Cisco IOS Release 12.0(3)T for Cisco 800 Series Routers

Feature Summary

Cisco IOS Release 12.0(3)T provides software support for the Cisco 800 series routers. This document describes how to set up the automatic detection of Integrated Services Digital Network (ISDN) service profile identifiers (SPIDs) and switch type (for North America only); how to verify your dial-on-demand routing (DDR) configuration; how to prioritize your data and voice calls; how to configure the physical characteristics of your telephone interface; how to create dial peers; how to activate three-way call conferencing; and how to activate call transferring.

Benefits

The Cisco 800 series routers connect small professional offices or telecommuters over ISDN Basic Rate Interface (BRI) lines to the Internet and corporate networks. The routers provide bridging and multiprotocol routing capability between LAN and WAN ports.

List of Terms

Dial peer—You can create a dial peer to determine how incoming calls are routed to the telephone ports. A dial peer also determines the calling party number for outgoing calls. A dial peer is composed of an identifying tag number, an ISDN directory number, and a telephone port number. A dial peer can also include commands to disable call waiting and to set up a distinctive ring.

ISDN directory number—The local 10-digit ISDN telephone number (including area code) of your router, such as 408-555-1111.

Telephone interface—A logical interface that you must configure to make an analog telephone, fax machine, or modem connected to a telephone port work properly.

Telephone port—The physical telephone port on the router back panel.

Platforms

Cisco IOS Release 12.0(3)T is supported on these platforms:

- Cisco 801 router
- Cisco 802 router
- Cisco 803 router
- Cisco 804 router

Supported MIBs and RFCs

None.

Configuration Tasks

This section describes the following Cisco 800 series configuration tasks:

- Setting up the automatic detection of ISDN SPIDs and switch type (North America only)
- Verifying your DDR configuration
- Prioritizing data and voice calls
- Configuring the physical characteristics of your telephone interface
- Creating a dial peer
- Activating three-way call conferencing
- Activating call transferring

Setting Up Automatic Detection of ISDN SPIDs and Switch Type

This task applies to North America only.

Task		Command
Step 1	Enter configuration mode.	**configure terminal**
Step 2	Enter configuration mode for the ISDN interface.	**interface bri 0**
Step 3	Associate the ISDN local directory numbers (LDNs) provided by your telephone service provider to the first and second SPIDs.	**isdn spid1** *spid-number ldn* [*ldn*] [*ldn*] **isdn spid2** *spid-number ldn* [*ldn*] [*ldn*]
Step 4	Enable the automatic detection of ISDN SPIDs and switch type.	**isdn autodetect**
Step 5	Exit the ISDN interface configuration mode, and return to privileged EXEC mode.	**end**

When entering the **isdn spid1** and **isdn spid2** commands, you can specify 0 for the *spid-number* argument to indicate that the SPID is automatically detected.

Verifying DDR Configuration

You can verify your DDR configuration by making an ISDN data call from the command-line interface (CLI). Enter the following commands from privileged EXEC mode.

Task		Command
Step 1	Initiate the data call.	**isdn call interface** *interface dialing-string* [**speed 56** | **64**]
Step 2	Disconnect the data call without bringing down the ISDN interface.	**isdn disconnect interface bri 0** {**b1** | **b2** | **all**}

Prioritizing Data and Voice Calls

By default, the router always bumps a data call for a voice call. You can reconfigure the priority of data and voice calls for telephones, fax machines, or modems connected to the router telephone ports.

Task		Command
Step 1	Enter configuration mode.	**configure terminal**
Step 2	Enter configuration mode for the ISDN interface.	**interface bri 0**
Step 3	Configure ISDN voice priority for each ISDN directory number.	**isdn voice-priority** *local-directory-number* {**in** | **out**} {**always** | **conditional** | **off**}
Step 4	Exit the ISDN interface configuration mode, and return to privileged EXEC mode.	**end**

If you have multiple ISDN directory numbers associated with a SPID, then the outgoing voice priority that you set for any of these directory numbers applies to the other numbers.

The setting of the **pots dialing-method** command affects when you hear a busy signal in the following situation:

- A data call cannot be bumped.
- You are trying to make an outgoing call.

If the setting is **overlap**, you hear a busy signal when you pick up the handset. If the setting is **enblock**, you initially hear a dial tone and then a busy signal.

Configuring Telephone Interface Physical Characteristics

You can configure the physical characteristics of the telephone interface.

Task		Command
Step 1	Enter configuration mode.	**configure terminal**
Step 2	Enter the **pots country ?** command to get a list of supported countries and the code you must input to indicate a particular country. By specifying a country, you are configuring your telephone to use country-specific default settings for each physical characteristic. If you need to change a country-specific default setting, you can use the optional commands described in this table.	**pots country** *country*
Step 3	Optional. Specify impedance of your connected devices.	**pots line-type** {**type1** | **type2** | **type3**}
Step 4	Optional. Specify how the router collects and transmits digits dialed on your connected devices.	**pots dialing-method** {**overlap** | **enblock**}
Step 5	Optional. Specify how the router notifies the connected devices when the calling party has hung up.	**pots disconnect-supervision** {**osi** | **reversal**}
Step 6	Optional. Set the pulse code modulation (PCM) encoding scheme for your connected devices.	**pots encoding** {**alaw** | **ulaw**}
Step 7	Optional. Specify the source of dial, ringback, and busy tones for your connected devices.	**pots tone-source** {**local** | **remote**}
Step 8	Optional. Specify frequency at which your connected devices ring.	**pots ringing-freq** {**20Hz** | **25Hz** | **50Hz**}

Task		Command
Step 9	Optional. Specify the interval in which the disconnect method is applied if your connected devices fail to detect that a calling party has disconnected.	**pots disconnect-time** *interval*
Step 10	Optional. Specify the interval of silence after a calling party disconnects from your connected devices.	**pots silence-time** *interval*
Step 11	Optional. Specify a delay in which a connected device can be rung after a previous call is directed.	**pots distinctive-ring-guard- time** *milliseconds*
Step 12	Exit configuration mode, and return to privileged EXEC mode.	**exit**
Step 13	Optional. Display the settings of physical characteristics as well as other information on telephone interfaces.	**show pots status** [**1** | **2**]

Creating a Dial Peer

You can create a dial peer to determine how incoming calls are routed to the telephone ports. You can create a total of six dial peers for the two telephone ports. There are no restrictions on how many dial peers you can create per port; for example, you can create six dial peers for port 1 and zero on port 2.

