line**] [**a** | **b**]

Syntax Description

internal	Internal (framer) loopback.
line	Loopback line data.
a	The side of a node that has outer ring receive fiber is identified as side A.
b	The side of a node that has inner ring receive fiber is identified as side B.

Defaults

No loopbacks are in place by default.

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines

Using the **srp loopback** command breaks connectivity. This command is used mostly during the initial setup of the SONET link (such as a node-to-node fiber connection), or when general connectivity is not clearly and obviously achieved. You can also use the **srp loopback** command when fiber or equipment connections are rearranged, or if new connectivity problems arise. If a node (side A or side B) is not specified in the command, the loopback value is applied to both sides.

Examples

The following example shows how to enter the **srp loopback** command on side A:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp loopback line a
Router(config-if)#
```

srp priority-map

To set priority mapping for transmitting and receiving packets, use the **srp priority-map** command in global configuration mode. To disable priority mapping, use the **no** form of this command.

srp priority-map {**transmit**} *value*

no srp priority-map

Syntax Description

transmit	Transmits priority mapping for high priority traffic.
value	Minimum SRP transmit priority. Valid range is 1-7.

Defaults   No default behavior or values.

Command Modes   Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT⁄ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   The SRP interface provides commands to enforce quality of service (QoS) functionality on the transmit side of Cisco uBR10012 router. SRP uses the IP type-of-service (ToS) field values to determine packet priority.

The SRP interface classifies traffic on the transmit side into high- and low-priority traffic. You have the option to configure high- or low-priority traffic and can rate limit the high-priority traffic.

The **srp priority-map transmit** command enables users to specify SRP packets with SRP priority. Anything above the specified value is considered high-priority traffic.

Examples   The following example shows how to configure the Cisco uBR10012 router to transmit packets with priority greater than 5 as high priority packets:

```
Router(config-if)# srp priority-map transmit 5
```

srp shutdown

To shut down an interface by entering a forced-switch, use the **srp shutdown** command in interface configuration mode. To remove the forced-switch wrap near the interface, use the **no** form of this command .

> **srp shutdown** [**a** | **b**]

> **no srp shutdown** [**a** | **b**]

Syntax Description		
	a	Side of a node that has outer ring receive fiber identified as side A.
	b	Side of a node that has inner ring receive fiber identified as side B.

Defaults   The default is SRP protocol enabled.

Command Modes   Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines   This **srp shutdown** command is an abbreviated form of the **srp ips request forced-switch command in** interface configuration mode that enters a forced-switch request and inserts a wrap on a ring. To remove the wrap on the ring, Use the **no** form of this command. The long form, **srp ips request forced-switch**, appears in the **show** command output.

✎

Note   The **srp shutdown** command differs from the **shutdown** command in the following manner: **srp shutdown** inserts a forced-switch wrap on a ring, while **shutdown** invokes the pass-through mode, logically removing the interface from the ring.

Examples   The following example shows how to enter a Spatial Reuse Protocol (SRP) shutdown request on side A of an SRP interface:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp shutdown a
Router(config-if)#
```

srp topology-timer

To specify the frequency of the Spatial Reuse Protocol (SRP) topology timer, use the **srp topology-timer** command in interface configuration mode. Use the **no** form of this command to restore the default value of 10 seconds.

> **srp topology-timer** *value*

> **no srp topology-timer**

Syntax Description

value	1 to 600 seconds.

Defaults The timer is set to 10 seconds by default.

Command Modes Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines The **srp topology-timer** command in interface configuration mode and a specified value determine how frequently topology discovery messages are sent around the ring to identify the current nodes on the SRP ring. Cisco recommends that the **srp topology-timer** value be the same for all nodes on a ring. Therefore, if one node's topology-timer value is changed, the value for all other nodes on a ring should be changed to the same value.

