isdn call interface

The **isdn call interface** command is replaced by the **isdn test call interface** command. See the **isdn test call interface** command for more information.

isdn caller

To configure ISDN caller ID screening and optionally to enable ISDN caller ID callback for legacy dial-on-demand routing (DDR), use the **isdn caller** command in interface configuration mode. To disable this feature, use the **no** form of this command.

isdn caller *phone-number* [**callback**] [**exact**]

no isdn caller *phone-number* [**callback**] [**exact**]

Syntax Description

phone-number	Remote telephone number for which to screen. Use the letter X to represent a single "don't care" digit. The maximum length of each number is 25 digits.
callback	(Optional) Enables callback.
exact	(Optional) Performs matching on incoming telephone number exactly as entered.

Command Default Disabled

Command Modes Interface configuration

Command History

Release	Modification
10.0	This command was introduced.
11.2F	This command was implemented on additional Cisco router and access server platforms.
12.1	The **exact** keyword was added.

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

Note Caller ID screening requires a local switch or router that is capable of delivering the caller ID to the router. If you enable caller ID screening but do not have such a switch or router, no calls are allowed in. Caller ID screening is available on Cisco 7200 and 7500 series, Cisco 4000 series, Cisco 3000 series, and Cisco 2500 series routers that have one or more BRIs.

When the optional **callback** keyword is used and a call is received from one of the callback numbers, the initial call is rejected (hence, not subject to tolls) and a callback is initiated to that calling number.

When Xs are used in the callback number, dialer caller screening is based on a best match system that uses the *number* of Xs as a criterion. To make callback calls only to specified numbers or ranges of numbers but to accept any other incoming calls, make sure that the number of Xs in any configuration line that uses the **callback** keyword is less than the number of Xs in any configuration line that does not use the keyword.

For example, if you use at most four Xs in the configuration lines with the **callback** keyword, then to accept calls from other numbers use at least five Xs in a configuration line that does not use the keyword.

When a telephone number is entered *without* the **exact** keyword, the software compares each number going from right to left until matching numbers are detected. For example, if the *phone-number* argument is 4085550134, calls from telephone numbers 0134, 50134, 5550134, and 4085550134 would be accepted, but calls from telephone numbers 44 and 4155550134 would be rejected.

If you want to accept a telephone number *exactly* as it is configured, enter it with the **exact** keyword. For example, if the *phone-number* argument is 5550112 and the **exact** keyword is applied, only the telephone number 5550112 is accepted; calls from telephone numbers 408550112 and 50112 would be rejected.

The maximum length of each telephone number is 25 characters. There is no limit on the numbers you can specify per interface.

Examples

The following example configures the router to accept a call containing the numbers 415 555-0134:

```
isdn caller 4155550134
```

The following example configures the router to accept a call only from telephone number 555-0134:

```
isdn caller 5550134 exact
```

In the above example, a call from telephone number 415 555-0134 would be rejected.

The following example configures the router to accept a call with telephone number containing 415 555-01 and any numbers in the last two positions:

```
isdn caller 41555501xx
```

In the following example, callback calls will be made only to numbers in the 555 exchange, but any other telephone number can call in:

```
isdn caller 408555xxxx callback
isdn caller xxxxx
```

Related Commands

Command	Description
show dialer	Displays general diagnostic information for interfaces configured for DDR.

isdn calling-number

To configure an ISDN PRI or BRI interface to present the number of the device making the outgoing call, use the **isdn calling-number** command in interface configuration mode. 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.

Command Default

No calling number is presented.

Command Modes

Interface configuration

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

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

For ISDN BRI, this command is intended for use when the ISDN network offers TS014 tariffing, in which devices present the calling (billing) number.

For ISDN PRI, this command is intended for use when the network offers better pricing on calls in which devices present the calling number (that is, the billing number). The calling number information is included in the outgoing setup message.

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

Examples

The following example first configures the T1 interface, then configures the D channel interface 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 10.1.1.1 255.255.255.0
 encapsulation ppp
 isdn calling-number 4233570925
 dialer map ip 10.1.1.2 name mymap 14193460913
```

In the following example, the ISDN BRI interface is configured to present the number 5550112 when it makes outgoing calls:

```
interface bri 0
 isdn calling-number 5550112
```

Related Commands

Command	Description
interface dialer	Configures a BRI interface and enters interface configuration mode.
interface serial	Specifies a serial interface created on a channelized E1 or channelized T1 controller (for ISDN PRI, CAS, or robbed bit signaling).

isdn calling-party-num

To specify whether the network-provided or user-provided calling party number is selected when two calling party numbers are sent from a primary NET5 switch on ISDN, use the **isdn calling-party-num** command in interface configuration mode. To reset the default value, use the **no** form of this command.

isdn calling-party-num {**network-provided** | **user-provided**} [**first** | **last**]

no isdn calling-party-num

Syntax Description

network-provided	Network-provided calling party number.
user-provided	User-provided calling party number.
first	(Optional) Specifies that the first number provided as the calling number information element (IE) should be used to display the calling party number.
last	(Optional) Specifies that the last number provided as the calling number IE should be used to display the calling party number.

Command Default

The first user-provided calling party number is used to display the calling party number.

Command Modes

Interface configuration

Command History

Release	Modification
12.2	This command was introduced for the primary ISDN NET5 switch.
12.3(7)T	The **first** and **last** keywords were added and this command was integrated into this release.
12.3(7)	This command was integrated into this release.

Usage Guidelines

The **isdn calling-party-num** command is useful for customers who use network-provided and user-provided calling party numbers for accounting purposes. The selected number will be used by dialer filters, such as those configured with the **isdn caller** command.

Use the optional **first** and **last** keywords for instances when more than one calling number is sent. By default, the first number is used, and subsequent numbers are not recognized. If you specify **last** in the command syntax, the last calling number displays in the caller ID display.

An example application of the **last** keyword can be seen in an enterprise customer using multiple 800 numbers in an intelligent network service from a PSTN service provider. If a PSTN user dials (from 919-555-1111, for example) the customer's 800 number, the PSTN service provider routes the call to the customer's telephone number (for example, 408-555-0100) based on the 800 number. The incoming ISDN SETUP message from the PSTN has two user-provided calling party IEs:

- The 800 number that the user dialed
- The calling party number of the PSTN user (919-555-1111)

Because the Cisco IOS gateway always uses the first user-provided calling party number by default, the IP phone user is able to see only the 800 number and not the actual calling party number of the PSTN user, unless the **last** keyword is entered in the command syntax.

Examples

The following example shows how to configure the ISDN switch to accept network-provided calling party numbers. If more than one number is provided, the last number provided is used as the calling party number:

```
interface Serial0:23
 no ip address
 encapsulation ppp
 dialer rotary-group 1
 isdn switch-type primary-net5
 isdn protocol-emulate network
 isdn incoming-voice modem
 isdn calling-number 1111111
 isdn calling-party-num network-provided last
 isdn T310 40000
 no cdp enable
```

Related Commands

Command	Description
isdn caller	Configures ISDN caller ID screening and optionally enables ISDN caller ID callback for legacy DDR.
isdn calling-number	Configures an ISDN PRI or BRI interface to present the number of the device making the outgoing call.

isdn channel-id invert extended-bit

To invert the value of the extend bit (0x80) in the last octet of the channel ID information element, use the **isdn channel-id invert extended-bit** command in interface configuration mode. To restore the default setting, use the **no** form of this command.

isdn channel-id invert extended-bit

no isdn channel-id invert extended-bit

Syntax Description

This command has no arguments or keywords.

Command Default

The last octet of the channel ID information element is not inverted.

Command Modes

Interface configuration

Command History

Release	Modification
12.2	This command was introduced.

Usage Guidelines

Use this command if you use a primary-DMS 100 switch type to ensure compatibility with a Setup or Call Proceeding message containing a channel ID information element. This command can be used only with ISDN PRI.

This command replaces the **isdn-flip-chan-flag** command.

Examples

The following example configures the router to invert the extended bit in the last octet of the channel ID information element:

```
isdn channel-id invert extended-bit
```

isdn conference-code

To activate three-way call conferencing, use the **isdn conference-code** command in interface configuration mode. To disable three-way call conferencing, use the **no** form of this command.

isdn conference-code *code*

no isdn conference-code

Syntax Description

code	Number from 0 to 999 (ISDN conference code).

Command Default

The default code is 60.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(3)T	This command was introduced.

Usage Guidelines

Use this command if your ISDN line is connected to an NI1 or a Nortel DMS-100 Custom switch. Your telephone service provider should provide an ISDN conference code when you order three-way call conferencing.

Examples

The following example specifies 61 as the ISDN conference code:

```
isdn conference-code 61
```

isdn disconnect interface

The **isdn disconnect interface** command is replaced by the **isdn test disconnect interface** command. See the **isdn test disconnect interface** command for more information.

isdn disconnect-cause

To send a specific ISDN cause code to the switch, use the **isdn disconnect-cause** command in interface configuration mode. To return to the default condition, use the **no** form of this command.

isdn disconnect-cause {*cause-code-number* | **busy** | **not-available**}

no isdn disconnect-cause

Syntax Description

cause-code-number	Sends a cause code number (submitted as integer in the range of 1 through 127) to the switch.
busy	Sends the USER-BUSY code to the switch.
not-available	Sends the CHANNEL-NOT-AVAILABLE code to the switch.

Command Default

The default condition is no cause code override. If the **isdn disconnect-cause** command is not configured, the default cause codes for the application are sent.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(5)T	This command was introduced.

Usage Guidelines

The **isdn disconnect-cause** command overrides specific cause codes (such as modem availability and resource pooling) that are sent to the switch by ISDN applications. When the **isdn disconnect-cause** command is implemented, the configured cause codes are sent to the switch; otherwise, the default cause codes for the application are sent. ISDN protocol errors are still reflected in the cause codes and are not overridden.

Examples

The following example sends the CHANNEL-NOT-AVAILABLE code to the ISDN switch:

```
interface serial0:20
 isdn disconnect-cause not-available
```

Related Commands

Command	Description
isdn disconnect-cause	Sends a specific ISDN cause code to the switch.

isdn fast-rollover-delay

To control the timing between successive dial attempts, use the **isdn fast-rollover-delay** command in interface configuration mode. To remove or change a value, use the **no** form of this command.

isdn fast-rollover-delay *seconds*

no isdn fast-rollover-delay

Syntax Description

seconds	Number of seconds between dial attempts.

Command Default

No default timer.

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command provides a timer separate from the dialer wait-for-carrier timer to control the amount of time that elapses before calls are redialed. This delay is provided to allow the old call to be torn down completely before the new call is attempted.

The **isdn fast-rollover-delay** command is necessary on some ISDN switches because the new call may be attempted before the old call is completely torn down, which causes the second call or the callback to fail.

Use this command when *all* the following conditions are true:

- A BRI has two phone numbers configured, one for each B channel.
- You are dialing in to this BRI.
- You have a dialer map or dialer string for each phone number.
- The first call succeeds but the second call continuously fails.

When these conditions occur, set the **isdn fast-rollover-delay** command to 5 seconds and try again. A delay of 5 seconds should cover most cases. Configure sufficient delay to make sure that the ISDN RELEASE_COMPLETE message has been sent or received before the fast rollover call is made. Use the **debug isdn q931** command to display this information.

When the **isdn fast-rollover-delay** command is configured on a client requesting callback, the callback client first confirms whether the callback server has placed a call back to the callback client before dialing any subsequent numbers.

Examples

The following partial example sets the fast-rollover delay that is suggested when all the conditions specified in the list in the "Usage Guidelines" are true:

```
isdn fast-rollover-delay 5
```

Related Commands

Command	Description
dialer map	Configures a serial interface or ISDN interface to call one or multiple sites or to receive calls from multiple sites.
dialer wait-for-carrier-time (map-class)	Specifies the length of time to wait for a carrier when dialing out to the dial string associated with a specified map class.
ppp callback (DDR)	Enables a dialer interface that is not a DTR interface to function either as a callback client that requests callback or as a callback server that accepts callback requests.

isdn flip-chan-flag

The **isdn flip-chan-flag** command is replaced by the **isdn channel-id invert extended-bit** command. See the **isdn channel-id invert extended-bit** command for more information.

isdn guard-timer

To enable a managed timer for authentication requests, use the **isdn guard-timer** command in interface configuration mode. To reset the timer to its default value, use the **no** form of this command.

isdn guard-timer *milliseconds* [**on-expiry** {**accept** | **reject**}]

no isdn guard-timer

Syntax Description

milliseconds	Number of milliseconds that the network access server (NAS) waits for a response from the AAA security server. The valid range is from 1000 through 20,000.
on-expiry	(Optional) Determines whether calls are accepted or rejected after the specified number of milliseconds has expired. If no expiry action is selected, calls are rejected.
accept	(Optional) Calls are accepted if the guard-timer expires before AAA responds.
reject	(Optional) Calls are rejected if the guard-timer expires before AAA responds.

Command Default

The default timer value is eight (8) seconds and calls are rejected when the timer expires.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(3)T	This command was introduced.

Usage Guidelines

The guard-timer starts when the DNIS number is sent to AAA for authentication. When the timer expires, authentication ends and the call is accepted or rejected based on the configured expiry action.

Examples

The following example sets the guard-timer to six (6) seconds and specifies that the call should be rejected if AAA does not respond within that interval:

```
interface serial 1/0/0:23
isdn guard-timer 6000 on-expiry reject
```

Related Commands

Command	Description
aaa preauth	Enables authentication using DNIS numbers.

isdn incoming alerting add-PI

To add a Progress Indicator (PI) in an incoming ALERTING messages during ISDN B-channel cut-through, use the **isdn incoming alerting add-PI** command in interface configuration mode. To remove the indicator, use the **no** form of this command.

isdn incoming alerting add-PI

no isdn incoming alerting add-PI

Syntax Description

This command has no arguments or keywords.

Command Default

On North American ISDN switches, the default behavior is to add the PI in incoming ALERTING messages. On ISDN switches compliant with the European Telecommunications Standards Institute (ETSI), the default behavior is to *not* add the PI in incoming ALERTING messages.

Command Modes

Interface configuration

Command History

Release	Modification
12.3	This command was introduced for ISDN BRI and PRI interfaces.

Usage Guidelines

The **isdn incoming alerting add-PI** and **no isdn incoming alerting add-PI** commands provide a way for switch types conforming to different standards to handle B-channel cut-through. These commands apply to both ISDN BRI and PRI connections.

North American switch types such as the 5ESS, 4ESS, DMS, and NI allow cut-through when an ALERTING message is received. ISDN B-channel cut-through for customer premises equipment (CPE) should happen upon receipt of a channel ID Information Element (IE) in the CALL_PROC message. For this reason, the default on North American ISDN switches is to add the PI in incoming ALERTING message.

On ETSI-compliant ISDN switches, the default behavior is to *not* add the PI in incoming ALERTING messages. But ETSI also specifies that when the remote device is playing tones or announcements, it should also include the PI in the ALERTING message. This is not the default behavior for ETSI-compliant switches, but the **isdn incoming alerting add-PI** command allows Cisco IOS software to support this behavior.

The **isdn incoming alerting add-PI** and **no isdn incoming alerting add-PI** commands can be used on switches that do not want to add the PI in incoming ALERTING messages and on those switches that cannot handle or do not want the PI in incoming ALERTING messages.

Examples

Because the the **isdn incoming alerting add-PI** command is the default for a North American ISDN switch, the following example shows that when the interface configuration is displayed, the **isdn incoming alerting add-PI** command is not listed, even if it was explicitly configured:

```
Router(config)# interface BRI1/0
Router(config-if)# no ip address
Router(config-if)# isdn switch-type basic-dms100
Router(config-if)# isdn spid1  40876726760101 5459374
Router(config-if)# isdn spid2 51076726760101 5459375
Router(config-if)# isdn incoming-voice voice
Router(config-if)# isdn incoming alerting add-PI
Router(config-if)# end
Router(config)# end
Router# show running interface BRI1/0
Building configuration...

Current configuration : 167 bytes
!
interface BRI1/0
 no ip address
 isdn switch-type basic-dms100
 isdn spid1  40876726760101 5459374
 isdn spid2 51076726760101 5459375
 isdn incoming-voice voice
end
```

The following example shows that when the the **no isdn incoming alerting add-PI** command is configured on a North American ISDN switch, the command is listed in the interface configuration:

```
Router(config)# interface BRI1/0
Router(config-if)# no isdn incoming alerting add-PI
Router(config-if)# end
Router(config)# end
Router# show running interface BRI1/0
Building configuration...