Task		Command
Step 1	Enter configuration mode.	**configure terminal**
Step 2	Set up tag number for the dial peer.	**dial-peer voice** *tag* **pots**
Step 3	Specify the local ISDN directory number assigned to the telephone interface.	**destination-pattern** *ldn*
Step 4	Specify the number associated with the telephone port.	**port** *port-number*
Step 5	Optional. Disable call waiting.	**no call-waiting**
Step 6	Optional. Set up a distinctive ring.	**ring** *cadence-number*
Step 7	Exit configuration mode for the dial peer.	**exit**
Step 8	Specify parameters for the ISDN interface.	**interface bri 0**
Step 9	Specify that incoming ISDN voice calls are forwarded to devices connected to telephone ports.	**isdn incoming-voice modem**
Step 10	Exit the ISDN interface configuration mode, and return to privileged EXEC mode.	**end**
Step 11	Optional. Display all or a particular dial-peer configuration.	**show dial-peer voice** [*tag*]

Note Make sure that all ISDN directory numbers associated with a SPID are in turn associated with one port. For example, if 555-1111 and 555-2222 are associated with SPID1 and you associate 555-1111 to port 1 and 555-2222 to port 2, you will not be able to make outgoing calls on ports 1 and 2 simultaneously.

Activating Three-Way Call Conferencing

You must request this feature when you order your ISDN line. For information on ordering your ISDN line, refer to the *Cisco 800 Series Routers Software Configuration Guide*.

If you are connected to a National ISDN-1 (NI1) or a Northern Telecom (Nortel) DMS-100 Custom switch and your telephone service provider supplies a conference code other than 60 (the default), you must activate three-way call conferencing.

Task		Command
Step 1	Enter configuration mode.	**configure terminal**
Step 2	Enter configuration mode for the ISDN interface.	**interface bri 0**
Step 3	Activate three-way call conferencing.	**isdn conference-code** *range*
Step 4	Exit the ISDN interface configuration mode, and return to privileged EXEC mode.	**end**

Activating Call Transferring

You must request this feature when you order your ISDN line. For information on ordering your ISDN line, refer to the *Cisco 800 Series Routers Software Configuration Guide*.

If you are connected to an NI1 or a Nortel DMS-100 Custom switch and your telephone service provider supplies a transfer code other than 61 (the default), you must activate call transferring.

Task		Command
Step 1	Enter configuration mode.	**configure terminal**
Step 2	Enter configuration mode for the ISDN interface.	**interface bri 0**
Step 3	Activate call transferring.	**isdn transfer-code** *range*
Step 4	Exit the ISDN interface configuration mode, and return to privileged EXEC mode.	**end**

Configuration Examples

This section provides examples of the following Cisco 800 series configuration tasks:

- Setting up the automatic detection of ISDN SPIDs and switch type (North America only)
- Verifying your DDR configuration
- Prioritizing data and voice calls
- Configuring the physical characteristics of your telephone interface
- Creating dial peers
- Activating three-way call conferencing
- Activating call transferring

Setting Up Automatic Detection of ISDN SPIDs and Switch Type

To set up the automatic detection of ISDN SPIDs and switch type, follow these steps. These steps apply to North America only.

Step 1 Associate the ISDN LDNs provided by your telephone service provider to the first and second SPIDs:

isdn spid1 ***spid-number ldn*** [*ldn*] [*ldn*]

isdn spid2 ***spid-number ldn*** [*ldn*] [*ldn*]

Because the SPID numbers provided by your telephone service provider are automatically detected, you do not need to specify them in this command; instead, you can specify 0 to indicate that the SPID numbers should be automatically detected.

For example, if your telephone service provider assigned 408-555-1111 as a primary directory number and 408-555-2222 as a secondary directory number for the first SPID and 408-555-3333 and 408-555-4444 for the second SPID, you can enter the following commands:

```
router (config-if)# isdn spid1 0 4085551111 4085552222
router (config-if)# isdn spid2 0 4085553333 4085554444
```

Always provide the complete directory number, including the area code.

Step 2 Enable the automatic detection of ISDN SPID numbers and switch type:

```
router (config-if)# isdn autodetect
```

Verifying DDR Configuration

You can test your DDR configuration by making an ISDN data call through the CLI:

Step 1 Initiate the data call:

isdn call interface *interface dialing-string* [**speed 56 | 64**]

For example, enter the following command to initiate the call through the BRI to 555-1111 at the line speed of 56 kbps:

```
router# isdn call interface bri 0 5551111 speed 56
```

Step 2 Disconnect the data call without bringing down the interface:

isdn disconnect interface *interface* {**b1 | b2 | all**}

For example, enter the following command to disconnect the data call on B channel 1 of the BRI:

```
router# isdn disconnect interface bri 0 b1
```

Prioritizing Data and Voice Calls

To control the priority of data and voice calls for telephones, fax machines, and modems connected to a router telephone port, enter the following command:

isdn voice-priority *local-directory-number* {**in | out**} {**always | conditional | off**}

The following is a sample voice priority configuration:

```
router (config-if)# isdn voice-priority 5551111 in conditional
router (config-if)# isdn voice-priority 5551111 out conditional
router (config-if)# isdn voice-priority 5552222 in off
router (config-if)# isdn voice-priority 5552222 out off
```

In this example, if an ISDN circuit endpoint is busy with a data call or calls and either a voice call comes in (incoming) or you attempt to place a voice call (outgoing), the data call is handled in the following ways:

- For 555-1111, the data call is bumped.
- For 555-2222, the data call is not bumped. The voice call receives a busy signal.

