CHAPTER 10

ISDN Commands

This chapter describes the commands available to configure your router for Integrated Services Digital Network (ISDN) operations.

For ISDN configuration information and examples, refer to the chapter entitled "Configuring ISDN" in the *Router Products Configuration Guide*.

For information about the Channel Interface Processor (CIP), see the chapter entitled "IBM Channel Attach Commands" in this manual. The CIP is described in a separate chapter because of the interrelation of host system configuration values and router configuration values.

For hardware technical descriptions, and for information about installing the router interfaces, refer to the hardware installation and maintenance publication for your particular product.

interface bri

To configure a Basic Rate Interface (BRI) interface and enter interface configuration mode, use the **interface bri** global configuration command.

interface bri *number*

To configure a BRI subinterface, use the following form of the **interface bri** global configuration command.

interface bri *number.subinterface-number* [**multipoint** | **point-to-point**]

Syntax Description

number	Port, connector, or interface card number. The numbers are assigned at the factory at the time of installation or when added to a system, and can be displayed with the **show interfaces** command.
.*subinterface-number*	Subinterface number in the range 1 to 4294967293. The *number* that precedes the period (.) must match the *number* this subinterface belongs to.
multipoint | **point-to-point**	(Optional) Specifies a multipoint or point-to-point subinterface. The default is **multipoint**.

Default

The default mode for subinterfaces is multipoint.

Command Mode

Global configuration

Usage Guidelines

Subinterfaces can be configured to support partially meshed Frame Relay networks (refer to the "Configuring Frame Relay" chapter in the *Router Products Configuration Guide*).

Example

The following example configures BRI 0 to call and receive calls from two sites, use PPP encapsulation on outgoing calls, and use CHAP authentication on incoming calls.

```
interface bri 0
encapsulation ppp
no keepalive
dialer map ip 131.108.36.10 name EB1 234
dialer map ip 131.108 36.9 name EB2 456
dialer-group 1
isdn spid1 0146334600
isdn spid2 0146334610
isdn T200 1000
ppp authentication chap
```

Related Commands

A dagger (†) indicates that the command is documented in another chapter.

dialer map†
dialer-group†
encapsulation ppp†
isdn spid1
isdn spid2
ppp authentication chap†
ppp authentication pap†
show interfaces bri

isdn answer1, isdn answer2

To have the router verify a called-party number or subaddress number in the incoming setup message for ISDN BRI calls, if the number is delivered by the switch, use the **isdn answer1** interface configuration command. To remove the verification request, use the **no** form of this command.

isdn answer1 [*called-party-number*][**:***subaddress*]
no isdn answer1 [*called-party-number*][**:***subaddress*]

To have the router verify an additional called-party number or subaddress number in the incoming setup message for ISDN BRI calls, if the number is delivered by the switch, use the **isdn answer2** interface configuration command. To remove this second verification request, use the **no** form of this command.

isdn answer2 [*called-party-number*][**:***subaddress*]
no isdn answer2 [*called-party-number*][**:***subaddress*]

Syntax Description

called-party-number	(Optional) Telephone number of the called party. At least one of the *called-party-number* or *subaddress* must be specified.
:	Identifies the number that follows as a subaddress. Use the colon (:) when you configure both the called party number and the subaddress or when you configure only the subaddress.
subaddress	(Optional) Subaddress number, 20 or fewer characters long, used for ISDN multipoint connections. At least one of the *called-party-number* or *subaddress* must be specified.

Default

The router does not verify the called-party or subaddress number.

Command Mode

Interface configuration

Usage Guidelines

If you do not specify the **isdn answer1** or **isdn answer2** command, all calls are processed/accepted. If you specify the **isdn answer1** or **isdn answer2** command, the router must verify the incoming called-party number and the subaddress before processing/accepting the call. The verification proceeds from right to left for the called-party number; it also proceeds from right to left for the subaddress number.

It is possible to configure just the called-party number or just the subaddress. In such a case, only that part is verified. To configure a subaddress only, include the colon (:) before the subaddress number.

