



# Channelized E1 and Channelized T1 Setup Commands

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This chapter describes commands needed to configure channelized E1 and channelized T1 for the following:

- ISDN PRI on any platform that supports Primary Rate Interface
- Robbed bit (in-band) signaling for analog calls over digital T1 lines
- Channel-associated (out-of-band) signaling over digital E1 lines on the AS5200/AS5300 access servers

In Cisco IOS Release 11.3, all commands supported on the Cisco 7500 series are also supported on the Cisco 7000 series.

## autodetect encapsulation

To enable automatic detection of the encapsulation types in operation over a point-to-point link to a specified serial or ISDN interface, use the **autodetect encapsulation** interface configuration command. To disable automatic, dynamic detection of the encapsulation types in operation on a link, use the **no** form of this command.

**autodetect encapsulation** *encapsulation-type*  
**no autodetect encapsulation**

### Syntax Description

*encapsulation-type*                      One or both of the encapsulation keywords **v120** and **ppp**.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Release 11.2.

At least one encapsulation type is required in the command, but you can specify additional encapsulation types.

Use this command to enable the specified serial or ISDN interface to accept calls and dynamically change the encapsulation in effect on the interface when the remote device does not signal the call type. For example, if an ISDN call does not identify the call type in the Lower Layer Compatibility fields and is using an encapsulation that is different from the one configured on the interface, the interface can change its encapsulation type dynamically.

This command enables interoperability with ISDN terminal adapters that use V.120 encapsulation but do not signal V.120 in the call setup message. An ISDN interface that by default answers a call as synchronous serial with PPP encapsulation can change its encapsulation and answer such calls.

Automatic detection is attempted for the first 10 seconds after the link is established or the first five packets exchanged over the link, whichever is first.

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**encapsulation**

## cas-custom

To customize E1 R2 signaling parameters for a particular E1 channel group on a channelized E1 line, use the **cas-custom** controller configuration command. Use the **no** form of this command to disable the signaling customization.

```
cas-custom channel
no cas-custom channel
```

### Syntax Description

<i>channel</i>	Specifies a single channel group number, which can be between 0 and 30. This channel group number must match the channel number specified in the <b>cas-group</b> command.
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### Default

No customized signaling parameters are set. If you do not specify a country name using the **country name** command, which is described in Table 45, ITU is the selected default signal.

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 P.

The customization parameters set by the **cas-custom channel** command are applied to the same channel group number used in the **cas-group channel timeslots range type signal** command. These channel group numbers must match. Otherwise, the customized features specified by the **cas-custom** command will not be applied to the **cas-group** command's configuration. The signaling customization will not take effect. See Example 1.

However, you will not need to configure or set more than one channel group number per E1 line in most cases. Though rarely used, it is possible to split a single E1 (timeslots 1 to 31) into two groups (for example, 1 to 15 on group 1 and timeslots 17 to 31 in group 2).

Cisco strongly recommends that you use the **use-defaults** option when specifying a particular country type. See the **country name** command in Table 45. This additional keyword ensures that all the local country settings are correctly enabled. For example, issue the **country greece use-defaults** command. If the **use-defaults** option is not specified, generic ITU will be the default setting for all countries. See Example 2.

You can configure the system to deviate from a country's default settings as defined by Cisco. To do this, choose from the following list of commands described in Table 45: **ani-digits min number max number**, **answer-signal {group-a | group-b} number**, **caller-digits number**, **category number**, **dnis-digits min number max number**, **invert-abcd**, **ka number**, **kd number**, **metering**, **nc-congestion**, and **unused-abcd value**. To return a country back to its country specific default settings, issue the **country name use-defaults** command. To return a country back to the ITU standard, issue the **default country name use-defaults** command. See Example 3 and Example 4.

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**Note** Only integrated MICA modems support E1 R2 signaling on Cisco access servers.

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Table 45 shows a list of command options in cas-custom mode, which is used to customize R2 signaling settings. Some switches require you to fine tune your R2 settings. Do not tamper with these commands unless you understand exactly how your switch will be affected.