Configuring Telephone Interface Physical Characteristics

To configure the telephone interface physical characteristics, follow these steps:

Step 1 Specify the country where your router is located:

pots country *country*

Enter the **pots country ?** command to get a list of supported countries and the code you must input to indicate a particular country. For example, if your router is located in Germany, enter the following command:

```
router (config)# pots country de
```

This command determines the physical characteristics of the telephone interfaces. By specifying Germany, you are configuring your telephone to use Germany-specific default settings for each of the physical characteristics.

Step 2 Exit to privileged EXEC mode:

```
router (config)# exit
```

Step 3 Display the setting of each physical characteristic:

```
router # show pots status
```

The following sample output shows German-specific default settings for each physical characteristic. (The **show pots status** command typically displays telephone interface physical characteristics and status of telephone ports 1 and 2. This sample output is truncated to display only the physical characteristics.)

```
POTS Global Configuration:
   Country: Germany
   Dialing Method: Overlap, Tone Source: Remote, CallerId Support: NO
   Line Type: Complex Impedance, PCM Encoding: a-law, Disc Type: OSI,
   Ringing Frequency: 20Hz, Distinctive Ring Guard timer: 0 msec
   Disconnect timer: 1000 msec, Disconnect Silence timer: 5 sec
   ...
```

Step 4 After viewing the default settings for the physical characteristics, determine if you need to change any settings.

Step 5 If necessary, change any country-specific default settings.

For a summary of the physical characteristics commands, refer to the "Configuring Telephone Interface Physical Characteristics" section on page 3. For example, to change the dialing method from overlap to enblock, do the following:

(a) Enter configuration mode:

```
router # configure terminal
```

(b) Enter the following command:

```
router (config)# pots dialing-method enblock
```

Creating a Dial Peer

You can create a dial peer to determine how incoming calls are routed to the telephone ports. For example, if you have connected one voice device (555-1111) to port 1 and another (555-2222) to port 2, you can create two dial peers:

```
dial-peer voice 1 pots
destination-pattern 5551111
port 1
no call-waiting
ring 0

dial-peer voice 2 pots
destination-pattern 5552222
port 2
no call-waiting
ring 0
```

When a caller dials 555-1111, the call is routed to port 1. When a caller dials 555-2222, the call is routed to port 2. If the dial peers are not created, calls to both numbers are routed to port 1.

After creating the dial peers, enter the **isdn incoming-voice modem** command to ensure that the incoming ISDN voice calls are forwarded to the telephone ports.

Activating Three-Way Call Conferencing

To activate three-way call conferencing, enter the following command:

isdn conference-code *range*

For example, if your telephone service provider supplies 61 as the conference code, enter the following command:

```
router (config-if)# isdn conference-code 61
```

Activating Call Transferring

To activate call transferring, enter the following command:

isdn transfer-code *range*

For example, if your telephone service provider supplies 62 as the transfer code, enter the following command:

```
router (config-if)# isdn transfer-code 62
```

Command Reference

This section documents new and modified commands specific to the Cisco 800 series routers. All other commands are documented in the Cisco IOS Release 12.0 command references.

- **call-waiting**
- **destination-pattern**
- **dial-peer voice pots**
- **isdn autodetect**
- **isdn call interface**
- **isdn conference-code**
- **isdn disconnect interface**
- **isdn spid1**
- **isdn spid2**
- **isdn transfer-code**
- **isdn voice-priority**
- **port**
- **pots country**
- **pots dialing-method**
- **pots disconnect-supervision**
- **pots disconnect-time**
- **pots distinctive-ring-guard-time**
- **pots encoding**
- **pots line-type**
- **pots ringing-freq**
- **pots silence-time**
- **pots tone-source**
- **ring**
- **show dial-peer voice**
- **show pots status**

call-waiting

Use the **call-waiting** interface configuration command to enable call waiting. Use the **no** form of this command to disable call waiting.

call-waiting
no call-waiting

Syntax Description

This command has no arguments or keywords.

Default

Call waiting is enabled.

Command Mode

Interface configuration

Usage Guidelines

You must specify this command when creating a dial peer. This command will not work if it is not specified within the context of a dial peer. For information on creating a dial peer, refer to the *Cisco 800 Series Routers Software Configuration Guide*.

Example

The following example disables call waiting:

```
router (config-dial-peer)# no call-waiting
```

Related Commands

destination-pattern
dial-peer voice pots
port
ring
show dial-peer voice

destination-pattern

Use the **destination-pattern** interface configuration command to specify the ISDN directory number for the telephone interface. Use the **no** form of this command to disable the specified ISDN directory number.

destination-pattern *ldn*
no destination-pattern

Syntax Description

ldn	Local ISDN directory number assigned by your telephone service provider.

Default

A default ISDN directory number is not defined for this interface.

Command Mode

Interface configuration

Usage Guidelines

You must specify this command when creating a dial peer. This command will not work if it is not specified within the context of a dial peer. For information on creating a dial peer, refer to the *Cisco 800 Series Routers Software Configuration Guide*.

Do not specify an area code with the local ISDN directory number.

Example

The following example specifies 555-1111 as the local ISDN directory number:

```
router (config-dial-peer)# destination-pattern 5551111
```

Related Commands

dial-peer voice pots
no call-waiting
port
ring
show dial-peer voice

dial-peer voice pots

Use the **dial-peer voice pots** global configuration command to create a dial peer that determines how incoming calls are routed to the telephone ports. Use the **no** form of this command to delete the specified dial peer.

dial-peer voice *tag* **pots**
no dial-peer voice *tag* **pots**

Syntax Description

tag	Tag number from 1 through 6.
pots	Plain old telephone service (POTS). Create a dial peer for the telephone interface.

Default

Default dial peers are not defined.

Command Mode

Global configuration

Usage Guidelines

You can create a maximum of six dial peers. Within this, there are no restrictions on the number of dial peers you can create per telephone port. For example, you can create six dial peers for telephone port 1 and none on telephone port 2.