You can declare a digit a “don’t care” digit by configuring it as an “x” or “X”. In such a case, any incoming digit is allowed.

Examples

In the following example, 5552222 is the called-party number and 1234 is the subaddress:

```
interface bri 0
isdn answer1 5552222:1234
```

In the following example, only the subaddress is configured:

```
interface bri 0
isdn answer1 :1234
```

isdn caller

To configure ISDN caller ID screening, use the **isdn caller** interface configuration command. To disable this feature, use the **no** form of this command.

isdn caller *number*
no isdn caller *number*

Syntax Description

number	Telephone number for which to screen. Specify an "x" to represent a single "don't-care" character. The maximum length of each number is 25 characters.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command configures the router to accept calls from the specified number.

Caller ID screening is available on Cisco 7000 series, Cisco 4000 series, Cisco 3000 series, and Cisco 2500 series routers that have one or more BRIs.

The maximum length of each number is 25 characters. You can specify up to 64 numbers per interface.

Note Caller ID screening requires a local switch that is capable of delivering the caller ID to the router. If you enable caller ID screening but do not have such a switch, no calls will be allowed in.

Examples

The following example configures the router to accept a call with a delivered caller ID equal to 4155551234:

```
isdn caller 4155551234
```

The following example configures the router to accept a call with a delivered caller ID having 41555512 and any numbers in the last two positions:

```
isdn caller 41555512xx
```

Related Command

A dagger (†) indicates that the command is documented in another chapter.

show dialer †

isdn calling-number

To configure an Australian basic-ts013 ISDN BRI interface to present a billing number of the device making the outgoing call, use the **isdn calling-number** interface configuration command. To remove a previously configured calling number, use the **no** form of this command.

isdn calling-number *calling-number*
no isdn calling number

Syntax Description

calling-number	Number of the device making the outgoing call; only one entry is allowed and it is limited to 16 digits.

Default

No calling number is presented.

Command Mode

Interface configuration

Usage Guidelines

An interface can have only one ISDN calling-number entry.

This command is intended for use only in Australia because the Australian network offers better pricing on calls in which devices present the calling number (that is, the billing number).

This command can be used only with Australian basic-ts013 switch types.

Example

In the following example, the ISDN BRI interface is configured to present the number 5551212 when it makes outgoing calls:

```
interface bri 0
isdn calling-number 5551212
```

Related Command

interface bri

isdn leased-line

To configure a Basic Rate Interface (BRI) interface to use the ISDN physical connection as a leased-line service, use the **isdn leased-line** command.

isdn leased-line bri *number*
no isdn leased-line bri *number*

Syntax Description

bri *number*	BRI interface number. When configured as a leased line, each B channel has an interface associated with it and can be displayed with the **show interfaces** command. The possible values are 0 to the maximum number of BRI interfaces, minus one, on the router. The D channel is represented by the normal BRI interface BRI0. The B interfaces are named after the original BRI interface with a colon and the B channel number. For example, BRI0:2 is the second B channel on the first BRI interface.

Default

Disabled

Command Mode

Global configuration

Usage Guidelines

Use this command to utilize the telephone company service that uses the ISDN physical connection as a leased-line service including the D64S (Digital 64S) in Germany and the I-Interface support in Japan. On leased-line ISDN, you must specify a switch type.

Example

The following example configures a leased-line ISDN interface:

```
router#conf t
router(config)#isdn leased-line
BRI ISDN Basic Rate Interface
router(config)#isdn leased bri?
<0-7> BRI interface number
router(config)#isdn Leased bri0
router(config)#exit
```

Related Command

show interfaces bri

isdn not-end-to-end

For incoming calls, to override the speed that the network reports it will use to deliver the call data, use the **isdn not-end-to-end** interface configuration command.

isdn not-end-to-end {**56** | **64**}

Command Syntax

56 | **64** Line speed used for incoming calls that are not ISDN from end to end.

Default

The default line speed is 64 kbps.