Examples The following example shows how to set the frequency for how often SRP topology packets are sent around the ring to identify the nodes:

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp topology-timer 100
Router(config-if)#
```

srp TX-traffic-rate

To configure the amount of high- and low-priority traffic being transmitted from the router onto the Spatial Reuse Protocol (SRP) ring, use the **srp TX-traffic-rate** command in interface configuration mode. To remove the TX-traffic-rate from the configuration, use the **no** form of this command.

> **srp TX-traffic-rate** [**high** | **low**] *Mbps*

> **no srp TX-traffic-rate** [**high** | **low**] *Mbps*

Syntax Description

Mbps	Average rate in Mbps. OC-48 DPT line card values must be in increments of 1 Mbps in the range of 1 to 2488. The range for OC-192 DPT line cards is from 1 to 9952.

Defaults

By default, TX-traffic-rate is disabled on low priority and set to 20 Mbps for high priority.

Command Modes

Interface configuration mode

Command History

Release	Modification
12.2(11)BC3	This command introduced in support of the Cisco OC-48 DPT/ POS interface module on the Cisco uBR10012 router with PRE1 route processors.
12.3(9a)BC	Support added for the Cisco uBR10012 router with PRE2 route processors.

Usage Guidelines

Use this command to control the amount of high- and low-priority traffic a node can transmit onto the SRP ring. This command does not control the amount of transit traffic on the ring, which is controlled by the SRP fairness algorithm.

> **Note**   High-priority traffic in transit on the ring is not controlled by the SRP fairness algorithm. Cisco recommends that the TX-traffic-rate for high-priority traffic not be disabled in order to prevent high-priority traffic transmitted from one node on the ring from starving traffic transmitted by other nodes on the SRP ring.

Examples

The following example limits the rate of high-priority traffic transmitted on the ring to an average rate of 622 Mbps (25 percent line bandwidth) and low-priority traffic transmitted on the ring to an average rate of 1866 Mbps (75 percent line bandwidth):

```
Router# configure terminal
Router(config)# interface srp 1/0/0
Router(config-if)# srp rate-limit hi 622
Router(config-if)# srp rate-limit low 1866
Router(config-if)# end
Router#
```

Cisco OC-48 DPT∕ POS Interface Module System Messages

This section describes the system messages that concern the operation of the Cisco OC48DPT/POS interface module. These system messages are organized according to FACILITY, and then listed alphabetically according to their MNEMONIC values.

C10KSDCC

This section describes system messages that are generated by the main processor to indicate an error with the SDCC driver that is used with line cards such as the Cisco OC48DPT/POS interface module.

Error Message

```
%C10KSDCC-3-INTERNAL: SDCC internal: [chars]
```

Explanation   Internal SDCC error.

Recommended Action   Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%C10KSDCC-4-MSGVERSION: Incompatible message version with slot[dec]
```

Explanation   An incompatibility exists between the the message version being sent by the line card and the message version being used by the processor card. This type of incompatibility could happen if the processor card and line card use different software versions due to an processor card OIR event.

Recommended Action   The only problem is that SDCC statistics are not reported to the main processor. Reload the processor to correct the problem.

Error Message

```
%C10KSDCC-3-OP: Interface ([chars]): [chars]
```

Explanation   The SDCC driver on the processor card received an unexpected event.

Recommended Action   Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%C10KSDCC-3-UNKNOWN: Unknown message ([dec]) received ([chars]) from interface
[chars]
```

Explanation   An unknown message received from the line card.

Recommended Action   Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

C10K_APS

This section describes the system messages that are generated by the Automatic Protection Switching (APS) subsystem.

Error Message

```
%C10K_APS-3-INTERNAL1: APS internal error, [chars] [dec] [dec]
```

Explanation APS Internal Error.

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%C10K_APS-3-INTERNAL2: APS internal error, [chars] [hex] [hex] [dec]
```

Explanation APS Internal Error.

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%C10K_APS-3-INTERNALCFG: APS config internal error, [dec] [dec]
```

Explanation APS Internal Error.

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%C10K_APS-4-SWITCH: Interface [chars] switched from [chars] to [chars] channel.
```

Explanation The APS logic has determined that a switchover from one port to another was required because the channel currently carying data is no longer able to carry that data, per the critera given in the GR-253-CORE specification.