Example

The following example creates dial peer 1:

```
router (config)# dial-peer voice 1 pots
router (config-dial-peer)#
```

Related Commands

destination-pattern
no call-waiting
port
ring
show dial-peer voice pots

isdn autodetect

Use the **isdn autodetect** interface configuration command to enable the automatic detection of ISDN SPIDs and switch type. Use the **no** form of this command to disable the automatic detection of ISDN SPIDs and switch type.

isdn autodetect
no isdn autodetect

Syntax Description

This command has no arguments or keywords.

Default

The automatic detection of ISDN SPIDs and switch type is disabled.

Command Mode

Interface configuration

Usage Guidelines

This command applies to North America only. If you are outside of North America, you must use the **isdn switch-type** *switch-type* interface configuration command to specify the ISDN switch type.

Example

The following example enables the automatic detection of ISDN SPIDs and switch type:

```
router (config-if)# isdn autodetect
```

Related Commands

isdn spid1
isdn spid2

isdn call interface

Use the **isdn call interface** privileged EXEC command to make an ISDN data call.

isdn call interface *interface dialing-string* [**speed 56** | **64**]

Syntax Description

interface	Interface number.
dialing-string	Telephone number used for making ISDN data call.
speed	(Optional) Line speed (56 or 64 kbps) used for making ISDN data call.

Default

The default B-channel speed is 64 kbps.

Command Mode

Privileged EXEC

Usage Guidelines

You can use the **isdn call interface** command to test your DDR configuration. You can also use this command to verify the dialing string and speed without having to know the IP address of the remote router or without configuring a dialer map or string.

Example

The following example makes an ISDN data call through interface bri 0 to 555-1111 and at a line speed of 56 kbps:

```
router# isdn call interface bri 0 5551111 speed 56
```

Related Commands

isdn disconnect interface

isdn conference-code

Use the **isdn conference-code** interface configuration command to activate three-way call conferencing. Use the **no** form of this command to disable three-way call conferencing.

isdn conference-code *range*
no isdn conference-code

Syntax Description

range	Number from 0 through 999 (ISDN conference code).

Default

The default code is 60.

Command Mode

Interface configuration

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.

Example

The following example specifies 61 as the ISDN conference code:

```
router (config-if)# isdn conference-code 61
```

isdn disconnect interface

Use the **isdn disconnect interface** privileged EXEC command to disconnect an ISDN data call without bringing down the interface.

isdn disconnect interface *interface* {**b1** | **b2** | **all**}

Syntax Description

interface	Interface type and number, such as bri 0.
b1	B channel 1.
b2	B channel 2.
all	B channels 1 and 2.

Default

A default interface is not defined.

Command Mode

Privileged EXEC

Usage Guidelines

You can use the **isdn disconnect interface** command to disconnect any ongoing data calls placed manually or caused by DDR.

Example

The following example disconnects an ISDN data call through interface bri 0 and B channel 1:

```
router# isdn disconnect interface bri 0 b1
```

Related Commands

isdn call interface

isdn spid1

Use the **isdn spid1** interface configuration command to associate up to three ISDN local directory numbers provided by your telephone service provider to the first SPID. Use the **no** form of this command to disable the first SPID.

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

Syntax Description

spid-number	Number that identifies the ISDN B channel. The SPID format is generally an ISDN telephone number with numbers added to it, such as 40855522220101.
ldn	ISDN local directory number. You can optionally specify second and third LDNs.

Default

A default SPID number and ISDN local directory numbers are not defined.

Command Mode

Interface configuration

Usage Guidelines

This command applies only to North America. If you want the SPID to be automatically detected, you can specify 0 for the *spid-number* argument.

Example

The following example shows how to specify that the SPID should be automatically detected, that the primary ISDN local directory number is 4085551111, and that the secondary number is 4085552222:

```
router (config-if)# isdn spid1 0 4085551111 4085552222
```

Related Commands

isdn spid2
isdn autodetect

isdn spid2

Use the **isdn spid2** interface configuration command to associate up to three ISDN local directory numbers provided by your telephone service provider to the second SPID. Use the **no** form of this command to disable the second SPID.

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

Syntax Description

spid-number	Number that identifies the ISDN B channel. The SPID format is generally an ISDN telephone number with numbers added to it, such as 40855522220101.
ldn	ISDN local directory number. You can optionally specify second and third LDNs.

Default

A default SPID number and ISDN local directory numbers are not defined.

Command Mode

Interface configuration

Usage Guidelines

This command applies only to North America. If you want the SPID to be automatically detected, you can specify 0 for the *spid-number* variable.

Example

The following example specifies that the SPID should be automatically detected, that the primary ISDN local directory number is 4085551111, and that the secondary number is 4085552222:

```
router (config-if)# isdn spid2 0 4085551111 4085552222
```

Related Commands

isdn spid1
isdn autodetect

isdn transfer-code

Use the **isdn transfer-code** interface configuration command to activate call transferring. Use the **no** form of this command to disable call transferring.

isdn transfer-code *range*
no isdn transfer-code

Syntax Description

range	Number from 0 to 999 (ISDN transfer code).

Default

The default code is 61.

Command Mode

Interface configuration

Usage Guidelines

Use this command if your ISDN line is connected to a NI1 or a Nortel DMS-100 Custom switch. Your telephone service provider should issue an ISDN transfer code when you order call transferring.

Example

The following example specifies 62 as the ISDN transfer code:

```
router (config-if)# isdn transfer-code 62
```

isdn voice-priority

Use the **isdn voice-priority** interface configuration command to control the priority of data and voice calls for the telephones, fax machines, and modems connected to the router telephone ports. If an ISDN circuit endpoint is busy with a data call or calls and either a voice call comes in (incoming) or you attempt to place a voice call (outgoing), the data call is handled according to the setting of this command. Use the **no** form of this command to disable a specified ISDN voice priority setting and to use the default setting.

isdn voice-priority *local-directory-number* {**in** | **out**} {**always** | **conditional** | **off**}
no isdn voice-priority *local-directory-number*

Syntax Description

local-directory-number	Local ISDN directory number assigned by your telephone service provider.
in	Incoming voice call.
out	Outgoing voice call.
always	Always bump a data call for a voice call.
conditional	Bump a data call only if there is more than one call to the same destination.
off	Never bump a data call for a voice call.