Command Mode

Interface configuration

Usage Guidelines

This command is useful when calls originate at 56 kbps, but the network delivers the calls as 64 kbps calls. If calls originate at one speed and are delivered at another, a speed mismatch occurs and no data can be transferred.

A speed mismatch can occur when the source and destination ISDN ports do not belong to the same network.

Example

In the following example, the line speed for incoming calls is set to 56 kbps:

```
isdn not-end-to-end 56
```

isdn spid1

Use the **isdn spid1** interface configuration command to define at the router the service profile identifier (SPID) number that has been assigned by the ISDN service provider for the B1 channel. Use the **no** form of this command to disable the specified SPID, thereby preventing access to the switch. If you include the LDN in the **no** form of this command, the access to the switch is permitted, but the other B-channel may not be able to receive incoming calls.

isdn spid1 *spid-number* [*ldn*]
no isdn spid1 *spid-number* [*ldn*]

Syntax Description

spid-number	Number identifying the service to which you have subscribed. This value is assigned by the ISDN service provider and is usually a ten-digit telephone number with some extra digits.
ldn	(Optional) Local directory number, as delivered by the service provider in the incoming setup message. This is a seven-digit number assigned by the service provider.

Default

No SPID number is defined.

Command Mode

Interface configuration

Usage Guidelines

This command is required for DMS-100 and National ISDN-1 (NI-1) switches only.

You must define the LDN if you want to receive any incoming calls on the B2-channel. The ISDN switch checks for the LDN to determine whether both channels can be used to transmit and receive data. If the LDN is not present, then only the B1-channel can be used for full-duplex communication. However, the other channel can still be used for making outgoing calls.

Example

The following example defines, on the router, a SPID and LDN for the B1 channel:

```
isdn spid1 415555121301 5551215
```

isdn spid2

Use the **isdn spid2** interface configuration command to define at the router the SPID number that has been assigned by the ISDN service provider for the B2 channel. Use the **no** form of this command to disable the specified SPID, thereby preventing access to the switch. If you include the LDN in the **no** form of this command, the access to the switch is permitted, but the other B-channel might not be able to receive incoming calls.

isdn spid2 *spid-number* [*ldn*]
no isdn spid2 *spid-number* [*ldn*]

Syntax Description

spid-number	Number identifying the service to which you have subscribed. This value is assigned by the ISDN service provider and is usually a ten-digit telephone number with some extra digits.
ldn	(Optional) Local directory number, as delivered by the service provider in the incoming setup message. This is a seven-digit number also assigned by the service provider.

Default

No SPID number is defined.

Command Mode

Interface configuration

Usage Guidelines

This command is required for DMS-100 and National ISDN-1 (NI-1) switches only.

You must define the LDN if you want to receive any incoming calls on the B1-channel. The ISDN switch checks for the LDN to determine whether both channels can be used to transmit and receive data. If the LDN is not present, then only the B2-channel can be used for full-duplex communication. However, the other channel can still be used for making outgoing calls.

Example

The following example defines, on the router, a SPID and LDN for the B2 channel:

```
isdn spid2 415555121202 5551214
```

isdn switch-type

To configure a central office switch on the ISDN interface, use the **isdn switch-type** global configuration command.

isdn switch-type *switch-type*

Syntax Description

switch-type	Service provider switch type; see Table 10-1 for a list of supported switches.

Default

The switch type defaults to **none**, which disables the switch on the ISDN interface.

Command Mode

Global configuration

Usage Guidelines

To disable the switch on the ISDN interface, specify **isdn switch-type none**.

Table 10-1 lists supported switch types by geographic area.

