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 *Wide-Area Networking Configuration Guide*.

For information about the Channel Interface Processor (CIP), see the chapter entitled "IBM Channel Attach Commands" in the *Bridging and IBM Networking Command Reference*. 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.

cpp authentication

To enable negotiation of authentication with a router or bridge that supports the Combinet Proprietary Protocol (CPP) and that is calling in to this router, use the **cpp authentication** interface configuration command.

cpp authentication

Syntax Description

This command has no keywords or arguments.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Use this command for authenticating the device that is calling in to this router.

Use this command to communicate over an ISDN interface with Combinet devices that do not support Point-to-Point Protocol (PPP) but do support the Combinet Proprietary Protocol (CPP).

Currently, most Combinet devices *do* support PPP. Cisco routers can communicate over ISDN with these devices by using PPP encapsulation, which supports both routing and fast switching.

This command is supported on ISDN and dialer interfaces.

This command uses names and passwords from the **username password** command. It does not support the Terminal Access Controller Access Control System (TACACS).

Example

The following example configures a Basic Rate Interface (BRI) to communicate with a Combinet bridge that does not support PPP:

```
interface bri 0
encapsulation cpp
cpp callback accept
cpp authentication
```

Related Commands

A dagger (†) indicates that the command is documented outside this chapter.

cpp callback accept
encapsulation cpp
username password †

cpp callback accept

To enable the router to accept callback from a Combinet router or bridge that supports the Combinet Proprietary Protocol (CPP), use the **cpp authentication** interface configuration command.

cpp callback accept

Syntax Description

This command has no keywords or arguments.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Use this command to communicate over an ISDN interface with Combinet devices that do not support PPP but do support CPP.

Currently, most Combinet devices *do* support PPP. Cisco routers can communicate over ISDN with these devices by using PPP encapsulation, which supports both routing and fast switching.

This command is supported on ISDN and dialer interfaces.

Example

The following example configures BRI 0 to communicate with a Combinet router or bridge that does not support PPP:

```
interface bri 0
encapsulation cpp
cpp callback accept
cpp authentication
```

Related Commands

cpp authentication
encapsulation cpp

dialer outgoing

To configure the dialer map class for an AT&T Network-Specific Facility (NSF) dialing plan to support outgoing calls, use the **dialer outgoing** map-class dialer configuration command.

dialer outgoing *classname*

Syntax Description

classname	Keyword for a specified AT&T Primary-4ESS NSF dialing plan; the following keywords are supported: **sdn**, **megacomm**, and **accunet**.

Default

This command is disabled; no classname is provided.

Command Mode

Map-class dialer configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Use this command only to define a dialer map class for an NSF call-by-call service offered by AT&T on Primary-4ESS ISDN switches. This command is not used for other vendors and switch types.

Example

The following partial example shows a class called sdn to support the Software Defined Network (SDN) dialing plan. For a more complete example using all the related commands, see the **map-class dialer** command.

```
dialer outgoing sdn
```

Related Commands

dialer map class
map-class dialer
dialer voice-call

dialer voice-call

To configure the dialer map class for an NSF dialing plan to support outgoing voice calls, use the **dialer voice-call** map-class dialer command.

dialer voice-call

Syntax Description

This command has no arguments and keywords.

Default

This command is disabled.

Command Mode

Map-class dialer configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

Example

The following partial example defines a dialer map class to support the SDN dialing plan and to support outgoing voice calls. For a more complete example using all the related commands, see the **map-class dialer** command.

```
map-class dialer sdnplan
dialer voice-call
dialer outgoing sdn
```

Related Commands

dialer map class
map-class dialer
dialer outgoing

map-class dialer

To define a class of shared configuration parameters for outgoing calls from an ISDN interface, use the **map-class dialer** global configuration command.

map-class dialer *classname*

Syntax Description

classname	Unique class identifier.

Default

Disabled; no class name is provided.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

The *classname* in the **map-class dialer** command used to specify the class must be the same as a *classname* used in a **dialer map** command.

This command is used to define classes of calls for PPP callback for DDR, for ISDN Advice of Charge, and for NSF call-by-call dialing plans.

For NSF call-by-call support on AT&T Primary-4ESS switches only, use one of the dialing-plan keywords listed in Table 27.