Default

A data call is never bumped for an incoming or outgoing voice call.

Command Mode

Interface configuration

Usage Guidelines

If you are in North America and have multiple ISDN directory numbers associated with a SPID, the outgoing voice priority that you set for any of these directory numbers applies to the other directory numbers. For example, if you enter the following commands, the outgoing voice priority for all directory numbers specified in the **isdn spid1** command is set to conditional:

```
router (config-if)# isdn spid1 0 4085551111 4085552222 4085553333
router (config-if)# isdn voice-priority 5551111 out conditional
```

The setting of the **pots dialing-method** command affects when you hear a busy signal in the following situation:

- A data call cannot be bumped.
- You are trying to make an outgoing call.

If the setting is **overlap**, you hear a busy signal when you pick up the handset. If the setting is **enblock**, you initially hear a dial tone and then a busy signal.

Example

The following example specifies that a data call for the specified ISDN directory number never be bumped for an incoming or an outgoing voice call:

```
router (config-if)# isdn voice-priority 5551111 in off
router (config-if)# isdn voice-priority 5551111 out off
```

Related Commands

isdn spid1
isdn spid2
pots dialing-method

port

Use the **port** interface configuration command to specify a telephone port to which an incoming voice call is routed. Use the **no** form of this command to disable the specified port.

port *port-number*
no port *port-number*

Syntax Description

port-number	Telephone port 1 or 2. To determine the telephone port number, see the telephone port markings on the router back panel.

Default

The default is telephone port 1.

Command Mode

Interface configuration

Usage Guidelines

You must specify this command when creating a dial peer. This command will not work if it is not specified within the context of a dial peer. For information on creating a dial peer, refer to the *Cisco 800 Series Routers Software Configuration Guide*.

Example

The following example specifies that an incoming voice call is routed to telephone port 2:

```
router (config-dial-peer)# port 2
```

Related Commands

destination-pattern
dial-peer voice pots
no call-waiting
ring
show dial-peer voice

pots country

Use the **pots country** global configuration command to configure your connected telephones, fax machines, or modems to use country-specific default settings for each physical characteristic. Use the **no** form of this command to disable the use of country-specific default settings for each physical characteristic.

pots country *country*
no pots country *country*

Syntax Description

country	Country that your router is in. Enter the **pots country ?** command to get a list of supported countries and the code you must enter to indicate a particular country.

Default

A default country is not defined.

Command Mode

Global configuration

Usage Guidelines

If you need to change a country-specific default setting of a physical characteristic, you can use the associated command listed in the "Related Commands" section.

Example

The following example specifies that the devices connected to the telephone ports use default settings specific to Germany for the physical characteristics:

```
router (config)# pots country de
```

Related Commands

pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots ringing-freq
pots silence-time
pots tone-source
show pots status

pots dialing-method

Use the **pots dialing-method** global configuration command to specify how the router collects and transmits digits dialed on your connected telephones, fax machines, or modems. Use the **no** form of this command to disable the specified dialing method.

pots dialing-method {**overlap** | **enblock**}
no pots dialing-method {**overlap** | **enblock**}

Syntax Description

overlap	The router transmits each digit dialed in a separate message.
enblock	The router collects all digits dialed and transmits the digits in one message.

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Usage Guidelines

To interrupt the collection and transmission of dialed digits, enter a pound sign (#) or stop dialing digits until the interdigit timer runs out (10 seconds).

Example

The following example specifies that the router uses the enblock dialing method:

```
router (config)# pots dialing-method enblock
```

Related Commands

pots country
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots ringing-freq
pots silence-time
pots tone-source
show pots status

pots disconnect-supervision

Use the **pots disconnect-supervision** global configuration command to specify how a router notifies the connected telephones, fax machines, or modems when the calling party has disconnected. Use the **no** form of this command to disable the specified disconnect method.

pots disconnect-supervision {**osi** | **reversal**}
no pots disconnect-supervision {**osi** | **reversal**}

Syntax Description

osi	Open switching interval (OSI) is the duration for which DC voltage applied between tip and ring conductors of a telephone port is removed.
reversal	Polarity reversal of tip and ring conductors of a telephone port.

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Usage Guidelines

Most countries except Japan typically use the **osi** option. Japan typically uses the **reversal** option.

Example

The following example specifies that the router uses the osi disconnect method:

```
router (config)# pots disconnect-supervision osi
```

Related Commands

pots country
pots dialing-method
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots ringing-freq
pots silence-time
pots tone-source
show pots status

pots disconnect-time

Use the **pots disconnect-time** global configuration command to specify the interval in which the disconnect method is applied if your connected telephones, fax machines, or modems fail to detect that a calling party has disconnected. The **pots disconnect-supervision** command configures the disconnect method. For more information, refer to the "pots disconnect-supervision" section. Use the **no** form of this command to disable the specified disconnect interval.

pots disconnect-time *interval*
no pots disconnect-time *interval*

Syntax Description

interval	Number from 50 to 2000 (milliseconds).

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Example

The following example specifies that the connected devices apply the configured disconnect method for 100 milliseconds after a calling party disconnects:

```
router (config)# pots disconnect-time 100
```

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots ringing-freq
pots silence-time
pots tone-source
show pots status

pots distinctive-ring-guard-time

Use the **pots distinctive-ring-guard-time** global configuration command to specify a delay in which a telephone port can be rung after a previous call is disconnected. Use the **no** form of this command to disable the specified delay.

pots distinctive-ring-guard-time *milliseconds*
no pots distinctive-ring-guard-time *milliseconds*

Syntax Description

milliseconds Number from 0 to 1000 (milliseconds).