Current configuration : 201 bytes
!
interface BRI1/0
 no ip address
 isdn switch-type basic-dms100
 isdn spid1  4087672676 5459374
 isdn spid2 51076726760101 5459375
 isdn incoming-voice voice
 no isdn incoming alerting add-PI
end
```

Because the default for ETSI-compliant ISDN switches is **no isdn incoming alerting add-PI**, the following example shows that when the the **isdn incoming alerting add-PI** command is added to the configuration for a NET3 switch, the command is listed in the interface configuration:

```
Router(config-if)# no ip address
Router(config-if)# isdn switch-type basic-net3
Router(config-if)# isdn spid1  40876726760101 5459374
Router(config-if)# isdn spid2 51076726760101 5459375
Router(config-if)# isdn incoming-voice voice
Router(config-if)# isdn incoming alerting add-PI
Router(config-if)# end
Router(config)# end
Router# show running interface BRI1/0
Building configuration...
```

```
Current configuration : 165 bytes
!
interface BRI1/0
 no ip address
 isdn switch-type basic-net3
 isdn spid1 40876726760101 5459374
 isdn spid2 51076726760101 5459375
 isdn incoming-voice voice
 isdn incoming alerting add-PI
end
```

If the configuration for the NET3 switch were changed back to contain **no isdn incoming alerting add-PI**, the command would not be listed in the interface configuration, because this is the default behavior for ETSI-compliant switches:

```
Current configuration : 165 bytes
!
interface BRI1/0
 no ip address
 isdn switch-type basic-net3
 isdn spid1  40876726760101 5459374
 isdn spid2 51076726760101 5459375
 isdn incoming-voice voice
end
```

isdn incoming ie

To specify that the **channel-id** and **display** information elements (IEs) may be accepted in incoming ISDN messages, use the **isdn incoming ie** command in interface configuration mode. To indicate that one of these IEs may not be accepted in incoming ISDN messages, use the **no** form of this command.

isdn incoming ie {**channel-id** [**accept-qsig-variant**] | **display** {**dms250** | **transparent**}} [**redirecting-selection** {**first** | **last**}]

no isdn incoming ie {**channel-id** [**accept-qsig-variant**] | **display** {**dms250** | **transparent**}} [**redirecting-selection** {**first** | **last**}]

Syntax Description

channel-id	Information element pertaining to the channel ID.
accept-qsig-variant	(Optional) Specifies that the ISDN D channel supports QSIG switches that send a variant (the D-channel selector bit is not set) of the normal channel ID IE usage for calls that are "signaling only."
display	Information element pertaining to the text display.
dms250	(Optional) Configures the router to accept the ISDN incoming message when octet 3 of the display IE has been modified for compatibility with the DMS-250 switch type. **Note** This keyword is available only when the **display** keyword is entered. This option controls the handling of octet 3 of the display IE in the incoming message, and applies only when DMS-100 or DMS-250 switches must interoperate with other switch types.
transparent	(Optional) Configures the router to accept the ISDN message when the display IE has been packed in the incoming message without modifying or inserting octet 3. This is the default behavior for non-DMS switches. **Note** This keyword is available only when the **display** keyword is entered. This option controls the handling of octet 3 of the display IE in the incoming message, and applies only when DMS-100 or DMS-250 switches must interoperate with other switch types.
redirecting-selection	(Optional) Selects the first or the last redirect number (RDN) when multiple RDN IEs are received on an incoming ISDN call. The **first** keyword selects the first RDN received; the **last** keyword selects the last RDN received. **Note** The **first** and **last** keywords are available only when the **redirecting-selection** keyword is entered.

Command Default

Supported IEs are accepted in applicable incoming messages by default. The channel ID does not accept IEs with the QSIG variant, and the display IE for DMS-250 (transparent) is not altered. When multiple RDN IEs are received on an incoming ISDN call, the last RDN is automatically selected.

Command Modes

Interface configuration

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.4(7)	The **accept-qsig-variant** keyword was added.
12.4(8)	The **redirecting-selection**, **first**, and **last** keywords were added.

Usage Guidelines

Incompatibility between ISDN switch types at the originating and terminating gateways can prevent provided IEs from being passed end-to-end. Cisco devices can be configured to transparently accept incoming unsupported IEs, allowing full interworking between different switch types.

Use the **isdn incoming ie** command to configure a Cisco router to transparently accept unsupported IEs to its peer. IEs may be sent in any codeset. However IEs can be manually controlled using only the **isdn incoming ie** command when they are sent in codeset 0. IEs will be accepted only in applicable message types.

To configure the router so it will not accept channel ID and display IEs, use the **no isdn incoming ie** command.

Note If the **isdn gateway-max-interworking** command is enabled, IEs that are invalid for some destination switch types may be passed. This can result in the occurrence of undesirable events.

Note If the **isdn protocol-emulate** command is switched between the network and user configurations, the **isdn outgoing ie** command reverts to its default setting. The **isdn outgoing ie** command must be reissued to restore the manual configuration.

Examples

The following example configures the serial interface for the QSIG D channel to accept “malformed” channel-id IEs:

```
interface se3/0:3:23
isdn incoming ie channel-id accept-qsig-variant
end
```

The following example configures the serial interface to select the first RDN IE when multiple RDN IEs are received on an incoming ISDN call:

```
interface se3/0:3:23
isdn incoming ie redirecting-selection first
end
```

Related Commands

Command	Description
isdn gateway-max-interworking	Prevents an H.323 gateway from checking for ISDN protocol compatibility and dropping IEs in call messages.
isdn outgoing ie	Specifies that an IE may be passed in outgoing ISDN messages.
isdn protocol-emulate	Configures an ISDN data or voice port to emulate network or user functionality.

isdn incoming-voice

To route all incoming voice calls to the modem and determine how they will be treated, use the **isdn incoming-voice** command in interface configuration mode. To disable the setting or return to the default, use the **no** form of this command.

isdn incoming-voice {**voice** | **data** [**56** | **64**] | **modem** [**56** | **64**]}

no isdn incoming-voice {**voice** | **data** [**56** | **64**] | **modem** [**56** | **64**]}

Syntax Description

voice	Incoming voice calls bypass the modems and be handled as a voice call.
data	Incoming voice calls bypass the modems and will be handled as digital data. If the **data** keyword is selected, you can specify a B-channel bandwidth of either **56** kbps or **64** kbps.
modem	Incoming voice calls are passed over to the digital modems, where they negotiate the appropriate modem connection with the far-end modem. If this keyword is selected, you can specify a B-channel bandwidth of either **56** kbps or **64** kbps. If no argument is entered, the default value is 64.

Command Default

If you do not enter the **56** or **64** keywords after the **data** keyword, the default value will be 64 kbps.

Command Modes

Interface configuration

Command History

Release	Modification
11.1	This command was introduced for ISDN PRI interfaces.
11.1AA	This command was implemented on ISDN BRI interfaces.
12.0(2)XC	This command was implemented on ISDN BRI interfaces.
11.2	This command was enhanced for channelized T1 and integrated into Cisco IOS Release 11.2.
11.3NA	This command was implemented on additional Cisco router and access server platforms.
12.0(3)T	This command was implemented on additional Cisco router and access server platforms.

Usage Guidelines

Unless you specify otherwise, all calls received by the router and characterized as voice calls are treated as normal ISDN calls, which are handled as digital data and not passed over to the modem. Ordinarily, a data device ignores incoming voice calls, but the tariff structure for data and voice calls might make it less expensive to do “data over voice” calls.

If you use the **voice** keyword, incoming ISDN voice calls will be treated as voice calls and handled by either a modem or a voice DSP as directed by CSM.

If the default value is configured and the bearer capability of the incoming call is the **voice** keyword, the call will be rejected.

To answer incoming voice calls at a configured rate (overriding the incoming data rate in the call), use the **data** keyword.

To establish speedier connections for analog calls to the router, use the **isdn incoming-voice** command with the **modem** keyword to have voice calls routed through digital modems (as pulse-code modulated analog data) instead of being treated as digital data.

Configure this command on each D channel in the access server or router. Incoming circuit-switched data calls are not affected by this command.

Note Use the **isdn incoming-voice modem** command only when you are using ISDN. You must use this command to carry voice over a modem when using ISDN PRI.

Examples

The following example designates incoming ISDN voice calls to be treated as voice calls:

```
interface 10
 isdn incoming-voice voice
```

The following example for channelized T1 configures the D channel (hence, all B channels) to answer all incoming voice calls at 56 kbps:

```
interface serial 0:23
 isdn incoming-voice data 56
```

The following example routes all incoming voice calls through the modem as analog data:

```
interface BRI 0/0
 isdn incoming-voice modem
```

The following example enables incoming and outgoing ISDN calls to route to the modems using the D channel serial interface:

```
interface serial 0:23
 isdn incoming-voice modem
```

isdn layer1-emulate

To configure the Layer 1 operation of a BRI voice port as clock master (NT) or slave (TE), use the **isdn layer1-emulate** command in interface configuration mode. To restore the default (user), use the **no** form of this command.

isdn layer1-emulate {**user** | **network**}

no isdn layer1-emulate

Syntax Description

user	Physical interface operation in clock slave mode (as TE).
network	Physical interface operation in clock master mode (as NT).

Command Default Layer 1 port operation is as user (TE functionality as clock slave).

Command Modes Interface configuration

Command History

Release	Modification
12.0(3)XG	This command was introduced on the MC3810.
12.1(3)XI	This command was implemented on the Cisco 2600 and Cisco 3600 series.

Usage Guidelines If you use the **no isdn layer1-emulate network** command, the physical layer port operation defaults to user.

Examples The following example configures the Layer 1 operation of a BRI voice port as QSIG clock slave (TE):