Table 10-1 ISDN Service Provider Switch Types

Keywords by Area	Switch Type
none	No switch defined
Australia	
basic-ts013	Australian TS013 switches
Europe	
basic-1tr6	German 1TR6 ISDN switches
basic-nwnet3	Norway NET3 switches (phase 1)
basic-net3	NET3 ISDN switches (UK and others)
primary-net5	NET5 switches (UK and Europe)
vn2	French VN2 ISDN switches
vn3	French VN3 ISDN switches
Japan	
ntt	Japanese NTT ISDN switches
primary-ntt	Japanese ISDN PRI switches
North America	
basic-5ess	AT&T basic rate switches
basic-dms100	NT DMS-100 basic rate switches
basic-ni1	National ISDN-1 switches

Keywords by Area	Switch Type
primary-4ess	AT&T 4ESS switch type for the U.S. (ISDN PRI only)
primary-5ess	AT&T 5ESS switch type for the U.S. (ISDN PRI only)
primary-dms100	NT DMS-100 switch type for the U.S. (ISDN PRI only)
New Zealand	
basic-nznet3	New Zealand Net3 switches

Example

The following example configures the French VN3 ISDN switch type:

```
isdn switch-type vn3
```

isdn tei

To configure when ISDN Layer 2 terminal endpoint identifier (TEI) negotiation should occur, use the **isdn tei** global configuration command. Use the **no** form of this command to restore the default.

isdn tei [**first-call** | **powerup**]
no isdn tei

Syntax Description

first-call	(Optional) ISDN TEI negotiation should occur when the first ISDN call is placed or received.
powerup	(Optional) ISDN TEI negotiation should occur when the router is powered on.

Default

powerup

Command Mode

Global configuration

Usage Guidelines

Use this command with care. This command is only used for BRI configuration.

Example

The following example configures the router to negotiate TEI when the first ISDN call is placed or received:

```
isdn tei first-call
```

linecode b8zs

Use the **linecode b8zs** controller configuration command to select the B8ZS line-code type for the T1 line attached to an ISDN PRI.

linecode b8zs

Syntax Description

This command has no arguments or keywords.

Command Mode

Controller configuration

Usage Guidelines

This command is used in configurations where the router is intended to communicate with a T1 fractional data line.

Example

The following example specifies B8ZS as the line-code type:

```
linecode b8zs
```

pri-group

To specify ISDN Primary Rate Interface (PRI) on a channelized T1 card on the Cisco 7000 series, use the **pri-group** controller configuration command. Use the **no** form of this command to remove the ISDN PRI.

pri-group [**timeslots** *range*]
no pri-group

Syntax Description

timeslots *range*	(Optional) Specifies a single range of values from 1 to 23.

Default

Disabled

Command Mode

Controller configuration

Usage Guidelines

Before you enter the **pri-group** command, you must specify an ISDN switch type for PRI and a T1 controller.

Example

The following example specifies ISDN PRI on T1 slot 1, port 0:

```
isdn switch-type primary-4ess
controllers t1 1/0
framing esf
linecode b8zs
pri-group timeslots 2-6
```

Related Commands

A dagger (†) indicates that the command is documented in another chapter.

controllers t1†
framing†
isdn switch-type
linecode b8zs

show controllers bri

To display information about the ISDN Basic Rate Interface (BRI), use the **show controllers bri** privileged EXEC command.

show controllers bri *number*

Syntax Description

number	Interface number. The value is 0 through 7 if the router has one BRI NIM or 0 through 15 if the router has two BRI NIMs.