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Example

The following example specifies that a telephone port can be rung 100 milliseconds after a previous call is disconnected:

```
router (config)# pots distinctive-ring-guard-time 100
```

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots encoding
pots line-type
pots ringing-freq
pots silence-time
pots tone-source
ring
show pots status

pots encoding

Use the **pots encoding** global configuration command to specify the pulse code modulation (PCM) encoding scheme for your connected telephones, fax machines, or modems. Use the **no** form of this command to disable the specified PCM encoding scheme.

pots encoding {**alaw** | **ulaw**}
no pots encoding {**alaw** | **ulaw**}

Syntax Description

alaw	International Telecommunication Union Telecommunication Standardization Section (ITU-T) PCM encoding scheme used to represent analog voice samples as digital values.
ulaw	North American PCM encoding scheme used to represent analog voice samples as digital values.

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Usage Guidelines

Europe typically uses the **alaw** option. North America typically uses the **ulaw** option.

Example

The following example specifies **alaw** as the PCM encoding scheme:

```
router (config)# pots encoding alaw
```

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots line-type
pots ringing-freq
pots silence-time
pots tone-source
show pots status

pots line-type

Use the **pots line-type** global configuration command to specify the impedance of your connected telephones, fax machines, or modems. Use the **no** form of this command to disable the specified line type.

pots line-type {**type1** | **type2** | **type3**}
no pots line-type {**type1** | **type2** | **type3**}

Syntax Description

type1	Runs at 600 ohms.
type2	Runs at 900 ohms.
type3	Runs at 300/400 ohms.

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Example

The following example specifies type1 as the line type:

```
router (config)# pots line-type type1
```

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots ringing-freq
pots silence-time
pots tone-source
show pots status

pots ringing-freq

Use the **pots ringing-freq** global configuration command to specify the frequency at which your connected telephones, fax machines, or modems ring. Use the **no** form of this command to disable the specified ringing frequency.

pots ringing-freq {**20Hz** | **25Hz** | **50Hz**}
no pots ringing-freq {**20Hz** | **25Hz** | **50Hz**}

Syntax Description

20Hz	Connected devices ring at 20 Hz.
25Hz	Connected devices ring at 25 Hz.
50Hz	Connected devices ring at 50 Hz.

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Example

The following example specifies a ringing frequency of 50 Hz:

```
router (config)# pots ringing-freq 50Hz
```

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots silence-time
pots tone-source
show pots status

pots silence-time

Use the **pots silence-time** global configuration command to specify the interval of silence after a calling party disconnects. Use the **no** form of this command to disable the specified silence time.

pots silence-time *interval*
no pots silence-time *interval*

Syntax Description

interval	Number from 0 to 10 (seconds).

Default

Depends on the setting of the **pots country** command. For more information, refer to the **pots country** command.

Command Mode

Global configuration

Example

The following example specifies 10 seconds as the interval of silence:

```
router (config)# pots silence-time 10
```

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots ringing-freq
pots tone-source
show pots status

pots tone-source

Use the **pots tone-source** global configuration command to specify the source of dial, ringback, and busy tones for your connected telephones, fax machines, or modems. Use the **no** form of this command to disable the specified tone source.

pots tone-source {**local** | **remote**}
no pots tone-source {**local** | **remote**}

Syntax Description

local	Router supplies the tones.
remote	Telephone switch supplies the tones.

Default

The default setting is **local**.

Command Mode

Global configuration

Usage Guidelines

This command applies only to ISDN lines connected to a EURO-ISDN (NET3) switch.

Example

The following example specifies **remote** as the tone source:

```
router (config)# pots tone-source remote
```

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots ringing-freq
pots silence-time
show pots status

ring

Use the **ring** interface configuration command to set up a distinctive ring for your connected telephones, fax machines, or modems. Use the **no** form of this command to disable the specified distinctive ring.

ring *cadence-number*
no ring *cadence-number*

Syntax Description

cadence-number Number from 0 through 2:

- Type 0 is a primary ringing cadence—default ringing cadence for country your router is in.
- Type 1 is a distinctive ring—0.8 seconds on, 0.4 seconds off, 0.8 seconds on, 0.4 seconds off.
- Type 2 is a distinctive ring—0.4 seconds on, 0.2 seconds off, 0.4 seconds on, 0.2 seconds off, 0.8 seconds on, 4 seconds off.

Default

The default is 0.

Command Mode

Interface configuration

Usage Guidelines

You can specify this command when creating a dial peer. This command will not work if it is not specified within the context of a dial peer. For information on creating a dial peer, refer to the *Cisco 800 Series Routers Software Configuration Guide*.

Example

The following example specifies the type 1 distinctive ring:

```
router (config-dial-peer)# ring 1
```

Related Commands

destination-pattern
dial-peer voice pots
no call-waiting
port
pots distinctive-ring-guard-time
ring
show dial-peer voice

show dial-peer voice

Use the **show dial-peer voice** privileged EXEC command to display the dial-peer configurations.

show dial-peer voice [*tag*]

Syntax Description

tag	(Optional) Tag number of a dial peer that you created by using the **dial-peer voice** command.

Command Mode

Privileged EXEC

Usage Guidelines

The **show dial-peer voice** command displays all configured dial peers.

Sample Display

The following is a sample output from the **show dial-peer voice** command. Table 1 describes the fields in this output.

```
router# show dial-peer voice
VoiceEncapPeer1
        tag = 1
        destination-pattern = '5551111'
        voice-port = 1
        ring cadence = 0
        call-waiting disabled
VoiceEncapPeer2
        tag = 2
        destination-pattern = '5552222'
        voice-port = 2
        ring cadence = 0
        call-waiting disabled
```

Table 1 Show Dial-Peer Voice Field Descriptions

Field	Descriptions
VoiceEncapPeer	Dial peer number. Indented fields that follow are associated with this dial peer.
tag	Tag number associated with this dial peer.
destination-pattern	Local ISDN directory number associated with this dial peer.
voice-port	Telephone port number associated with this dial peer.
ring cadence	Ring cadence number associated with this dial peer.
call-waiting	Status of call-waiting feature. Call-waiting indicates that the feature is enabled. No call-waiting indicates that the feature is disabled.

Related Commands

destination-pattern
dial-peer voice pots
no call-waiting
port
ring

show pots status

Use the **show pots status** privileged EXEC command to display the settings of the telephone port physical characteristics as well as other information on the telephone interfaces.

show pots status [**1** | **2**]

Syntax Description

1 (Optional) Display the settings of telephone port 1.