**Table 45 Available Commands in Cas-Custom Mode**

Command	Purpose
<b>ani-digits</b> <i>min number max number</i>	Requested number of ANI digits for each call. All calls that do not match the minimum and maximum settings that you specify will be dropped. The minimum number of collected digits is set by <b>min number</b> . Replace the <i>number</i> variable with a value between 0 and 64. The maximum number of collected digits is set by <b>max number</b> . Replace the <i>number</i> variable with a value between 5 and 64. By default, ANI digits are not collected, which is the ITU standard.
<b>answer-signal</b> { <b>group-a</b>   <b>group-b</b> } <i>number</i>	Answer signal to be used. You can specify the group A signal or the group B signal. The signal <i>number</i> can be 1 to 15. Default is group-b 6, which is the ITU default.
<b>caller-digits</b> <i>number</i>	Specifies the number of digits the access server needs to collect before it requests ANI or CallerID information. The digits can be from 1 to 10. Default is 1, which is the ITU default.
<b>category</b> <i>number</i>	Specifies the category type of the incoming call, which is mapped to a group signal <i>number</i> . Signal numbers from 1 to 15 are available. Default is 1, which is the ITU default.
<b>country</b> <i>name use-defaults</i>	<p>Specifies the local country, regional, and some corporation settings for R2 signaling. Replace the <i>name</i> variable with one of the following supported country names. Cisco strongly recommends that you include the <b>use-defaults</b> option, which enables the default settings for a specific country. Default country setting is ITU.</p> <ul style="list-style-type: none"> <li>• argentina use-defaults</li> <li>• australia use-defaults</li> <li>• brazil use-defaults</li> <li>• china use-defaults</li> <li>• columbia use-defaults</li> <li>• costarica use-defaults</li> <li>• easteurope use-defaults</li> </ul> <p>The <b>easteurope</b> option supports Croatia, Russia, and the Slovak Republic.</p> <ul style="list-style-type: none"> <li>• ecuador-itu use-defaults</li> <li>• ecuador-lme use-defaults</li> <li>• greece use-defaults</li> <li>• guatemala use-defaults</li> <li>• hongkong-china use-defaults</li> </ul> <p>The Hong Kong option uses the China variant.</p>

Table 45 Available Commands in Cas-Custom Mode (continued)

Command	Purpose
	<ul style="list-style-type: none"> <li>• indonesia use-defaults</li> <li>• israel use-defaults</li> <li>• itu</li> </ul> <p>ITU is the signaling default. ITU provides support for the following list of countries: Denmark, Finland, Germany, Russia (ITU variant), Hong Kong (ITU variant), and South Africa (ITU variant).</p> <p>The expression “ITU variant” means that there are multiple R2 signaling types deployed in the specified country, but Cisco supports the ITU variant.</p> <ul style="list-style-type: none"> <li>• korea use-defaults</li> <li>• malaysia use-defaults</li> <li>• newzealand use-defaults</li> <li>• paraguay use-defaults</li> <li>• peru use-defaults</li> <li>• philippines use-defaults</li> <li>• saudi-arabia use-defaults</li> <li>• singapore use-defaults</li> <li>• south-africa-panaf-tel use-defaults</li> </ul> <p>The South Africa option uses the Panaftel variant.</p> <ul style="list-style-type: none"> <li>• telmex use-defaults</li> <li>• telnor use-defaults</li> </ul> <p>The Telemex and Telnor corporations are supported for Mexico.</p> <ul style="list-style-type: none"> <li>• thailand use-defaults</li> <li>• uruguay use-defaults</li> <li>• venezuela use-defaults</li> <li>• vietnam use-defaults</li> </ul>
<b>default</b>	Sets a command to its default setting.
<b>dnis-digits</b> <i>min number max number</i>	Requested number of DNIS digits for each call. All calls that do not match the minimum and maximum settings that you specify will be dropped. The minimum number of collected digits is set by <b>min number</b> . Replace the <i>number</i> variable with a value between 0 and 64. The maximum number of collected digits is set by <b>max number</b> . Replace the <i>number</i> variable with a value between 5 and 64. By default, DNIS digits are not collected, which is the ITU standard.
<b>exit</b>	Takes you out of cas custom mode.
<b>invert-abcd</b>	Inverts the ABCD bits before tx and after rx. This feature is disabled by default, which is the ITU default.
<b>ka</b> <i>number</i>	Specifies the KA signal code. You can choose 1 to 15. Default is 0, which is the ITU default.
<b>kd</b> <i>number</i>	Specifies the KD signal code. You can choose 1 to 15. Default is 0, which is the ITU default.