Recommended Action Use the **show aps** and **show controller** commands to display the current interface status. Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

GRP_C10K_SRP

This section describes the system messages generated by the SRP subsystem that is used on line cards such as the Cisco OC48DPT/POS interface module.

Error Message

```
%GRP_C10K_SRP-3-INTERNALEVT: SRP LC Event internal error, [chars] [dec] [dec]
```

Explanation Internal SRP LC event error.

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%GRP_C10K_SRP-4-BADSRPSLOT: SRP slot [dec] allocation rejected: Illegal slot
specified
```

Explanation SRP card pair must be configured via the lower odd numbered slot.

Recommended Action Place the cards in adjacent slots with the lower slot being an odd numbered slot. Specify the lower numbered slot when issuing the **hw-module slot srp** command

Error Message

```
%GRP_C10K_SRP-4-SRPMODEMISMATCH: SRP slot [dec] allocation rejected: POS mode
already configured on slot [dec]
```

Explanation The modes of the cards forming an SRP pair must both be unitialized before issuing this command.

Recommended Action Issue the **no hw-module slot** *slot* **pos** and **no hw-module slot** *slot+1* **pos** commands then reconfigure the cards for SRP mode

Error Message

```
%GRP_C10K_SRP-4-CARDMISMATCH: SRP slot [dec] allocation rejected: Card type
mismatch
```

Explanation The card type of the card in this slot is not the one expected by the **hw-module slot** *slot* **srp** command.

Recommended Action Insert the correct card into the proper slot and reissue the command.

Error Message

```
%GRP_C10K_SRP-4-CARDOVERLAP: SRP slot [de]allocation rejected: Slot [dec]
overlaps.
```

Explanation The [**no**] **hw-module slot** *slot* **srp** and **hw-module slot** *slot-1* **srp** commands are overlapping.

Recommended Action Reissue either command with the correct parameters.

Error Message

```
%GRP_C10K_SRP-3-TIMEOUT: Interface ([chars]): [chars]
```

Explanation The SSRP RP driver queries the LC for SONET information, the LC didn't reply.

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%GRP_C10K_SRP-4-MSGVERSION: Incompatible message version with slot [dec]
```

Explanation There is incompatibility between the the message version being send by the line card and the message version used by the GRP. This type of incompatibility could happen is GRP and line card using different IOS versions due to a GRP oir event

Recommended Action The only problem is that ssrp statistics are not reported to the GRP, a microcode reload will solve the problem.

Error Message

```
%GRP_C10K_SRP-3-OP: Interface ([chars]): [chars]
```

Explanation The SSRP RP driver receives an unexpect event.

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

GRP_OC48SRPPOS

This section describes the system messages that are generated by the Cisco OC48DPT/POS interface module.

Error Message

```
%GRP_OC48SRPPOS-4-POSMODECONFIGURED: POS slot [dec] allocation rejected: mode
already configured
```

Explanation   The card is part of an SRP pair and must be unitialized before issuing this command.

Recommended Action   Issue the **no hw-module slot srp** command for the lower slot of the configured SRP card pair, and then reconfigure the desired cards for POS mode.

Error Message

```
%GRP_OC48SRPPOS-4-MODECONFIGURED: Slot [dec] Mode Change rejected: not ready for
mode change
```

Explanation   The card must be fully unitialized before issuing this command.

Recommended Action   Issue the **no hw-module slot pos/srp** command and wait for card to reboot before reissuing the command.

Error Message

```
%GRP_OC48SRPPOS-3-INTERNAL: OC48 POS internal error, [chars] [dec] [dec]
```

Explanation   Internal OC48 POS error.

Recommended Action   Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%GRP_OC48SRPPOS-4-REDCONFIGURED: POS slot [dec] mode change rejected: redundancy
mode configured
```

Explanation   The card is part of a redundant pair. The redundancy association must be removed before changing the card's mode of opertion from POS.

Recommended Action   Use the **no assoc slot** command to remove the association between the two card slots before using the **no hw-module slot pos** command.

Error Message

```
%GRP_OC48SRPPOS-3-INTERNALCMD: OC48 SRP/POS LC command internal error, [chars]
[dec] [dec]
```

Explanation   Internal POS LC command error.

Recommended Action   Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%GRP_OC48SRPPOS-4-CMD_NOT_SUPPORTED: hw-module slot [dec] [chars] command not
supported on card type [chars]
```

Explanation   This command is only supported on the dual-mode OC48 SRP/POS card.