2 (Optional) Display the settings of telephone port 2.

Command Mode

Privileged EXEC

Usage Guidelines

The **show pots status** command displays the settings and information for both telephone ports.

Sample Display

The following is a sample output from the **show pots status** command. Table 2 describes the fields in this output.

```
router # show pots status
POTS Global Configuration:
   Country: United States
   Dialing Method: Overlap, Tone Source: Remote, CallerId Support: YES
   Line Type: 600 ohm, PCM Encoding: u-law, Disc Type: OSI,
   Ringing Frequency: 20Hz, Distinctive Ring Guard timer: 0 msec
   Disconnect timer: 1000 msec, Disconnect Silence timer: 5 sec
   TX Gain: 6dB, RX Loss: -6dB,
   Filter Mask: 6F
   Adaptive Cntrl Mask: 0
POTS PORT: 1
   Hook Switch Finite State Machine:
      State: On Hook, Event: 0
      Hook Switch Register: 10, Suspend Poll: 0
   CODEC Finite State Machine:
      State: Idle, Event: 0
      Connection: None, Call Type: Two Party, Direction: Rx only
      Line Type: 600 ohm, PCM Encoding: u-law, Disc Type: OSI,
      Ringing Frequency: 20Hz, Distinctive Ring Guard timer: 0 msec
      Disconnect timer: 1000 msec, Disconnect Silence timer: 5 sec
      TX Gain: 6dB, RX Loss: -6dB,
      Filter Mask: 6F
      Adaptive Cntrl Mask: 0
   CODEC Registers:
      SPI Addr: 2, DSLAC Revision: 4
      SLIC Cmd: 0D, TX TS: 00, RX TS: 00
      Op Fn: 6F, Op Fn2: 00, Op Cond: 00
      AISN: 6D, ELT: B5, EPG: 32 52 00 00
      SLIC Pin Direction: 1F
```

```
   CODEC Coefficients:
      GX: A0 00
      GR: 3A A1
       Z: EA 23 2A 35 A5 9F C2 AD 3A AE 22 46 C2 F0
       B: 29 FA 8F 2A CB A9 23 92 2B 49 F5 37 1D 01
       X: AB 40 3B 9F A8 7E 22 97 36 A6 2A AE
       R: 01 11 01 90 01 90 01 90 01 90 01 90
      GZ: 60
     ADAPT B: 91 B2 8F 62 31
   CSM Finite State Machine:
      Call 0 - State: idle, Call Id: 0x0
               Active: no
      Call 1 - State: idle, Call Id: 0x0
               Active: no
      Call 2 - State: idle, Call Id: 0x0
               Active: no
POTS PORT: 2
   Hook Switch Finite State Machine:
      State: On Hook, Event: 0
      Hook Switch Register: 20, Suspend Poll: 0
   CODEC Finite State Machine:
      State: Idle, Event: 0
      Connection: None, Call Type: Two Party, Direction: Rx only
      Line Type: 600 ohm, PCM Encoding: u-law, Disc Type: OSI,
      Ringing Frequency: 20Hz, Distinctive Ring Guard timer: 0 msec
      Disconnect timer: 1000 msec, Disconnect Silence timer: 5 sec
      TX Gain: 6dB, RX Loss: -6dB,
      Filter Mask: 6F
      Adaptive Cntrl Mask: 0
   CODEC Registers:
      SPI Addr: 3, DSLAC Revision: 4
      SLIC Cmd: 0D, TX TS: 00, RX TS: 00
      Op Fn: 6F, Op Fn2: 00, Op Cond: 00
      AISN: 6D, ELT: B5, EPG: 32 52 00 00
      SLIC Pin Direction: 1F
   CODEC Coefficients:
      GX: A0 00
      GR: 3A A1
       Z: EA 23 2A 35 A5 9F C2 AD 3A AE 22 46 C2 F0
       B: 29 FA 8F 2A CB A9 23 92 2B 49 F5 37 1D 01
       X: AB 40 3B 9F A8 7E 22 97 36 A6 2A AE
       R: 01 11 01 90 01 90 01 90 01 90 01 90
      GZ: 60
     ADAPT B: 91 B2 8F 62 31
   CSM Finite State Machine:
      Call 0 - State: idle, Call Id: 0x0
               Active: no
      Call 1 - State: idle, Call Id: 0x0
               Active: no
      Call 2 - State: idle, Call Id: 0x0
               Active: no
Time Slot Control: 0
```

Table 2 Show Pots Status Field Descriptions

Field	Descriptions
POTS Global Configuration	Displays the settings of the telephone port physical characteristic commands. Also displays the following: • TX GAIN—Current transmit gain of telephone ports. • RX LOSS—Current transmit loss of telephone ports. • Filter Mask—Value determines which filters are currently enabled or disabled in the telephone port hardware. • Adaptive Cntrl Mask—Value determines if telephone port adaptive line impedance hardware is enabled or disabled.
Hook Switch Finite State Machine	Device driver that tracks state of telephone port hook switch.
CODEC Finite State Machine	Device driver that controls telephone port CODEC hardware.
CODEC Registers	Register contents of telephone port CODEC hardware.
CODEC Coefficients	CODEC coefficients selected by telephone port driver. Selected line type determines CODEC coefficients.
CSM Finite State Machine	State of call-switching module (CSM) software.
Time Slot Control	Register that determines if telephone port voice or data packets are transmitted to an ISDN B channel.

Related Commands

pots country
pots dialing-method
pots disconnect-supervision
pots disconnect-time
pots distinctive-ring-guard-time
pots encoding
pots line-type
pots ringing-freq
pots silence-time
pots tone-source

Debug Command

This section documents the new **debug pots** command. The Cisco IOS Release 12.0 debug command reference manuals document all other debug commands used with this feature.

debug pots

Use the **debug pots** privileged EXEC command to display information on the telephone interfaces. Use the **no** form of this command to disable debugging output.

debug pots {**driver** | **csm**} [**1** | **2**]
no debug pots {**driver** | **csm**} [**1** | **2**]

Syntax Description

driver	Display driver debug information.
csm	Display CSM debug information.
1	(Optional) Display information for telephone port 1 only.
2	(Optional) Display information for telephone port 2 only.