**Table 45 Available Commands in Cas-Custom Mode (continued)**

<b>Command</b>	<b>Purpose</b>
<b>metering</b>	Specifies sending a metering pulse when the access server is making an outgoing call. Metering is turned off by default, which is the ITU default.
<b>nc-congestion</b>	Specifies the noncompelled congestion signal. This signal is sent to the central office when the access server is congested and cannot accept the call. The default is B4, which is the ITU default.
<b>no</b>	Negates a command or sets its defaults.
<b>request-category</b>	DNIS digits to be collected before requesting category. A category specifies different priority levels for different calls within R2, such as data calls versus voice calls. This information is primarily used for the switches that forward the calls to the NAS.  For example, India needs the category requested after the first DNIS digit.
<b>unused-abcd</b> <i>value</i>	Specifies unused ABCD bit values, which can have a 0 or 1 bit value. This feature is disabled by default, which is the ITU default.

**Example 1**

The following example displays the available signaling parameters after you enter cas-custom mode. Notice that the same channel group 1 is specified in the **cas-group** command and the **cas-custom** command.

```

router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z
router(config)# controller e1 1
router(config-controller) cas-group 1 timeslots 1-31 type r2-digital r2-compelled
router(config-controller) cas-custom 1
router(config-ctrl-cas)# ?
CAS custom commands:
  ani-digits           Expected number of ANI digits
  answer-signal       Answer signal to be used
  caller-digits        Digits to be collected before requesting CallerID
  category             Category signal
  country              Country Name
  default              Set a command to its defaults
  dnis-digits          Expected number of DNIS digits
  exit                 Exit from cas custom mode
  invert-abcd          invert the ABCD bits before tx and after rx
  ka                   KA Signal
  kd                   KD Signal
  metering             R2 network is sending metering signal
  nc-congestion        Non Compelled Congestion signal
  no                   Negate a command or set its defaults
  request-category     DNIS digits to be collected before requesting category
  unused-abcd          Unused ABCD bit values

```

## Example 2

You can localize your R2 configuration for a specific country. Don't forget to include the **use-defaults** option as described in Table 45. For example, use the **country argentina use-defaults** command for a R2 scenario in Argentina.

```

router(config-ctrl-cas)# country ?
  argentina      Argentina
  australia      Australia
  brazil         Brazil
  china          China
  columbia       Columbia
  costarica      Costa Rica
  easteuropa     East Europe
  ecuador-itu    Ecuador ITU
  ecuador-lme    Ecuador LME
  greece         Greece
  guatemala      Guatemala
  hongkong-china Hong Kong (China variant)
  indonesia      Indonesia
  israel         Israel
  itu            ITU
  korea          Korea
  malaysia       Malaysia
  newzealand     New Zealand
  paraguay       Paraguay
  peru           Peru
  philippines     Philippines
  saudi-arabia   Saudi Arabia
  singapore      Singapore
  southafrica-panaftel South Africa Panaftel
  telmex         Telmex
  telnor         Telnor
  thailand       Thailand
  uruguay        Uruguay
  venezuela      Venezuela
  vietnam        Vietnam

router(config-ctrl-cas)# country argentina ?
  use-defaults  Use Country defaults
  <cr>

router(config-ctrl-cas)# country argentina use-defaults

```

## Example 3

The following example customizes the signaling for channel group 1. The configuration collects 3 digits before it requests ANI information for analog calls received on a Cisco AS5300 in Argentina.

```

router(config-controller)# cas-custom 1
router(config-ctrl-cas)# country argentina use-defaults
router(config-ctrl-cas)# caller-digits 3
router(config-controller)# ^z
router(config)#

```

### Example 4

Because cas-custom mode gives you the flexibility to customize R2 parameters, the margin for user error increases. Therefore, the Cisco IOS software enables you to return a country back to its default R2 settings using the **use-defaults** option. The following example begins by bringing up Argentina's default settings, changing a few customization parameters, then returning the Argentina R2 setting back to its original state.

```
router(config-ctrl-cas)# country argentina use-defaults  
router(config-ctrl-cas)# caller-digits 3  
router(config-ctrl-cas)# unused-abcd 1  
router(config-ctrl-cas)# metering  
router(config-ctrl-cas)# country argentina use-defaults
```

### Related Command

You can use the master indexes or search online to find documentation of related commands.