Table 27 NSF Keywords and Supported Services

Keyword	NSF Dialing Plan	Data	Voice	International
sdnplan	SDN	Yes	Yes	GSDN (Global SDN)
megaplan	MEGACOMM	No	Yes	Yes
accuplan	ACCUNET	Yes	Yes	Yes

Example

The following example configures the PPP callback server on an ISDN BRI interface on a router in Atlanta. The callback server requires an enable timeout and a map class to be defined.

```
interface BRI0
 ip address 7.1.1.7 255.255.255.0
 encapsulation ppp
 dialer callback-secure
 dialer enable-timeout 2
 dialer map ip 7.1.1.8 name atlanta class dial1 81012345678901
 dialer-group 1
 ppp callback accept
 ppp authentication chap
!
```

```
map-class dialer dial1
 dialer callback-server username
```

In the following example, the ISDN switch type is set to Primary-4ESS, ISDN PRI is configured on T1 controller 1/0, and the D channel is configured for dialer map classes that reference the NSF dialing plans. Finally, the **map-class dialer** command uses a dialing plan keyword and the **dialer outgoing** command refers to the same plan.

```
isdn switch-type primary-4ess
!
!
controller T1 1/0
 framing esf
 linecode b8zs
 pri-group timeslots 1-24
!
interface Serial1/0:23
 description This is the DMS D-chan 415-390-9503
 ip address 6.1.1.3 255.255.255.0
 encapsulation ppp
 no keepalive
 dialer map ip 6.1.1.1 name tommyjohn class sdnplan 14085770715
 dialer map ip 6.1.1.2 name angus class megaplan 14085773775
 dialer map ip 6.1.1.4 name angus class accuplan 14085773778
 dialer-group 1
 ppp authentication chap
!
map-class dialer sdnplan
 dialer outgoing sdn
!
map-class dialer megaplan
 dialer voice-call
 dialer outgoing mega
!
map-class dialer accuplan
 dialer outgoing accu
!
```

Related Command

dialer map class
map-class dialer
dialer outgoing

encapsulation cpp

To enable encapsulation for communication with routers or bridges using the Combinet Proprietary Protocol (CPP), use the **encapsulation cpp** interface configuration command.

encapsulation cpp

Syntax Description

This command has no keywords or arguments.

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

Use this command to communicate over an ISDN interface with Combinet devices that do not support PPP but do support CPP.

Currently, most Combinet devices *do* support PPP. Cisco routers can communicate over ISDN with these devices by using PPP encapsulation, which supports both routing and fast switching.

Combinet devices support only IP, IPX and bridging. For AppleTalk, Cisco routers automatically perform half-bridging with Combinet devices.

This command is supported on ISDN BRIs and Primary Rate Interfaces (PRIs) only.

Example

The following example configures BRI 0 to communicate with a Combinet router or bridge that does not support PPP:

```
interface bri 0
encapsulation cpp
cpp callback accept
cpp authentication
```

Related Commands

cpp authentication
cpp callback accept

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 only, 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

This command first appeared in Cisco IOS Release 10.3.

Subinterfaces can be configured to support partially meshed Frame Relay networks. (Refer to the "Configuring Frame Relay" chapter in the *Wide-Area Networking Configuration Guide.*)

Example

The following example configures BRI 0 to call and receive calls from two sites, use Point-to-Point Protocol (PPP) encapsulation on outgoing calls, and use Challenge Handshake Authentication Protocol (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 outside this 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 value—*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 value—*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

This command first appeared in Cisco IOS Release 10.3.

If you do not specify the **isdn answer1** or **isdn answer2** command, all calls are processed and/or 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 and/or 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.

You can 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 first appeared in Cisco IOS Release 10.0.

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

Caller ID screening is available on Cisco routers with one or more ISDN BRI or PRI interfaces.

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 are 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 outside this chapter.

show dialer †

isdn calling-number

To configure an ISDN BRI or PRI 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

This command first appeared in Cisco IOS Release 10.3.

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

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

Note This command cannot be used with German 1TR6 ISDN BRI switches. It can be used with all other switches.

Examples

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
```

In the following example, the T1 controller is configured and then the D channel interface is configured to present the billing number 4233570925 when it makes outgoing calls:

```
controller t1 1/1
 framing esf
 linecode b8zs
 pri-group timeslots 1-23
 isdn switchtype primary-4ess
!
interface serial 1/1:23
 ip address 7.1.1.1 255.255.255.0
 encapsulation ppp
```

```
isdn calling-number 4233570925
dialer map ip 7.1.1.2 name dallas 14193460913
```

Related Command

interface 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 first appeared in Cisco IOS Release 10.3.

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 sending-complete

To specify that the Sending Complete information element (IE) is included in the outgoing Setup message, use the **isdn sending-complete** interface configuration command.

isdn sending-complete

Syntax Description

This command has no arguments and keywords.

Default

This command is disabled by default.

Command Mode

Interface configuration

Usage Guidelines

Some switches in some countries want a Sending Complete information element to be included in the outgoing Setup message to indicate that the entire number is included. The Sending Complete IE is required in Hong Kong and Taiwan, and the **isdn sending-complete** command forces it to be sent.

Example

In the following example, the **isdn sending-complete** command applies to an ISDN BRI interface:

```
interface BRI0
  description connected to PBX 61886
  ip address 172.1.1.1 255.255.255.0
  encapsulation ppp
  isdn sending-complete
  dialer idle-timeout 20
  dialer map ip 172.1.1.2 name rudder 61884
  dialer map ip 172.1.1.3 name bosun 61885
  dialer-group 1
  ppp authentication chap
 !
```

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 local directory number (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 10-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 7-digit number assigned by the service provider.

Default

No SPID number is defined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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 10-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 7-digit number also assigned by the service provider.

Default

No SPID number is defined.

Command Mode

Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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 specify the central office switch type 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 28 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

This command first appeared in Cisco IOS Release 10.0.

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

Table 28 lists supported switch types by geographic area.

Table 28 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, Denmark, and other nations); covers the Euro-ISDN E-DSS1 signalling system
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

Table 28 ISDN Service Provider Switch Types (Continued)

Keywords by Area	Switch Type
basic-ni1	National ISDN-1 switches
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 occurs when the first ISDN call is placed or received.
powerup	(Optional) ISDN TEI negotiation occurs when the router is powered on.

Default

powerup

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

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

Example

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

```
isdn tei first-call
```

linecode

Use the **linecode** controller configuration command to select the line-code type for the T1 or E1 line attached to an ISDN Primary Rate Interface (PRI).

linecode {**b8zs** | **hdb3**}

Syntax Description

b8zs	Binary 8-zero substitution (B8ZS) linecode, used on the T1 line attached to an ISDN Primary Rate Interface (PRI).
hdb3	High-density bipolar 3 (HDB3) linecode, used on the E1 line attached to an ISDN Primary Rate Interface (PRI).

Command Mode

Controller configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command is used in configurations where the router is intended to communicate with a channelized T1 or E1 data line.

Example

The following example specifies B8ZS as the line-code type on a channelized T1 line:

```
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

This command first appeared in Cisco IOS Release 10.3.

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 outside this 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 network interface module (NIM), or 0 through 15 if the router has two BRI NIMs.

Command Mode

Privileged EXEC

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

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 29 describes the significant fields in the display.

Table 29 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 cyclic redundancy check (CRC) error and noninteger number of octets.

Table 29 Show Controllers BRI Field Descriptions (Continued)

Field	Description
bad datagram encapsulations	Packets received with bad encapsulation.
memory errors	Internal direct memory access (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 channel or about one or more B channels.

show interfaces bri *number*[[**:***bchannel*] | [*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.
:*bchannel*	(Optional) Specific B channel number, preceded by a colon.
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

This command first appeared in Cisco IOS Release 10.3.

Use either the :*bchannel-number* argument or the *first* or *last* arguments to display information about specified B channels.

Use the **show interfaces bri** *number* form of the command (without the optional **:***bchannel,* or *first* and *last* arguments) to obtain D channel information.

Use the command syntax sample combinations in Table 30 to display the associated output.

Table 30 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 2:1	Channel B1 on BRI interface 2
show interfaces bri 2:2	Channel B2 on 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 bri** command:

```
Router# show interfaces bri 0:1

BRI0:1 is down, line protocol is down
  Hardware is BRI
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255, load 1/255
  Encapsulation PPP, loopback not set, keepalive not set
  LCP Closed
  Closed: IPCP
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     0 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants
     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, 7 interface resets
     0 output buffer failures, 0 output buffers swapped out
     0 carrier transitions
```

Table 31 describes the fields shown in the display.

Table 31 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 percent 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 nonfunctioning interface failed.
output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface.

Table 31 Show Interfaces BRI Field Descriptions (Continued)

Field	Description
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.
bytes	Total number of bytes, including data and media access control (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 increase the ignored count.
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.

Table 31 Show Interfaces BRI Field Descriptions (Continued)

Field	Description
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, because 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. These can occur when you have several devices connected on a multiport line.
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 recognizes 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. Check for 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 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 keyword is for use by technical development staff only.
timers	Displays the values of Layer 2 and Layer 3 timers.
services	Displays the status of PRI channels.

Command Mode

Global configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Sample Displays

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 leftmost 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 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 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 32 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 32 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 33 describes the fields shown in the **show isdn services** display.

Table 33 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.

Table 33 Show ISDN Services Command Output (Continued)

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.