Command Mode

Privileged EXEC

Usage Guidelines

The **debug pots** command displays driver and CSM debug information for telephone ports 1 and 2.

Sample Displays

The following is a sample display from the **debug pots driver 1** command. This sample display indicates that the telephone port driver is not receiving caller ID information from the ISDN line. Therefore, the analog caller ID device attached to the telephone port does not display caller ID information.

```
router# debug pots driver 1
00:01:51:POTS DRIVER port=1 activate ringer: cadence=0 callerId=Unknown
00:01:51:POTS DRIVER port=1 state=Idle drv_event=RING_EVENT
00:01:51:POTS DRIVER port=1 enter_ringing
00:01:51:POTS DRIVER port=1 cmd=19
00:01:51:POTS DRIVER port=1 activate disconnect
00:01:51:POTS DRIVER port=1 state=Ringing drv_event=DISCONNECT_EVENT
00:01:51:POTS DRIVER port=1 cmd=1A
00:01:51:POTS DRIVER port=1 enter_idle
00:01:51:POTS DRIVER port=1 ts connect: 0 0
00:01:51:POTS DRIVER port=1 cmd=D
00:01:51:POTS DRIVER port=1 report onhook
00:01:51:POTS DRIVER port=1 activate tone=SILENCE_TONE
00:01:51:POTS DRIVER port=1 state=Idle drv_event=TONE_EVENT
00:01:51:POTS DRIVER port=1 activate tone=SILENCE_TONE
00:01:51:POTS DRIVER port=1 state=Idle drv_event=TONE_EVENT
00:01:53:POTS DRIVER port=1 activate ringer: cadence=0 callerId=Unknown
00:01:53:POTS DRIVER port=1 state=Idle drv_event=RING_EVENT
00:01:53:POTS DRIVER port=1 enter_ringing
00:01:53:POTS DRIVER port=1 cmd=19
00:01:55:POTS DRIVER port=1 cmd=1A
00:02:49:POTS DRIVER port=1 state=Ringing drv_event=OFFHOOK_EVENT
00:02:49:POTS DRIVER port=1 cmd=1A
00:02:49:POTS DRIVER port=1 enter_suspend
00:02:49:POTS DRIVER port=1 cmd=A
00:02:49:POTS DRIVER port=1 report offhook
00:02:49:POTS DRIVER port=1 activate connect: endpt=1 calltype=TWO_PARTY_CALL
00:02:49:POTS DRIVER port=1 state=Suspend drv_event=CONNECT_EVENT
00:02:49:POTS DRIVER port=1 enter_connect: endpt=1 calltype=0
00:02:49:POTS DRIVER port=1 cmd=A
00:02:49:POTS DRIVER port=1 ts connect: 1 0
00:02:49:POTS DRIVER port=1 activate connect: endpt=1 calltype=TWO_PARTY_CALL
00:02:49:POTS DRIVER port=1 state=Connect drv_event=CONNECT_EVENT
00:02:49:POTS DRIVER port=1 enter_connect: endpt=1 calltype=0
00:02:49:POTS DRIVER port=1 cmd=A
00:02:49:POTS DRIVER port=1 ts connect: 1 0
00:02:55:POTS DRIVER port=1 state=Connect drv_event=ONHOOK_EVENT
00:02:55:POTS DRIVER port=1 enter_idle
00:02:55:POTS DRIVER port=1 ts connect: 0 0
00:02:55:POTS DRIVER port=1 cmd=D
00:02:55:POTS DRIVER port=1 report onhook
00:02:55:POTS DRIVER port=1 activate tone=SILENCE_TONE
00:02:55:POTS DRIVER port=1 state=Idle drv_event=TONE_EVENT
00:02:55:POTS DRIVER port=1 activate tone=SILENCE_TONE
00:02:55:POTS DRIVER port=1 state=Idle drv_event=TONE_EVENT
```

The following is sample display from the **debug pots csm 1** command. This sample display indicates that a dial peer contains an invalid destination pattern (555-1111).

```
router# debug pots csm 1
01:57:28:EVENT_FROM_ISDN:dchanidb=0x66CB38, call_id=0x11, ces=0x2 bchan=0x0, event=0x1,
cause=0x0
01:57:28:Dial peer not found, route call to port 1
01:57:28:CSM_PROC_IDLE:CSM_EVENT_ISDN_CALL, call_id=0x11, port=1
01:57:28:Calling number '5551111'
01:57:40:CSM_PROC_RINGING:CSM_EVENT_VDEV_OFFHOOK, call_id=0x11, port=1
01:57:40:EVENT_FROM_ISDN:dchan_idb=0x66CB38, call_id=0x11, ces=0x2 bchan=0x0,
event=0x4, cause=0x0
01:57:40:CSM_PROC_CONNECTING:CSM_EVENT_ISDN_CONNECTED, call_id=0x11, port=1
01:57:47:CSM_PROC_CONNECTING:CSM_EVENT_VDEV_ONHOOK, call_id=0x11, port=1
01:57:201863503872: %ISDN-6-DISCONNECT:Interface BRI0:1 disconnected from unknown, call
lasted 5485 seconds
01:57:47: %ISDN-6-DISCONNECT:Interface BRI0:1 disconnected from unknown, call lasted
5485 seconds
01:57:47:EVENT_FROM_ISDN:dchan _idb=0x66CB38, call_id=0x11, ces=0x2 bchan=0xFFFFFFFF,
event=0x0, cause=0x1
01:57:47:CSM_PROC_NEAR_END_DISCONNECT:CSM_EVENT_ISDN_DISCONNECTED, call_id=0x11, port=1
```

What to Do Next

For additional software configuration information for the Cisco 800 series routers, refer to the following documents:

- *Cisco 800 Series Routers Software Configuration Guide*
- Cisco IOS Release 12.0 documentation set