**cas-group** (controller E1)

## cas-group (controller e1)

To configure channel associated signaling on an E1 controller, use the **cas-group** controller configuration command. Use the **no** form of this command to disable channel associated signaling for one or more timeslots.

```
cas-group channel timeslots range type signal
no cas-group channel timeslots range type signal
```

### Syntax Description

<i>channel</i>	Specifies a single channel group number. Replace the <i>channel</i> variable with a number between 0 and 30.
<b>timeslots</b> <i>range</i>	Specifies a timeslot range, which can be from 1 to 31. You can specify a timeslot range (for example, 1-31), individual timeslots separated by commas (for example 1, 3, 5), or a combination of the two (for example 1-14, 15, 17-31). The 16th time slot is reserved for out-of-band signaling.
<b>type</b> <i>signal</i>	Specifies the type of channel associated signaling. Configure the signal type that your central office uses. Replace the <i>signal</i> variable with one of the following signal types: <ul style="list-style-type: none"> <li>• <b>e&amp;m-fgb</b> [<b>dtmf</b> [<b>dnis</b>]   <b>mf</b> [<b>dnis</b>]]—Specifies ear and mouth channel signaling with feature group B support, which includes the wink start protocol. The optional signal tones are DTMF and MF with the option of provisioning DNIS.</li> <li>• <b>e&amp;m-fgd</b>—Specifies ear and mouth channel signaling with feature group D support, which includes the wink start protocol.</li> <li>• <b>e&amp;m-immediate-start</b>—Specifies ear and mouth channel signaling with immediate start support.</li> <li>• <b>fxs-ground-start</b>—Specifies Foreign Exchange Station ground start signaling support.</li> <li>• <b>fxs-loop-start</b>—Specifies Foreign Exchange Station loopstart signaling support.</li> <li>• <b>p7</b>—Specifies the P7 switch type.</li> <li>• <b>sas-ground-start</b>—Specifies Special Access Station ground start signaling support.</li> <li>• <b>sas-loop-start</b>—Specifies Special Access Station loopstart signaling support.</li> <li>• <b>r1-modified</b> {<b>ani-dnis</b>   <b>dnis</b>}</li> <li>• <b>r2-analog</b> [<b>dtmf</b>   <b>r2-compelled</b> [<b>ani</b>]   <b>r2-non-compelled</b> [<b>ani</b>]   <b>r2-semi-compelled</b> [<b>ani</b>]]</li> <li>• <b>r2-digital</b> [<b>dtmf</b>   <b>r2-compelled</b> [<b>ani</b>]   <b>r2-non-compelled</b> [<b>ani</b>]   <b>r2-semi-compelled</b> [<b>ani</b>]]</li> <li>• <b>r2-pulse</b> [<b>dtmf</b>   <b>r2-compelled</b> [<b>ani</b>]   <b>r2-non-compelled</b> [<b>ani</b>]   <b>r2-semi-compelled</b> [<b>ani</b>]]</li> </ul>

The following descriptions are provided for the previous R1 and R2 syntax bullets:

**r1-modified ani-dnis**—Indicates R1 signaling will collect ani and dnis information.

**r1-modified dnis**—Indicates R1 signaling will collect only dnis information.

**r2-analog**—Specifies R2 ITU Q411 analog line signaling, which reflects the on/off switching of a tone in frequency-division multiplexing circuits (before TDM circuits were created). The tone is used for line signaling.

**r2-digital**—Specifies R2 ITU Q421 digital line signaling, which is the most common signaling configuration. The A and B bits are used for line signaling.

**r2-pulse**—Specifies R2 ITU supplement 7 pulse line signaling, which is a transmitted pulse that indicates a change in the line state.

**dtmf**—Specifies the DTMF tone signaling.

**r2-compelled [ani]**—Specifies R2 compelled register signaling. You can also specify provisioning the ANI addr option.

**r2-non-compelled [ani]**—Specifies R2 noncompelled register signaling.

**r2-semi-compelled [ani]**—Specifies R2 semicompelled register signaling.

## Default

For ISDN PRI, the **cas-group** command is disabled.