```
configure terminal
 interface bri 1
 isdn layer1-emulate user
```

Related Commands

Command	Description
isdn protocol-emulate (dial)	Configures the Layer 2 and Layer 3 port protocol of a BRI voice port or a PRI interface to emulate NT (network) or TE (user) functionality.
network-clock-priority	Specifies the clock-recovery priority for the BRI voice ports in a BVM.

isdn layer2-flap

To send RESTART or STATUS ENQUIRY messages over the ISDN PRI line when a Layer 2 link flap and recovery occurs, use the **isdn layer2-flap** command in interface configuration mode. To disable sending these messages, use the **no** form of this command.

isdn layer2-flap {**restart** | **status-enq**}

no isdn layer2-flap {**restart** | **status-enq**}

Syntax Description

restart	Sends a RESTART message to the remote peer.
status-enq	Sends a STATUS-ENQUIRY message to the remote peer.

Command Default

This command is disabled by default, in which case, no RESTART or STATUS-ENQUIRY messages are sent in the event of a Layer 2 flap and recovery.

Command Modes

Interface configuration

Command History

Release	Modification
12.4(15)T	This command was introduced.

Usage Guidelines

When you include the **isdn layer2-flap** command in the ISDN configuration, the router (as a user agent) sends a RESTART or STATUS-ENQUIRY message to the remote peer when a Layer 2 flap and recovery occurs. This notification enhances the gateway's ability to gracefully recover from a Layer 2 flap or failure error condition. This graceful recovery frees gateway resources to handle future calls and to increase the call completion rate.

Use the **isdn layer2-flap** command with the **isdn timer t309** command in your configuration. The **isdn timer t309** command enables the router to hold or drop calls. The effect of using these two commands in the event of a Layer 2 flap and recovery is summarized as follows:

- Layer 2 failure and then a Layer 2 recovery before the T309 timer expires (with T309 timer enabled)—STATUS-ENQUIRY message
- Layer 2 failure and then a Layer 2 recovery after the T309 timer expires or with the T309 timer not enabled—RESTART message

Examples

The following example shows how to enable the router to send a RESTART message when a Layer 2 flap or failure error condition occurs and recovery happens after the T309 timer has expired (or the T309 timer is not enabled):

```
isdn layer2-flap restart
```

Related Commands

Command	Description
isdn timer t309	Changes the value of the T309 timer to clear the network connection and to release the B channel and call reference when a data-link disconnection occurs.

isdn leased-line bri

To configure an ISDN BRI for leased-line service, or to configure both 64-kbps leased-line and ISDN service on the same BRI, use the **isdn leased-line bri** command in global configuration mode. To remove or change channel configurations, use the **no** form of this command.

isdn leased-line bri *number/number* [**b1** | **b2** | **128** | **144** | *Return-key*]

no isdn leased-line bri *number/number* [**b1** | **b2** | **128** | **144** | *Return-key*]

Syntax Description

number/number	BRI interface numbers (enter the slash to separate the physical interface numbers).
b1	(Optional) Uses channel B1 as a 64-kbps leased line and channel B2 for ISDN service on a single ETSI NET3 switch on a Cisco 800 series router.
b2	(Optional) Uses channel B2 as a 64-kbps leased line and channel B1 for ISDN service on a single ETSI NET3 switch on a Cisco 800 series router.
128	(Optional) Combines B1 and B2 channels for 128-kbps leased-line service.
144	(Optional) Combines B1 and B2 channels for 144-kbps leased-line service.
Return-key	(Optional) Configures two 64-kbps leased lines instead of two B channels. Press the Return or Enter key at the end of the **isdn leased-line bri** *number/numbe*r command instead of entering a keyword.

Command Default

Disabled

Command Modes

Global configuration

Command History

Release	Modification
11.2F	This command was introduced.
12.2(4)T	The **b1** and **b2** keywords were added to allow the BRI channels on an ETSI NET3 switch on a Cisco 800 series router to be split into leased-line and ISDN services.

Usage Guidelines

Use the **isdn leased-line bri** command to configure an ISDN BRI for leased-line service by aggregating two BRI B channels into a single pipe at a speed of 128 or 144 kbps, or configuring both a 64-kbps leased line and ISDN service on a single European Telecommunications Standards Institute (ETSI) NET3 switch on Cisco 800 series routers.

This command also supports two separate 64-kbps leased lines, where the BRI interface is configured as two separate leased lines instead of two B channels. No keyword is required for this configuration; just press the Return or Enter key at the end of the **isdn leased-line bri** *number/number* command string. This configuration is different than using the **128** keyword, which configures a single 128-kbps leased line.

When you use the **no isdn leased-line bri** command to change the channel configuration, you must also perform a system reload in order for the change to take effect.

When you use an ISDN BRI interface for access over leased lines, configure the ISDN BRI as a synchronous serial interface and do not configure ISDN calling and called numbers.

Examples

The following example configures the BRI interface for leased-line access at 128 kbps in Japan:

```
isdn leased-line bri0/0 128
```

Because of the leased-line—not dialed—environment, configuration of ISDN called and calling numbers is not needed and not used. The BRI 0 interface is henceforth treated as a synchronous serial interface, with the default High-Level Data Link Control (HDLC) encapsulation.

The following example configures BRI channel B1 for 64-kbps leased-line service and channel B2 for ISDN service:

```
isdn switch-type basic-net3
isdn leased-line bri0/0 b1
!
interface bri0/0
 ip address 10.1.1.1 255.255.255.0
 no ip address
 dialer pool-member 1

interface bri0/0:1
 ip address 10.1.1.2 255.255.255.0
 encapsulation ppp
 no ip address
```

The following example configures two 64-kbps leased lines:

```
isdn leased-line bri0/0
```

Related Commands

Command	Description
isdn switch-type (BRI)	Specifies the central office switch type on the ISDN BRI interface.

isdn logging

To enable logging of ISDN syslog messages, use the **isdn logging** command in global configuration mode. To disable logging, use the **no** form of this command.

isdn logging

no isdn logging

Syntax Description This command has no arguments or keywords.

Command Default This command is disabled by default.

Command Modes Global configuration

Command History

Release	Modification
12.3(1)	This command was introduced.

Usage Guidelines This command supports syslog logging of the following ISDN events:

- ISDN Layer 2 Up and Down events at severity 3.
- ISDN SERV, SERV ACK, RESTART, RESTART ACK, and STATUS ENQ messages at severity 4.
- ISDN SERV status audit messages for various triggers at different severities.

Examples The following example shows how to configure ISDN syslog logging:

```
isdn logging
```

Related Commands

Command	Description
isdn bchan-number-order	Configures an ISDN PRI interface to make outgoing call selection in ascending, descending, or round-robin order.
isdn protocol-emulate	Configures an ISDN data or voice port to emulate network or user functionality.

isdn map

To override the default ISDN type and plan generated by the router with custom values, use the **isdn map** command in interface configuration mode. To revert to the default ISDN type and plan, use the **no** form of this command.

isdn map address {{*address* | *reg-exp*} **plan** *plan* **type** *type* | **transparent**}

no isdn map address {{*address* | *reg-exp*} **plan** *plan* **type** *type* | **transparent**}

Syntax Description

address	Specifies that the default ISDN type and plan will be overridden.
address	Address map, which can be to either the calling number or the called number. This argument specifies the address for which the ISDN type and plan will be overridden.
reg-exp	Regular expression for pattern matching. This argument specifies that the ISDN type and plan will be overridden for addresses that match the regular expression.
plan *plan*	ISDN numbering plan. Valid values for the *plan* argument are as follows: • **any**—Any type of dialed number. • **data**—X.121 data numbering plan. • **ermes**—European Radio Message System numbering plan. • **isdn**—E.164 ISDN/Telephony numbering plan. • **national**—Number called to reach a subscriber in the same country, but outside the local network. • **private**—Private numbering plan. • **reserved**—Reserved for extension. • **telex**—F.69 telex numbering plan. • **unknown**—Number of a type that is unknown by the network.
type *type*	ISDN number type. Valid values for the *type* argument are as follows: • **abbreviated**—Abbreviated representation of the complete number as supported by this network. • **any**—Any type of called number. • **international**—Number called to reach a subscriber in another country. • **national**—Number called to reach a subscriber in the same country, but outside the local network. • **network**—Administrative or service number specific to the serving network. • **reserved**—Reserved for extension. • **subscriber**—Number called to reach a subscriber in the same local network. • **unknown**—Number of a type that is unknown by the network.
transparent	Specifies that the ISDN type and plan values received in raw messages from the ISDN originating gateway will take priority over the ISDN type and plan values received in the H.225 SETUP messages.

Command Default The default is the ISDN type and plan generated by the router.

Command Modes Interface configuration

Command History

Release	Modification
12.0(6)T	This command was introduced.
12.3(7)T	The **transparent** keyword was added.

Usage Guidelines The default ISDN type and plan can be overridden with custom values on a per-number basis or for numbers that match regular expression patterns.

If you use the **isdn map** command to configure custom values for the ISDN type and plan, these values take priority over any other ISDN type and plan values. The order of precedence for ISDN type and plan values is as follows, beginning with the highest precedence:

- Type and plan values configured with the **isdn map** command.
- Type and plan values from voice translation rules specified with the **rule (voice translation-rule)** command.
- Values received in the H.225 SETUP messages.
- Values received from the ISDN originating gateway in raw messages.

Configuring the **isdn map** command with the **transparent** keyword results in raw messages received from the ISDN originating gateway receiving priority over H.225 SETUP messages. When the **isdn map** command is configured with the **transparent** keyword, the order of precedence for ISDN type and plan values is as follows:

- Type and plan values configured with the **isdn map** command.
- Type and plan values from voice translation rules specified with the **rule (voice translation-rule)** command.
- Values received from the ISDN originating gateway in raw messages.
- Values received in the H.225 SETUP messages.

Examples The following example overrides any plan and type used for any ISDN calls with a called or calling number that exactly matches 123:

```
interface serial1:23
 isdn map address 123 plan isdn type unknown
```

The following example overrides any plan and type used for ISDN calls with a called or calling number that begins with the numerals 12:

```
interface serial1:23
 isdn map address 12.* plan data type subscriber
```

The following example matches any number that ends with the number 7:

```
interface serial1:23
 isdn map address .*7 plan data type subscriber
```

The following example reverses the precedence of ISDN type and plan values received from the ISDN originating gateway and from the H.225 SETUP message:

```
interface serial1:23
 isdn map address transparent
```

Related Commands

Command	Description
rule (voice translation-rule)	Defines a translation rule.

isdn modem-busy-cause

The **isdn modem-busy-cause** command is replaced by the **isdn disconnect-cause** command. See the **isdn disconnect-cause** command for more information.

isdn negotiate-bchan

To enable the router to accept a B channel that is different from the B channel requested in the outgoing call setup message, use the **isdn negotiate-bchan** command in interface configuration mode. To restore the default condition, use the **no** form of this command.

isdn negotiate-bchan [**resend-setup**] [**cause-codes** *cause-code1* [*cause-code2...cause-code16*]]

no isdn negotiate-bchan [**resend-setup**] [**cause-codes** *cause-code1* [*cause-code2...cause-code16*]]

Syntax Description

resend-setup	(Optional) Enables a single reattempt of a setup message if a disconnect message with a cause code of 44 is received before alerting. Supports NET5 and NI2 PRI switches only. (A Code 44 cause code means that the requested circuit or channel is not available. For more information, refer to the International Telecommunications Union [ITU] Q.850 standard.)
cause-codes *cause-code*	(Optional) Specifies up to 16 cause codes that will alert the gateway to reattempt a call. This reattempt may or may not be on the same B channel as the previous attempt. The value of each *cause-code* argument is a number from 1 to 127 corresponding to an ISDN cause code number. If the **cause-codes** keyword is entered, at least one cause code must be entered or the command will not be accepted. Separate multiple cause code entries with spaces. Once the **cause-codes** keyword is entered, cause code 44 will no longer cause a call reattempt unless 44 is specifically entered as one of the cause codes. **Note** The validity of each cause code is not checked by the gateway.

Command Default

B channel negotiation is not enabled. Most PRI switch types set the default channel ID to Exclusive in the setup message. An exception is the NI2 switch, which sets the default to Preferred.

If the **cause-codes** keyword is not entered, it is assumed that you want ISDN cause code 44.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.
12.2	The **resend-setup** keyword was implemented for NET5 and NI2 PRI switches.
12.2(15)T	The **cause-codes** keyword was implemented on the Cisco AS5350 and Cisco AS5400.

Usage Guidelines

The **isdn negotiate-bchan** command enables the router to negotiate the B channel by setting the channel ID information element to Preferred in the setup message. If this command is not configured, the channel ID is set to the default of the switch, which is usually Exclusive. Exclusive means that only the requested B channel is accepted. If the requested B channel is not available, the call is cleared.

The **isdn negotiate-bchan** command is supported for all PRI switch types. The **resend-setup** keyword is supported only for NET5 and NI2 switches. This command is not supported for BRI interfaces.

The **cause-codes** keyword allows you to configure the gateway to reattempt a call when a cause code other than 44 is received from the PSTN.

Refer to the "ISDN Cause Codes" table in the appendix of the *Cisco IOS Debug Command Reference* for a list of ISDN cause codes.

Examples

The following example enables a call to be reattempted when a disconnect with cause code of 44 is received before alerting:

```
interface serial0:23
 isdn negotiate-bchan resend-setup
```

The following example shows that cause codes 34, 44, and 63 have been configured:

```
interface serial0:23
 isdn negotiate-bchan resend-setup cause-codes 34 44 63
```

Related Commands

Command	Description
isdn bchan-number-order	Configures an ISDN PRI interface to make an outgoing call selection in ascending or descending order.
isdn switch-type (PRI)	Specifies the Central Office switch type on the ISDN PRI interface.

isdn not-end-to-end

To override the speed that the network reports it will use to deliver the call data, use the **isdn not-end-to-end** command in interface configuration mode. To disable the configured end-to-end speed, use the **no** form of this command.

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

no isdn not-end-to-end

Syntax Description

56	Answers all voice calls at 56 kbps.
64	Answers all voice calls at 64 kbps.

Command Default

The default line speed is 64 kbps.

Command Modes

Interface configuration

Command History

Release	Modification
10.3	This command was introduced.

Usage Guidelines

Note The **isdn not-end-to-end** command is valid only when an incoming Layer 3 Setup message contains a Progress Information Element in the message. The command is validated on a call-by-call basis, depending upon the message.

This command might be needed to handle incoming calls properly. Although a call might originate at a speed of 56 kbps, the network or internetworking networks might improperly deliver the call to the user at a speed of 64 kbps. This creates a speed mismatch and causes the data to be garbled. Enabling this command makes the router look more closely at the information elements of the incoming call to determine a speed.

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

Examples

The following example sets the line speed for incoming calls to 56 kbps:

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

isdn nsf-service

To configure Network Specific Facilities (NSF) on an ISDN PRI for outgoing calls configured as voice calls, use the **isdn nsf-service** command in interface configuration mode. To remove NSF on an ISDN PRI, use the **no** form of this command.

isdn nsf-service {**megacom** | **sdn**}

no isdn nsf-service {**megacom** | **sdn**}

Syntax Description

megacom	Dial voice calls using AT&T Megacom NSF.
sdn	Dial voice calls using AT&T SDN NSF.

Command Default

Disabled

Command Modes

Interface configuration

Command History

Release	Modification
11.3(5)T	This command was introduced.

Usage Guidelines

This command is used specifically on a PRI (channelized T1) to request NSF services supported on primary AT&T 4ESS (**primary-4ess**) switch types only.

Examples

The following example sets outgoing voice calls to use AT&T SDN NSF:

```
interface serial 0:23
 isdn-nsf-service sdn
```

Related Commands

Command	Description
dialer map	Configures a serial interface or ISDN interface to call one or multiple sites or to receive calls from multiple sites.
dialer voice-call	Configures the dialer map class for an NSF dialing plan to support outgoing voice calls.
map-class dialer	Defines a class of shared configuration parameters associated with the dialer map command for outgoing calls from an ISDN interface and for PPP callback.

isdn number

To change the maximum number of digits in a called number information element, use the **isdn number** command in interface configuration mode.

isdn number [**called enbloc** *limit*]

Syntax Description

called	Attributes for the ISDN number of the called party.
enbloc	Allows the ISDN terminal to send the ISDN number of the called party in a single SETUP message.
limit	Maximum number of digits allowed in a SETUP message, in the range from 1 to 32.

Command Default 20 digits

Command Modes Interface configuration

Command History

Release	Modification
12.2	This command was introduced.

Usage Guidelines The maximum number of digits sent in the initial call SETUP is defaulted to 20 digits. The default of 20 digits chosen because some switches cannot handle more than 20 digits. Some countries in Europe are changing their calling plans and will require calls to be made using more than 20 digits.

The **isdn number called enbloc** command is used when the maximum number of octets in the called number information element in a SETUP message must be changed from the 20-digit default to the user desired limit. With this command, the user can configure the maximum number from 1 to 32 digits. This command is available for ISDN interfaces and applicable to both BRI and PRI interfaces.

Note This command is enabled for only the following switch types:
BRI_NET3_STYPE
PRI_NET5_SYTPE

Examples The following example configures the called number information element for 32 digits:

```
Router(config-if) isdn number called enbloc 32
```

isdn outgoing ie

To specify that an information element (IE) may be passed in outgoing ISDN messages, use the **isdn outgoing ie** command in interface configuration mode. To specify that an IE may not be passed in outgoing ISDN messages, use the **no** form of this command.

isdn outgoing ie *ie* [**codeset_0** {**message** *message-type* | **shiftcodeset codeset_6**} | **dms250** | **nooct3** | **transparent**]

no isdn outgoing ie *ie* [**codeset_0** {**message** *message-type* | **shiftcodeset codeset_6**} | **dms250** | **nooct3** | **transparent**]

Syntax Description

ie	The IE to pass in outgoing ISDN messages. Valid keywords for the *ie* argument are listed in Table 1.
codeset_0	(Optional) Specifies that the IE will be packed in ISDN codeset 0. Codeset 0 is the ITU standard codeset and the default codeset. However, you must issue the **codeset_0** keyword if you want to specify a message type.
message *message-type*	(Optional) Specifies a particular outgoing message to pass an IE. Valid keywords for the *message-type* argument are listed in Table 2. If you do not specify a message type, the IE will be passed in all applicable message types.
shiftcodeset codeset_6	(Optional) Specifies that the display IE should be packed in codeset 6, instead of codeset 0, in outgoing messages. **Note** The **shiftcodeset codeset_6** keywords are available only when the **display** keyword is entered for the *ie* argument, and can be configured only for Class 4 Electronic Switching System (4ESS) or 5ESS switch types. See the "Usage Guidelines" section for more information.
dms250	(Optional) Specifies that the display IE should be packed in codeset 6, instead of codeset 0, in outgoing messages. **Note** The **dms250** keyword is available only when the **display** keyword is entered for the *ie* argument. The **dms250** optional keyword controls the handling of octet 3 of the display IE in the setup message, and is applicable only when DMS-100 or DMS-250 switches must interoperate with other switch types. See the "Usage Guidelines" section for more information.

nooct3	(Optional) Specifies that octet 3 of the display IE is stripped from the display IE before it is packed in the setup message. This is the default behavior for DMS-100 and DMS-250 switches. **Note** The **nooct3** keyword is available only when the **display** keyword is entered for the *ie* argument. This option controls the handling of octet 3 of the display IE in the setup message, and is applicable only when DMS-100 or DMS-250 switches must interoperate with other switch types. See the "Usage Guidelines" section for more information.
transparent	(Optional) Specifies that the display IE is packed in the setup message without modifying or inserting octet 3. This is the default behavior for non-DMS switches. **Note** The **transparent** keyword is available only when the **display** keyword is entered for the *ie* argument. This option controls the handling of octet 3 of the display IE in the setup message, and is applicable only when DMS-100 or DMS-250 switches must interoperate with other switch types. See the "Usage Guidelines" section for more information.

Command Default

Supported IEs are passed in applicable outgoing messages.

Command Modes

Interface configuration (config-if)

Command History

Release	Modification
12.3(7)T	This command was introduced. This command replaces the **isdn outgoing ie redirecting-number** command.

Usage Guidelines

Incompatibility between ISDN switch types at the originating and terminating gateways can prevent the provided IEs from being passed end-to-end. Cisco devices can be configured to transparently pass unsupported IEs, thereby allowing complete interworking between different switch types.

Use the **isdn outgoing ie** command to configure a device to transparently pass unsupported IEs to its peer. IEs may be packed in any codeset. However, the **isdn outgoing ie** command can manually control IEs packed in codeset 0 only. IEs will be passed only in applicable message types.

Use the **no isdn outgoing ie** command to disable the device from passing IEs in outgoing ISDN messages.

You may use the **isdn gateway-max-interworking** command to globally configure the device to transparently pass all unsupported IEs to its peer. However, the **isdn outgoing ie** command provides much finer control.

Note If the **isdn gateway-max-interworking** command is enabled, IEs that are invalid for some destination switch types may be passed. This can cause undesirable events to occur.

Note If the **isdn protocol-emulate** command is switched between the **network** and **user** keyword configurations, the **isdn outgoing ie** command reverts to its default setting. The **isdn outgoing ie** command must be reissued to restore the manual configuration.

Options That Are Specific to the Display IE

DMS-100 and DMS-250 switch types format the display IE by using octet 3, which is an additional octet that is not used by other switch types. Octet 3 specifies the calling party name and is mandatory for DMS-100 and DMS-250 switch types. DMS-100 and DMS-250 switches each use a different value for octet 3. For these switch types to interoperate with each other or with other switch types, octet 3 must be modified. Use the **dms250**, **nooct3**, or **transparent** keyword to control the interoperation of a DMS-100 or DMS-250 switch with other switch types.

4ESS and 5ESS switch types do not support the display IE. If a message with a display IE packed in codeset 0 is passed out of a PRI interface with 4ESS or 5ESS switch types, the display IE will be dropped. However, these switches will pass any unknown IE that is packed in codeset 6. Use the **shiftcodeset codeset_6** keywords to specify that the display IE should be packed in codeset 6 before being sent out of a PRI interface with a 4ESS or 5ESS switch.

Table 1 llists the IE keywords that can be entered for the *ie* argument. Not all IEs can be controlled using the **isdn outgoing ie** command.

Table 1 ISDN IE Values

IE	IE Description
called-number	Indicates the outgoing call number.
called-subaddr	Indicates the subaddress of the outgoing call.
caller-number	Indicates the incoming call number.
caller-subaddr	Indicates the subaddress of the incoming call.
connected-number	Indicates the number of the remaining caller if a disconnect occurs during a conference.
connected-subaddr	Indicates the subaddress of the remaining caller if a disconnect occurs during a conference.
display	Provides information about the text display.
extended-facility	Provides information about extended facility requests.
facility	Provides information about facility requests.
high-layer-compat	Provides information about higher layer compatibility.
low-layer-compat	Provides information about lower layer compatibility.
network-facility	Provides information about network facility requests.
notify-indicator	Provides information about notifications.
progress-indicator	Provides information about the call in progress.
redirecting-number	Indicates the number that is redirecting the call.
user-user	Provides information about the users at either end of the call.

Table 2 lists the ISDN message type keywords that can be entered for the *message-type* argument.

Table 2 ISDN Outgoing Message Type Keywords

Outgoing Message Type	Message Type Description
alerting	Indicates the alerting message.
callproc	Indicates the call proceeding message.
connect	Indicates the connect message.
disconnect	Indicates the disconnect message.
facility	Indicates the facility message.
information	Indicates the information message.
progress	Indicates the progress message.
rel_comp	Indicates the release complete message.
release	Indicates the release message.
setup	Indicates the setup message.
setup-ack	Indicates the setup acknowledge message.

Examples

The following example shows how to enable sending the redirect number IE in all applicable outgoing message types for a PRI-NI switch:

```
Device(config)# interface Serial 2/0
Device(config-if)# no ip address
Device(config-if)# isdn switch-type primary-ni
Device(config-if)# isdn incoming-voice modem
Device(config-if)# no cdp enable
Device(config-if)# isdn outgoing ie redirecting-number
```

The following example shows how to enable sending the called number IE in an outgoing alert message for a PRI-NI switch:

```
Device(config)# interface Serial 2/1
Device(config-if)# no ip address
Device(config-if)# isdn switch-type primary-ni
Device(config-if)# isdn incoming-voice modem
Device(config-if)# no cdp enable
Device(config-if)# isdn outgoing ie called-number codeset_0 message alerting
```

The following example shows how to enable the passing of the display IE and connected number IE in all applicable outgoing message types for a PRI-5ESS switch:

```
Device(config)# interface Serial 2/2
Device(config-if)# isdn outgoing ie display
Device(config-if)# isdn outgoing ie connected-number
```

The following example shows how to configure a DMS-100 switch to reformat octet 3 for interoperability with a DMS-250 switch:

```
Device(config)# interface Serial 2/3
Device(config-if)# no ip address
Device(config-if)# dialer idle-timeout 999999
Device(config-if)# isdn switch-type primary-dms100
Device(config-if)# isdn incoming-voice modem
Device(config-if)# no cdp enable
Device(config-if)# isdn outgoing ie display dms250
```

The following example shows how to configure a DMS-100 switch to drop the octet from the display IE:

```
Device(config)# interface Serial 2/4
Device(config-if)# no ip address
Device(config-if)# dialer idle-timeout 999999
Device(config-if)# isdn switch-type primary-dms100
Device(config-if)# isdn incoming-voice modem
Device(config-if)# no cdp enable
Device(config-if)# isdn outgoing ie display nooct3
```

The following example shows how to configure a DMS-100 switch to pack the display IE without modifying octet 3:

```
Device(config)# interface Serial 2/5
Device(config-if)# no ip address
Device(config-if)# dialer idle-timeout 999999
Device(config-if)# isdn switch-type primary-dms100
Device(config-if)# isdn incoming-voice modem
Device(config-if)# no cdp enable
Device(config-if)# isdn outgoing ie display transparent
```

The following example shows how to configure a switch to pack the display IE in codeset 6 before sending it out of an interface configured with a 4ESS switch:

```
Device(config)# interface Serial 2/6
Device(config-if)# no ip address
Device(config-if)# isdn switch-type primary-4ess
Device(config-if)# isdn incoming-voice modem
Device(config-if)# no cdp enable
Device(config-if)# isdn outgoing ie display codeset_0 shiftcodeset codeset_6
```

Related Commands

Command	Description
isdn gateway max-interworking	Prevents an H.323 gateway from checking for ISDN protocol compatibility and dropping IEs in call messages.
isdn outgoing display-ie	Enables the display IE to be sent in the outgoing ISDN message if the IE is provided by upper layers, such as voice or modem.
isdn protocol-emulate	Configures an ISDN data or voice port to emulate network or user functionality.

isdn outgoing ie redirecting-number

Note Beginning in Cisco IOS Release 12.3(7)T, the **isdn outgoing ie redirecting-number** command is replaced by the **isdn outgoing ie** command. See the **isdn outgoing ie** command for more information.

To enable passing of the redirect number information element (IE) in the setup message from the Cisco router to its peer, use the **isdn outgoing ie redirecting-number** command in interface configuration mode. To disable passing of the redirect number IE in the setup message from the Cisco router to its peer, use the **no** form of this command.

isdn outgoing ie redirecting-number

no isdn outgoing ie redirecting-number

Syntax Description

This command has no arguments or keywords.

Command Default

The redirecting number IE will be passed in the setup message for the following switch types only by default:

- basic-dms100
- basic-ni
- primary-dms100
- primary-4ESS
- primary-5ESS
- primary-ni
- primary-ni2c

For all other switch types, the redirecting number IE will not be passed by default.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(15)T5	This command was introduced.
12.3(7)T	This command was replaced by the **isdn outgoing ie** command.

Usage Guidelines

Use the **isdn outgoing ie redirecting-number** command to enable passing of the redirect number IE in the setup message from the Cisco router to its peer. Some switch types do not support the redirect number IE, so to ensure compatibility with a peer that does support the redirect number IE you may enable the passing of the redirect number IE using the **isdn outgoing ie redirecting-number** command.

Note If the **isdn protocol-emulate** command is switched between the **network** and **user** keyword configurations, the **isdn outgoing ie** command reverts to its default setting. The **isdn outgoing ie** command must be reissued to restore the manual configuration.

Examples

The following example enables the passing of the redirect number IE for a NET5 switch on a serial interface:

```
interface Serial 0:15
 isdn outgoing ie redirecting-number
```

Related Commands

Command	Description
isdn outgoing ie	Specifies that an IE should be passed in outgoing ISDN messages.
isdn protocol-emulate	Configures an ISDN data or voice port to emulate network or user functionality.

isdn outgoing-voice

To set information transfer capability on outgoing calls for all switch types, use the **isdn outgoing-voice** command in interface configuration mode. To revert to the default state, use the **no** form of this command.

isdn outgoing-voice info-transfer-capability {**3.1kHz-audio** | **speech**}

no isdn outgoing-voice

Syntax Description

info-transfer-capability	Specifies information transfer capability for voice calls.
3.1kHz-audio	Sets capability to 3.1 kHz audio.
speech	Sets capability to speech.

Command Default

No information transfer capabilities set.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

This command is used on outgoing voice calls only, and sets standard information transfer capability.

Examples

The following example sets information transfer capability on outgoing voice calls to speech:

```
interface serial 0:23
 isdn outgoing-voice info-transfer-capability speech
```

Related Commands

Command	Description
isdn incoming-voice	Specifies how to process incoming ISDN voice and data calls.

isdn overlap-receiving

To enable overlap receiving on an ISDN interface, use the **isdn overlap-receiving** command in interface configuration mode. To disable overlap receiving on an ISDN interface, use the **no** form of this command.

isdn overlap-receiving [**T302** *milliseconds*]

no isdn overlap-receiving

Syntax Description

T302 *milliseconds*	(Optional) The number of milliseconds that the T302 timer should wait before expiring. Valid values for the *milliseconds* argument range from 500 to 20000. The default value is 10000 (10 seconds).

Command Default

Overlap receiving is not enabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.1	This command was introduced.

Usage Guidelines

In some situations, the default timer value of the T302 timer is too long. You can shorten the duration of the timer by specifying the **T302** keyword with the number of milliseconds necessary.

When configuring outbound peer matching and overlap receiving, use the **isdn overlap-receiving** command with the **destination-pattern** command. You must configure the commands to allow the router to wait for all the digits to be received before the call is routed. To do this, use the **T** control character after the digits in the destination pattern specified with the **destination-pattern** command. Optionally, you can shorten the duration of the T302 timer when you specify the **isdn overlap-receiving** command.

Examples

The following example shows how to enable overlap receiving on the ISDN interface:

```
interface serial 0:23
 isdn overlap-receiving
```

The following example shows how to enable overlap receiving on the ISDN interface and set the T302 timer to 2 seconds:

```
interface serial 0:23
 isdn overlap-receiving T302 2000
```

Related Commands

Command	Description
destination-pattern	Specifies either the prefix or full E.164 telephone number to be used for a dial peer.
isdn service	Takes an individual B channel or an entire PRI interface out of service or sets it to a different channel service state that is passed in to the switch.

isdn overlap-receiving calltypes all

To enable overlap receiving for all call types, use the **isdn overlap-receiving calltypes all** command in interface configuration mode. To disable overlap receiving for all call types, use the **no** form of this command.

isdn overlap-receiving calltypes all

no isdn overlap-receiving calltypes all

Syntax Description

This commands has no arguments or keywords.

Command Default

Overlap receiving is not enabled.

Command Modes

Interface configuration

Command History

Release	Modification
12.2(13)T	This command was introduced.

Usage Guidelines

The **isdn overlap-receiving calltypes all** command enables overlap receiving for all nonvoice calls that use data dial peers, and it enables an ISDN interface to proceed with a call when a sufficient number of digits are received. These digits are determined by the **destination-pattern** command under the data dial peer configuration.

This command is supported on the Cisco AS5350, Cisco AS5400, and Cisco AS5850 routers.

Examples

The following example shows how to enable overlap receiving:

```
interface serial 0:23
 isdn overlap-receiving calltypes all
```

Related Commands

Command	Description
destination-pattern	Specifies either the prefix or full E.164 telephone number to be used for a dial peer.
dial-peer no-match disconnect-cause	Disconnects the incoming ISDN or CAS call when no inbound voice or modem dial peer is matched.
isdn overlap-receiving	Enables overlap receiving on an ISDN interface.

isdn piafs-enabled

To enable the PRI to take Personal Handyphone Internet Access Forum Standard (PIAFS) calls on MICA technologies modems, use the **isdn piafs-enabled** command in interface configuration mode. To disable the function, use the **no** form of this command.

isdn piafs-enabled

no isdn piafs-enabled

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

Interface configuration

Command History

Release	Modification
12.1(2)XH	This command was introduced on the Cisco AS5300.
12.1(3)T	This command was integrated into Cisco IOS Release 12.1(3)T.
12.1(5)T	This command was integrated into Cisco IOS Release 12.1(5)T and support was added for the Cisco AS5800.
12.2(2)XA	Support was added for PIAFS version 2.1 using Cisco MICA 8.2.3.0 was added. **Note** PIAFS 2.1 is not supported on Cisco AS5800 universal access servers for this release.
12.2(2)XB1	This command was implemented on the Cisco AS5800 platform.
12.2(11)T	This command was integrated into Cisco IOS Release 12.2(11)T.

Examples

The following example shows how to enable the PRI to take PIAFS calls:

```
Router(config)# interface serial 0:23
Router(config-if)# isdn piafs-enabled
```

isdn point-to-point-setup

To configure the ISDN port to send SETUP messages on the static terminal endpoint identifier (TEI), use the **isdn point-to-point-setup** command in interface configuration mode. To restore the default, use the **no** form of this command.

isdn point-to-point-setup

no isdn point-to-point-setup

Syntax Description This command has no arguments or keywords.

Command Default The BRI port sends SETUP messages on the static TEI (TEI 127).

Command Modes Interface configuration

Command History

Release	Modification
12.1(3)XI	This command was introduced.

Usage Guidelines This command only applies if a static TEI has been activated with the **isdn static-tei command.**

Examples The following example configures the BRI port to send SETUP messages on the static TEI:

```
interface bri 1
isdn point-to-point-setup
```

Related Commands

Command	Description
isdn tei-negotiation (global)	Configures when Layer 2 becomes active and ISDN TEI negotiation occurs.

isdn protocol-emulate

To emulate the network side of an ISDN configuration for a PRI Net5 or PRI NTT switch type, use the **isdn protocol-emulate** command in interface configuration mode. To disable ISDN emulation, use the **no** form of this command.

isdn protocol-emulate {**network** | **user**}

no isdn protocol-emulate {**network** | **user**}

Syntax Description

network	Network side of an ISDN configuration.
user	User side of an ISDN configuration.

Command Default No default behavior or values

Command Modes Interface configuration mode

Command History

Release	Modification
12.0(3)XG	This command was introduced on the following platforms: Cisco 2600 series, Cisco 3600 series, and Cisco MC3810 concentrator.
12.1(1)T	This command was introduced in the T train.
12.2(2)XB	This command was implemented on the Cisco AS5350 and Cisco AS5400.
12.2(2)XB1	This command was implemented on the Cisco AS5850.
12.2(8)T	This command was implemented on the Cisco IAD2420 series. This command is not supported on the access servers in this release.
12.2(11)T	This command was implemented on the following platforms: Cisco AS5350, Cisco AS5400, and Cisco AS5850.
12.3	This command was enhanced to support network emulation capability on the Lucent 4ESS, 5ESS, and Nortel DMS-100 ISDN switch types. These switch types can be configured as a network, but no additional changes were made and not all network side features are supported.
12.3(8)T	Added support for the PRI NTT switch type.

Usage Guidelines

- The current ISDN signaling stack can emulate the ISDN network side, but it does not conform to the specifications of the various switch types in emulating the network side.
- This command enables the Cisco IOS software to replicate the public switched network interface to a Private Branch Exchange (PBX).
- To emulate NT (network) or TE (user) functionality, use this command to configure the layer 2 and layer 3 port protocol of a BRI voice port or a PRI interface.

- Use this command to configure the Cisco AS5300 PRI interface to serve as either the primary QSIG slave or the primary QSIG master. To disable QSIG signaling, use the **no** form of this command; the layer 2 and layer 3 protocol emulation defaults to **user**.
- This feature is supported for the PRI Net5 and PRI NTT switch types.

Examples

The following example configures the interface (configured for Net5) to emulate the network-side ISDN:

```
Router(config)# int s0:15
Router(config-if)# isdn protocol-emulate network
```

The following example configures the layer 2 and layer 3 function of T1 PRI interface 23 to act as the QSIG master (NT):

```
interface serial 1:23
 isdn protocol-emulate network
```

The following example configures the layer 2 and layer 3 function of a BRI voice port to operate as QSIG slave (TE):

```
interface bri 1
 isdn protocol-emulate user
```

The following example configures the layer 2 and layer 3 function of an E1 PRI interface to operate as QSIG slave (TE):

```
interface serial 4:23
 isdn protocol-emulate user
```

Related Commands

Command	Description
isdn bchan-number-order	Configures an ISDN PRI interface to make outgoing call selection in ascending, descending, or round-robin order.
isdn logging	Enables logging of ISDN syslog messages.
isdn switch-type (PRI)	Specifies the central office switch type on the ISDN PRI interface.
network-clock-priority	Specifies the clock-recovery priority for the BRI voice ports in a BVM.
pri-group nec-fusion	Configures the NEC PBX to support FCCS.
show cdapi	Displays the CDAPI.
show rawmsg	Displays the raw messages owned by the required component.

isdn reject

To reject an incoming ISDN BRI or PRI call based on type, use the **isdn reject** command in interface configuration mode. To re-allow the incoming call type, use the **no** form of this command.

isdn reject {**cause** *cause-code* | **data** [**56** | **64**] | **piafs** | **v110** | **v120** | **vod** | **voice** [**3.1khz** | **7khz** | **speech**]}

no isdn reject {**cause** *cause-code* | **data** [**56** | **64**] | **piafs** | **v110** | **v120** | **vod** | **voice** [**3.1khz** | **7khz** | **speech**]}

Syntax Description

cause *cause-code*	Rejects call based on cause code value.
data [**56** | **64**]	Rejects incoming data call. If the optional **56** or **64** keyword is not specified, all data calls, including data over voice, are rejected. Use the optional **56** keyword to reject data coming in at 56 kbps. Use the optional **64** keyword to reject data coming in at 64 kbps.
piafs	Rejects incoming Personal Handyphone Internet Access Forum Standard (PIAFS) calls.
v110	Rejects incoming V.110 calls.
v120	Rejects incoming V.120 calls.
vod	Rejects incoming voice-over-data calls, or calls characterized by 64 kbps unrestricted digital data. Although the bearer capability for these calls indicates an incoming data call, the call is treated as voice over data. See the "Usage Guidelines" for more information.
voice [**3.1khz** | **7khz** | **speech**]	Rejects incoming voice and modem calls characterized by one of three information transfer capability types: 3.1 kHz, 7 kHz, and speech, which are defined by using, in corresponding order, the **3.1khz**, **7khz**, and **speech** keywords. If none of the optional keywords is used, all voice calls except voice over data are rejected.

Command Default

Incoming calls are rejected based on D-channel bearer capability information (cause code 65).

Command Modes

Interface configuration

Command History

Release	Modification
12.0	This command was introduced.
12.2	The **cause** *cause-code* keyword and argument were added.

Usage Guidelines

The **isdn reject** command rejects incoming calls based on D-channel bearer capability information.

If this command is configured with the **cause** *cause-code* keyword and argument, it will override the default value and use the configured cause code specified to reject the call. For example, if the **isdn reject data** command is configured so that data calls are rejected with cause code set to 65 ("bearer

capability not implemented" and the default), you can change the cause code to 2, so that data calls will then be rejected with cause code 2. Refer to the *ISDN Switch Types, Codes, and Values* appendix in the *Cisco IOS Debug Command Reference* for a list of ISDN cause code values.

The settings for the **isdn incoming-voice** interface configuration command determine how the call is handled based on bearer capability information, as follows:

- **isdn incoming-voice voice**—Calls bypass the modem and are handled as a voice call.
- **isdn incoming-voice data**—Calls bypass the modem and are handled as digital data.
- **isdn incoming-voice modem**—Calls are passed to a digital modem and the call negotiates the appropriate modem connection with the far-end modem.

When the ISDN interface is configured for incoming voice with the **isdn incoming-voice voice** command and the ISDN bearer capability indicates the call as unrestricted digital data (i = 0x8890), the call is handled as voice over data.

You can assign as many reject incoming call type statements as needed to reject unwanted calls on the ISDN interface.

This command works on any Cisco platform that supports ISDN PRI and BRI interfaces.

Examples

The following example configuration rejects all incoming data and voice-over-data calls but accepts voice calls:

```
interface serial 2/0:23
  no ip address
  no logging event link-status
  dialer-group 1
  isdn switch-type primary-net5
  isdn incoming-voice voice
  isdn map address 222 plan isdn type national
  isdn T309 80000
  isdn reject data
  isdn reject vod
  isdn reject v120
  isdn reject v110
  isdn reject piafs
```

The following example sets the ISDN interface to reject incoming PIAFS calls:

```
interface serial 2/0:23
 isdn reject piafs
```

The following example sets cause code 21 to reject all incoming data calls:

```
interface serial 2/0:23
 isdn reject data
 isdn reject cause 21
```

Related Commands

Command	Description
isdn incoming-voice	Specifies how to process incoming ISDN voice and data calls.

isdn send-alerting

To specify that an Alerting message be sent before a Connect message when making ISDN calls, use the **isdn send-alerting** command in interface configuration mode. To disable the Alerting information element, use the **no** form of this command.

isdn send-alerting

no isdn send-alerting

Syntax Description

This command has no arguments or keywords.

Command Default‘

This command is disabled by default.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

Some switches may want an Alerting message to be sent by the router before sending a Connect message. This is usually seen in a voice and data type of network.

Examples

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

```
interface BRI0
 description connected to PBX 61886
 ip address 172.26.1.1 255.255.255.0
 encapsulation ppp
 isdn send-alerting
 isdn sending-complete
 dialer idle-timeout 20
 dialer map ip 172.26.1.2 name name1 61884
 dialer map ip 172.26.1.3 name name2 61885
 dialer-group 1
 ppp authentication chap
```

Related Commands

Command	Description
isdn sending-complete	Specifies that the Sending Complete IE is included in the outgoing Setup message.