Command Mode

Privileged EXEC

Sample Display

The following is sample output from the **show controllers bri** command:

```
Router# show controllers bri 0

BRI unit 0
D Chan Info:
Layer 1 is ACTIVATED
idb 0x32089C, ds 0x3267D8, reset_mask 0x2
buffer size 1524
RX ring with 2 entries at 0x2101600 : Rxhead 0
00 pak=0x4122E8 ds=0x412444 status=D000 pak_size=0
01 pak=0x410C20 ds=0x410D7C status=F000 pak_size=0
TX ring with 1 entries at 0x2101640: tx_count = 0, tx_head = 0, tx_tail = 0
00 pak=0x000000 ds=0x000000 status=7C00 pak_size=0
0 missed datagrams, 0 overruns, 0 bad frame addresses
0 bad datagram encapsulations, 0 memory errors
0 transmitter underruns
B1 Chan Info:
Layer 1 is ACTIVATED
idb 0x3224E8, ds 0x3268C8, reset_mask 0x0
buffer size 1524
RX ring with 8 entries at 0x2101400 : Rxhead 0
00 pak=0x421FC0 ds=0x42211C status=D000 pak_size=0
01 pak=0x4085E8 ds=0x408744 status=D000 pak_size=0
02 pak=0x422EF0 ds=0x42304C status=D000 pak_size=0
03 pak=0x4148E0 ds=0x414A3C status=D000 pak_size=0
04 pak=0x424D50 ds=0x424EAC status=D000 pak_size=0
05 pak=0x423688 ds=0x4237E4 status=D000 pak_size=0
06 pak=0x41AB98 ds=0x41ACF4 status=D000 pak_size=0
07 pak=0x41A400 ds=0x41A55C status=F000 pak_size=0
TX ring with 4 entries at 0x2101440: tx_count = 0, tx_head = 0, tx_tail = 0
00 pak=0x000000 ds=0x000000 status=5C00 pak_size=0
01 pak=0x000000 ds=0x000000 status=5C00 pak_size=0
02 pak=0x000000 ds=0x000000 status=5C00 pak_size=0
03 pak=0x000000 ds=0x000000 status=7C00 pak_size=0
0 missed datagrams, 0 overruns, 0 bad frame addresses
0 bad datagram encapsulations, 0 memory errors
0 transmitter underruns
B2 Chan Info:
Layer 1 is ACTIVATED
idb 0x324520, ds 0x3269B8, reset_mask 0x2
buffer size 1524
```

```
RX ring with 8 entries at 0x2101500 : Rxhead 0
00 pak=0x40FCF0 ds=0x40FE4C status=D000 pak_size=0
01 pak=0x40E628 ds=0x40E784 status=D000 pak_size=0
02 pak=0x40F558 ds=0x40F6B4 status=D000 pak_size=0
03 pak=0x413218 ds=0x413374 status=D000 pak_size=0
04 pak=0x40EDC0 ds=0x40EF1C status=D000 pak_size=0
05 pak=0x4113B8 ds=0x411514 status=D000 pak_size=0
06 pak=0x416ED8 ds=0x417034 status=D000 pak_size=0
07 pak=0x416740 ds=0x41689C status=F000 pak_size=0
TX ring with 4 entries at 0x2101540: tx_count = 0, tx_head = 0, tx_tail = 0
00 pak=0x000000 ds=0x000000 status=5C00 pak_size=0
01 pak=0x000000 ds=0x000000 status=5C00 pak_size=0
02 pak=0x000000 ds=0x000000 status=5C00 pak_size=0
03 pak=0x000000 ds=0x000000 status=7C00 pak_size=0
0 missed datagrams, 0 overruns, 0 bad frame addresses
0 bad datagram encapsulations, 0 memory errors
0 transmitter underruns
```

Table 10-2 describes the significant fields in the display.

Table 10-2 Show Controllers BRI Field Descriptions

Field	Description
BRI unit 0	Interface type and unit number.
Chan Info	D- and B-channel numbers.
Layer 1 is ACTIVATED	Status can be DEACTIVATED, PENDING ACTIVATION, or ACTIVATED.
idb ds reset_mask	Information about internal data structures and parameters.
buffer size	Number of bytes allocated for buffers.
RX ring with - entries at -	Information about the Receiver Queue.
Rxhead	Start of the Receiver Queue.
pak ds status pak_size	Information about internal data structures and parameters.
TX ring with - entries at -	Information about the Transmitter Queue.
tx_count	Number of packets to transmit.
tx_head	Start of the transmit list.
tx_tail	End of the transmit list.
missed datagrams	Incoming packets missed due to internal errors.
overruns	Number of times the receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
bad frame addresses	Frames received with a CRC error and noninteger number of octets.
bad datagram encapsulations	Packets received with bad encapsulation.
memory errors	Internal DMA memory errors.
transmitter underruns	Number of times that the transmitter has been running faster than the router can handle.