If the channelized E1 is not configured as a PRI, the default value for line signaling is **e&m-fgb** and the default value for tone signaling is **DTMF**.

The R1 signaling default is **ani-dnis**.

R2 signaling types have DNIS turned on by default.

## Command Mode

Controller configuration

## Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 P.

The **R1** options first appeared in Cisco IOS Release 11.3 P.

The **R2** options first appeared in Cisco IOS Release 11.3 T.

Use this command to configure support for incoming and outgoing call signals (such as on-hook and off-hook) on each E1 controller.

If you specify the timeslot range 1-31, the system software automatically uses the 16th timeslot to transmit the channel associated signaling.

The signaling you configure on the access server must match the signaling used by the central office. For example if the central office switch is forwarding R2 analog signaling to a Cisco AS5300, then the access server's E1 controller must also be configured for R2 analog signaling (**r2-analog**).

All R2 signaling options have DNIS support turned on by default. If you enable the **ani** option, the collection of DNIS information is still performed. Specifying the **ani** option does not disable DNIS. DNIS is the number being called. ANI is the caller's number. For example, if you are configuring router A to call router B, then the DNIS number is router B, the ANI number is router A. ANI is very similar to Caller ID.

To customize the R2 signaling parameters, refer to the **cas-custom** controller configuration command. When you enable the **cas-group** command, the **cas-custom** command is automatically setup to be polled for configuration information. However, unless you enable or turn on specific features with the **cas-custom** command, the cas-custom feature has an empty set of signaling parameters.

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**Note** Only integrated MICA modems support E1 R2 signaling on Cisco access servers.

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DNIS is automatically collected for modem pools and R2 tone signaling. You do not need to specify the collection of DNIS information with the **cas-group** command. However, if you are using non-R2 tone signaling, the system must be manually configured to collect DNIS information. For non-R2 cas signaling, DNIS collection is done only for E&M-fgb.

## Examples

In most cases, you will configure the same channel associated signaling on each E1 controller. The following examples configure signaling and customized parameters on controller E1 2 using the **cas-group** and **cas-custom** controller configuration commands. The actual channel associated signaling is configured on the 16th timeslot, which is the reason why this timeslot does not come up in the following output.

```
router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
router(config)# controller e1 2
router(config-controller)# cas-group 1 timeslots 1-31 type r2-digital r2-compelled ani
router(config-controller)#
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 1 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 2 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 3 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 4 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 5 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 6 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 7 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 8 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 9 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 10 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 11 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 12 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 13 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 14 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 15 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 17 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 18 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 19 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 20 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 21 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 22 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 23 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 24 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 25 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 26 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 27 is up
```

```
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 28 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 29 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 30 is up
%DSX0-5-RBSLINEUP: RBS of controller 0 timeslot 31 is up
```

The following example shows all the supported E1 signaling types on a Cisco AS5300.

```
router(config-controller)# cas-group 1 timeslots 1-31 type ?
e&m-fgb          E & M Type II FGB
e&m-fgd          E & M Type II FGD
e&m-immediate-start E & M Immediate Start
fxs-ground-start FXS Ground Start
fxs-loop-start   FXS Loop Start
p7              P7 Switch
r2-analog       R2 ITU Q411
r2-digital      R2 ITU Q421
r2-pulse        R2 ITU Supplement 7
sas-ground-start SAS Ground Start
sas-loop-start  SAS Loop Start

router(config-controller)# cas-group 1 timeslots 1-31 type r2-analog ?
dtmf            DTMF tone signalling
r2-compelled    R2 Compelled Register Signalling
r2-non-compelled R2 Non Compelled Register Signalling
r2-semi-compelled R2 Semi Compelled Register Signalling
<cr>
```

R2 signaling parameters can be customized with the **cas-custom** controller configuration command:

```
router(config-controller)# cas-custom 1
router(config-ctrl-cas)# ?
CAS custom commands:
caller-digits  Digits to be collected before requesting CallerID
category       Category signal
country        Country Name
default        Set a command to its defaults
exit           Exit from cas custom mode
invert-abcd    invert the ABCD bits before tx and after rx
metering       R2 network is sending metering signal
nc-congestion  Non Compelled Congestion signal
no             Negate a command or set its defaults
```