Recommended Action   No action needed if the indicated card slot is empty or contains a card other than the Cisco OC48DPT/POS interface module.

POS

This section describes system messages for the Packet Over Sonet (POS) subsystem, which is used by line cards such as the Cisco OC48DPT/POS interface module.

Error Message

```
%POS-3-INTERNAL: POS internal error, [chars] [dec] [dec]
```

Explanation Internal POS error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%POS-3-INTERNALCMD: POS LC command internal error, [chars] [dec] [dec]
```

Explanation Internal POS line card command error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%POS-3-INTERNALEVT: POS LC Event internal error, [chars] [dec] [dec]
```

Explanation Internal POS line card event error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%POS-3-MIBINITFAIL: POS MIB initialization failed, [chars] [dec]
```

Explanation MIB initialization for POS Failed

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%POS-3-REDFATALLCEVT: Fatal error event on i/f ([chars]) reason: [chars]
```

Explanation   Internal redundant line card fatal event

Recommended Action   Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%POS-4-REDINLCEVT: Redundant inactive i/f ([chars]) event: [chars], reason:
[chars]
```

Explanation   Internal redundant line card event

Recommended Action   Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

PXF

Error Message

```
PXF_DMA-2-IPM_OVERRUN_ERROR: IPM overrun error detected on slot [integer].
Reloading microcode
```

Explanation An overrun occured while using redundant Cisco OC48-DPT/POS cards in SRP/DPT mode. This can happen when the primary (working) card is installed in an even-numbered slot, and an Automatic Protection Switching (APS) switchover occurs during periods of heavy traffic. The CMTS has responded by dropping all packets and reloading the microcode on the line cards, so it can resume normal traffic operations.

Recommended Action Reconfigure the system so that the primary (working) card is using the odd-numbered slot. Verify that the CMTS is running released software. If the problem persists, replace the Cisco OC48-DPT/POS card. If necessary, copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

RIM

This section describes system messages generated by the Redundant Interface Manager subsystem that manages the operation of line cards, such as the Cisco OC48DPT/POS interface module, that are operating in the SRP/DPT mode.

Error Message

```
%RIM-6-CHANGETORED: Changed to Redundant configuration: Active slot: [dec] [dec]
```

Explanation Changed to redundant configuration

Recommended Action No action is needed.

Error Message

```
%RIM-3-CUTOVERINT1: cutover int on nil card [dec] [dec]
```

Explanation Internal Redundant Interface Manager error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%RIM-3-CUTOVERINT2: Received disabled LC management interrupt 0x[hex]
```

Explanation Internal Redundant Interface Manager error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%RIM-3-GETRPSPAIR: active in illegal state [dec] [dec] 0x[hex] 0x[hex]
```

Explanation Internal Redundant Interface Manager error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%RIM-3-IDB2RPS: idb2rps failed [dec] [dec] 0x[hex]
```

Explanation Internal Redundant Interface Manager error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%RIM-3-INTERNALRIM: RIM internal error, [chars] [dec] [dec]
```

Explanation Internal Redundant Interface Manager error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%RIM-3-PLUGIN2RCS:plugin2rcs failed [dec] 0x[hex]
```

Explanation Internal Redundant Interface Manager error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%RIM-3-RCSUPDATESTDBY: RCS update on standby failed
```

Explanation Internal Redundant Interface Manager error

Recommended Action Copy the system message exactly as it appears on the console or in the system log. Issue the **show tech-support** command to gather data that may help identify the nature of the error. If you cannot determine the nature of the error from the system message text or from the **show tech-support** command output, contact your Cisco technical support representative and provide the representative with the gathered information.

Error Message

```
%RIM-6-REDREMOVED: Slots [dec] and [dec] redundant configuration removed
```

Explanation Removed redundant configuration

Recommended Action No action is needed.