show interfaces bri

Use the **show interfaces bri** privileged EXEC command to display information about the BRI D- and B-channels.

show interfaces bri *number* [*first*] [*last*] [**accounting**]

Syntax Description

number	Interface number. The value is 0 through 7 if the router has one BRI NIM or 0 through 15 if the router has two BRI NIMs. Specifying just the number will display the D-channel for that BRI interface.
first	(Optional) Specifies the first of the B-channels; the value can be either 1 or 2.
last	(Optional) Specifies the last of the B-channels; the value can only be 2, indicating B-channels 1 and 2.
accounting	(Optional) Displays the number of packets of each protocol type that have been sent through the interface.

Command Mode

Privileged EXEC

Usage Guidelines

To obtain D-channel information, use the command without the optional *first* and *last* arguments.

Use the command syntax sample combinations in Table 10-3 to display the associated output.

Table 10-3 Sample Show Interfaces BRI Combinations

Command Syntax	Displays
show interfaces	All interfaces in the router
show interfaces bri 2	Channel D for BRI interface 2
show interfaces bri 4 1	Channel B1 on BRI interface 4
show interfaces bri 4 2	Channel B2 on BRI interface 4
show interfaces bri 4 1 2	Channels B1 and B2 on BRI interface 4
show interfaces bri	Error message: "% Incomplete command."

Sample Display

The following is sample output from the **show interfaces** command for BRI:

```
Router# show interfaces bri 0

BRI0 is up, line protocol is up (spoofing)
   Hardware is BRI
   Internet address is 150.136.190.203, subnet mask is 255.255.255.0
   MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
   Encapsulation HDLC, loopback not set, keepalive set (10 sec)
   Last input 0:00:07, output 0:00:00, output hang never
```

```
Output queue 0/40, 0 drops; input queue 0/75, 0 drops
Five minute input rate 0 bits/sec, 0 packets/sec
Five minute output rate 0 bits/sec, 0 packets/sec
    16263 packets input, 1347238 bytes, 0 no buffer
    Received 13983 broadcasts, 0 runts, 0 giants
    2 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 2 abort
    22146 packets output, 2383680 bytes, 0 underruns
    0 output errors, 0 collisions, 2 interface resets, 0 restarts
    1 carrier transitions
```

Table 10-4 describes the fields shown in the display.

Table 10-4 Show Interfaces BRI Field Descriptions

Field	Description
BRI ... is {up | down | administratively down	Indicates whether the interface hardware is currently active (whether line signal is present) and if it has been taken down by an administrator.
line protocol is {up | down | administratively down}	Indicates whether the software processes that handle the line protocol consider the line usable (that is, whether keepalives are successful).
Hardware is	Hardware type.
Internet address is	IP address and subnet mask, followed by packet size.
MTU	Maximum Transmission Unit of the interface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100% reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes.
Encapsulation	Encapsulation method assigned to interface.
loopback	Indicates whether loopback is set or not.
keepalive	Indicates whether keepalives are set or not.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because of a transmission that took too long. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
Output queue, drops Input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped due to a full queue.
Five minute input rate Five minute output rate	Average number of bits and packets transmitted per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.

Field	Description
bytes	Total number of bytes, including data and MAC encapsulation, in the error free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so this sum may not balance with the other counts.
CRC	Cyclic redundancy checksum generated by the originating station or far-end device does not match the checksum calculated from the data received. On a serial link, CRCs usually indicate noise, gain hits, or other transmission problems on the data link.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets. On a serial line, this is usually the result of noise or other transmission problems.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. Broadcast storms and bursts of noise can cause the ignored count to be increased.
abort	Illegal sequence of one bits on a serial interface. This usually indicates a clocking problem between the serial interface and the data link equipment.
packets output	Total number of messages transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times that the transmitter has been running faster than the router can handle. This may never be reported on some interfaces.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, as some datagrams may have more than one error, and others may have errors that do not fall into any of the specifically tabulated categories.
collisions	Number of collisions. This could happen when you have several devices connected on a multiport line.