The following example would configure R1 Signaling on a Cisco AS5200 (T1 interface) and specify the collection of both ani and dnis information:

```
5200(config-controller)# cas-group 1 timeslots 1-24 type r1-modified ani-dnis
```

## cas-group (controller t1)

To configure channelized T1 timeslots with robbed bit signaling, use the **cas-group** controller configuration command. Use the **no** form of this command to disable robbed bit signaling for one or more timeslots.

```
cas-group channel timeslots range type signal
no cas-group channel timeslots range type signal
```

### Syntax Description

<i>channel</i>	Specifies a single channel group number, which can be between 0 and 23.
<b>timeslots</b> <i>range</i>	Specifies a range of timeslots, which are from 1 to 24. Timeslots can be specified by ranges or groups. For example, 1-24 or 1-15 and 17-24.
<b>type</b> <i>signal</i>	<p>Specifies a type of robbed bit signaling. Replace the <i>signal</i> variable with one of the following signal types. The keywords <b>service</b>, <b>data</b>, and <b>voice</b> are used for switched 56K configuration. These keywords are described at the end of this syntax description table.</p> <ul style="list-style-type: none"> <li>• <b>e&amp;m-fgb</b> [<b>dtmf</b> [<b>dnis</b>]   [<b>service</b> {<b>data</b>   <b>voice</b>}]   [<b>service</b> {<b>data</b>   <b>voice</b>}]   [<b>mf</b> [<b>dnis</b>]   [<b>service</b> {<b>data</b>   <b>voice</b>}]—Specifies ear and mouth channel signaling with feature group B support, which includes the wink start protocol. Use the options <b>dtmf</b> [<b>dnis</b>] to configure DTMF tone signaling with optional DNIS provisioning. Use the options <b>mf</b> [<b>dnis</b>] to configure MF tone signaling with optional DNIS provisioning. Use the options <b>service</b> {<b>data</b>   <b>voice</b>} for switched 56K configurations. (See the end of this syntax description table for more information about these switched 56K keywords.)</li> <li>• <b>e&amp;m-fgd</b> [<b>service</b> {<b>data</b>   <b>voice</b>}]—Specifies ear and mouth channel signaling with feature group D support, which includes the wink start protocol. Use the options <b>service</b> {<b>data</b>   <b>voice</b>} for switched 56K configurations. (See the end of this syntax description table for more information.)</li> <li>• <b>e&amp;m-immediate-start</b> [<b>service</b> {<b>data</b>   <b>voice</b>}]—Specifies ear and mouth channel signaling with immediate start support. Use the options <b>service</b> {<b>data</b>   <b>voice</b>} for switched 56K configurations. (See the end of this syntax description table for more information.)</li> <li>• <b>fxs-ground-start</b> [<b>service</b> {<b>data</b>   <b>voice</b>}]—Specifies Foreign Exchange Station ground start signaling support. Use the options [<b>service</b> {<b>data</b>   <b>voice</b>} for switched 56K configurations. (See the end of this syntax description table for more information.)</li> <li>• <b>fxs-loop-start</b> [<b>service</b> {<b>data</b>   <b>voice</b>}]— Specifies Foreign Exchange Station loopstart signaling support. Use the options <b>service</b> {<b>data</b>   <b>voice</b>} for switched 56K configurations. (See the end of this syntax description table for more information.)</li> <li>• <b>r1-modified ani-dnis</b>—Indicates R1 signaling will collect ani and dnis information.</li> <li>• <b>r1-modified dnis</b>—Indicates R1 signaling will collect only dnis information.</li> </ul>

- **sas-ground-start** [**service** {**data** | **voice**}]—Specifies Special Access Station ground start signaling support. Use the options **service** {**data** | **voice**} for switched 56K configurations. (See the end of this syntax description table for more information.)
- **sas-loop-start** [**service** {**data** | **voice**}]—Specifies Special Access Station loopstart signaling support. Use the options **service** {**data** | **voice**} for switched 56K configurations.
- **service**—(Optional) Specifies the type of services provided for scenarios involving switched 56K connections. Do not include this option in the **cas-group** command statement if you are not using the access server to provide switched 56K connections.
- **data**—Enables switched 56K digital data services on the specified range of timeslots. The data is directly read from the timeslot or channel. Timeslots configured with this option will not accept analog modem calls.
- **voice**—Enables analog modem services on the specified range of timeslots. The call is forwarded to the modems for demodulation. Timeslots configured with this option will not accept switched 56K digital calls.

### Default

For ISDN PRI, the **cas-group** command is disabled.

If the channelized T1 is not configured as a PRI, the default value for line signaling is **e&m-fgb** and the default value for tone signaling is **DTMF**.

The R1 signalling default value is **ani-dnis**.

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

The **service**, **data**, and **voice** signaling options first appeared in Cisco IOS Release 11.3 T.

The R1 options first appeared in Cisco IOS Release 11.3 P.

Use the **cas-group** command to configure T1 controllers with different types of robbed bit signaling, such as on-hook and off-hook for E&M feature group B (**e&m-fgb**).

If you want to collect DNIS information on a T1 controller, you must manually configure it on the access server. DNIS collection is performed only for E&M-fgb. To collect DTMF DNIS for E&M-fgb under a controller T1 configuration, issue the **cas-group 0 timeslots 1-24 type e&m-fgb dtmf dnis** command. To collect MF DNIS for E&M-fgb, issue the **cas-group 0 timeslots 1-24 type e&m-fgb mf dnis** command.

## Examples

The following example configures all 24 channels with ear and mouth robbed bit signaling with feature group B support:

```
router(config)# controller T1 0
router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb
router(config-controller)#
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 1 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 2 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 3 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 4 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 5 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 6 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 7 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 8 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 9 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 10 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 11 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 12 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 13 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 14 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 15 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 16 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 17 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 18 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 19 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 20 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 21 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 22 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 23 is up
%DSX0-5-RBSLINEUP: RBS of controller 1 timeslot 24 is up
```

The following example configures the required signaling to support modem pooling and the digital number identification service (DNIS) over channelized T1 lines on a Cisco AS5300. The only supported signaling and tone types for modem pooling over CT1 RBS are E&M feature group B, DTMF tones, and MF tones. By configuring DNIS as part of the **cas-group** command, the system can collect DNIS digits for incoming calls, which can be redirected to specific modem pools setup for different customers or services. Additionally, you must be running MICA modems in the system and have at least 10% of your total modems in the default modem pool. Free modems are needed in the default pool to detect the incoming called number or DNIS before handing the call off to the appropriate modem pool. Therefore, two modems are actually needed to handle each incoming call.

---

**Note** Make sure that your switch provides inband address information for incoming analog calls before you enable this feature.

---

```
router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
router(config)# controller t1 0
router(config-controller)# cas-group 0 timeslots 1-24 type e&m-fgb dtmf dnis
router(config-controller)# exit
router(config)#
router(config)# modem-pool accounts1
router(config-modem-pool)# pool-range 30-50
router(config-modem-pool)# called-number 2000 max-conn 21
router(config-modem-pool)# exit
router(config)#
```

The next example configures a Cisco AS5200 to accept switched 56K digital calls on both of its T1 controllers:

```
router(config)# controller T1 0
router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb service data
router(config-controller)# framing esf
router(config-controller)# clock source line secondary
router(config-controller)# linecode b8zs
router(config-controller)# exit
router(config)# controller T1 1
router(config-controller)# cas-group 1 timeslots 1-24 type e&m-fgb service data
router(config-controller)# framing esf
router(config-controller)# clock source line primary
router(config-controller)# linecode b8zs
router(config-controller)# exit
router(config)# copy running-config startup-config
```

The next example configures switched 56K digital services and analog modem services on one controller. Each service is assigned its own range of timeslots. Switched 56K calls are assigned to timeslots 1 through 15. Analog modem calls are assigned to timeslots 16 through 24. However, you must use different channel group numbers in each **cas-group** command entry.

```
router(config)# controller T1 0
router(config-controller)# cas-group 0 timeslots 1-15 type e&m-fgb service data
router(config-controller)# cas-group 1 timeslots 16-24 type e&m-fgb service voice
router(config-controller)# framing esf
router(config-controller)# clock source line secondary
router(config-controller)# linecode b8zs
router(config-controller)# exit
```

The following example would configure R1 Signaling on a Cisco AS5200 (T1 interface) and specify the collection of both ani and dnis information:

```
5200(config-controller)# cas-group 1 timeslots 1-24 type r1-modified ani-dnis
```