Field	Description
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for transmission were not sent within several seconds. On a serial line, this can be caused by a malfunctioning modem that is not supplying the transmit clock signal or by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down.
restarts	Number of times the controller was restarted because of errors.
carrier transitions	Number of times the carrier detect signal of a serial interface has changed state. Indicates modem or line problems if the carrier detect line is changing state often.

show isdn

To display the information about memory, Layer 2 and Layer 3 timers and, on the Cisco 7000 series only, to display information about the status of PRI channels, use the **show isdn** global configuration command.

show isdn {**memory** | **timers** | **services**}

Syntax Description

memory	Displays memory pool statistics.This is only used by technical development staff.
timers	Displays the values of Layer 2 and Layer 3 timers.
services	Displays the status of PRI channels. (Cisco 7000 series only).

Command Mode

Global configuration

Sample Display

The following is sample output from the **show isdn timers** command.

```
Router# show isdn timers

ISDN Layer 2 values:
         K    = 0   outstanding I-frames
         N200 = 0   max number of retransmits
         T200 = 0   seconds
         T202 = 2   seconds
         T203 = 0   seconds
ISDN Layer 3 values:
         T303 = 0   seconds
         T305 = 0   seconds
         T308 = 0   seconds
         T310 = 0   seconds
         T313 = 0   seconds
         T316 = 0   seconds
         T318 = 0   seconds
         T319 = 0   seconds
```

The following is sample output from the **show isdn services** command for an ISDN T1 PRI. The channels are displayed in numeric order with channel 1 in the left-most position. Because a T1 has 23 channels only, channels 24 through 31 are shown as unavailable.

```
Router# show isdn services

PRI Channel Statistics:
Dsl 3, Channel (1-31)
  State (0=Idle 1=Propose 2=Busy 3=Reserved 4=Restart 5=Maint)
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 3 3 3 3 3 3 3 3
  Channel (1-31) Service (0=Inservice 1=Maint 2=Outofservice)
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

The following is sample output from the **show isdn services** command for an ISDN E1 PRI. Because channel 16 is a D-channel, it is shown as unavailable for placing calls.

```
Router# show isdn services

PRI Channel Statistics:
Dsl 3, Channel (1-31)
  State (0=Idle 1=Propose 2=Busy 3=Reserved 4=Restart 5=Maint)
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  Channel (1-31) Service (0=Inservice 1=Maint 2=Outofservice)
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

Table 10-5 displays some typical values of the timers shown in the **show isdn timers** display. The values of the timers depend on the switch type and typically are used only for homologation purposes. See the Q.921 specifications for detailed technical definitions of the Layer 2 timers; see the Q.931 specifications for detailed technical definitions of the Layer 3 timers.

Table 10-5 Show ISDN Timers Command Output

Field	Typical Value
ISDN Layer 2 values:	
K = 0 outstanding I-frames	1
N200 = 0 max number of retransmits	3
T200 = 0 seconds	1
T202 = 2 seconds	2
T203 = 0 seconds	10
ISDN Layer 3 values:	
T303 = 0 seconds	4
T305 = 0 seconds	30
T308 = 0 seconds	4
T310 = 0 seconds	40
T313 = 0 seconds	0
T316 = 0 seconds	4
T318 = 0 seconds	4
T319 = 0 seconds	4

Table 10-6 describes the fields shown in the **show isdn services** display.

Table 10-6 Show ISDN Services Command Output

Field	Description
Dsl 3	Digital Services Loop, an interface on Cisco 7000 series routers.
State	
Idle	Channel is available for use.
Propose	Attempting to place or receive a call on this channel.
Busy	Channel is currently in use.

Field	Description
Reserved	Channel is not available for calls to be placed. D-channels are reserved; channels 24 through 31 are unavailable on a T1 PRI.
Restart	Restart message was sent on the channel.
Maint	Channel is in maintenance mode.
Channel Service (1-31)	
Inservice	Channel is available.
Maint	Channel is unavailable.
Outofservice	Network made this channel unavailable.