## channel-group

Use the **channel-group** controller configuration command to define the timeslots that belong to each T1 or E1 circuit. Use the **no** form of this command to clear the timeslots for the T1 or E1 circuit.

```
channel-group number timeslots range [speed {48 | 56 | 64}]
no channel-group [number timeslots range]
```

### Syntax Description

<i>number</i>	Channel-group number. When configuring a T1 data line, channel-group numbers can be values from 0 to 23. When configuring an E1 data line, channel-group numbers can be values from 0 to 30.
<b>timeslots</b> <i>range</i>	One or more timeslots or ranges of timeslots belonging to the channel group. The first timeslot is numbered 1. For a T1 controller, the timeslot range is from 1 to 24. For an E1 controller, the timeslot range is from 1 to 31.
<b>speed</b> { <b>48</b>   <b>56</b>   <b>64</b> }	(Optional) Line speed (in kilobits per second) of the T1 or E1 link.

### Default

The default line speed when configuring a T1 controller is 56 kbps.

The default line speed when configuring an E1 controller is 64 kbps.

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Release 11.3MA.

Use this command in configurations where the router or access server must communicate with a T1 or E1 fractional data line. The channel-group number may be arbitrarily assigned and must be unique for the controller. The timeslot range must match the timeslots assigned to the channel group. The service provider defines the timeslots that comprise a channel group.

On the Cisco MC3810 access concentrator, only one channel group can be configured on a controller.

### Example

The following example defines three channel groups. Channel-group 0 consists of a single timeslot, channel-group 8 consists of 7 timeslots and runs at a speed of 64 kbps per timeslot, and channel-group 12 consists of a single timeslot.

```
channel-group 0 timeslots 1
channel-group 8 timeslots 5,7,12-15,20 speed 64
channel-group 12 timeslots 2
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

**framing**

**linecode**

## clear controller

Use the **clear controller** EXEC command to reset the T1 or E1 controller.

**clear controller** {**t1** | **e1**} *slot/port* (Cisco 7200 series and Cisco 7500 series)

**clear controller** {**t1** | **e1**} *number* (on the Cisco AS5200 and Cisco AS5300 series)

### Syntax Description

<b>t1</b>	Specifies the T1 controller.
<b>e1</b>	Specifies the E1 controller.
<i>slot/port</i>	Backplane slot number and port number on the interface. See your hardware installation manual for the specific slot and port numbers.
<i>number</i>	Network interface module (NIM) number, in the range 0 through 2.

### Command Mode

EXEC

### Examples

The following example resets the T1 controller at slot 4, port 0 on a Cisco 7500 series router:

```
clear controller t1 4/0
```

The following example resets the E1 controller at NIM 0:

```
clear controller e1 0
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**controller e1**

**controller t1**

## clock source (controller)

Use the **clock source** controller configuration command to set the E1 line clock source for the Cisco AS5200.

```
clock source line {primary | secondary}  
no clock source line {primary | secondary}
```

### Syntax Description

<b>line</b>	E1 line from which the clocking is taken.
<b>primary</b>	Primary TDM clock source.
<b>secondary</b>	Secondary TDM clock source.

### Default

Primary TDM clock source is taken from the E1 controller 0 on the Cisco AS5200.  
Secondary TDM clock source is taken from the E1 controller 1 on the Cisco AS5200.

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

Configure the **clock source line primary** command on the controller that takes the most reliable clocking from an E1 line. Configure the **clock source line secondary** command on the controller that has the next best known clocking. With this configuration, the primary line clocking is backed up to the secondary line if the primary clocking shuts down.

### Examples

The following example configures the Cisco AS5200 to use the E1 controller 0 as the primary clocking source and the E1 controller 1 as the secondary clocking source:

```
controller e1 0  
  framing esf  
  linecode hdb3  
  pri-group timeslots 1-23  
  clock source line primary  
!  
controller e1 1  
  framing esf  
  linecode hdb3  
  pri-group timeslots 1-23  
  clock source line secondary
```

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**framing**  
**linecode**

## clock source (Cisco AS5200)

To select the clock source for the time-division multiplexing (TDM) bus in a Cisco AS5200/AS5300 access server, use the **clock source** interface configuration command. The **no** form of this command configures the clock source to its default setting.

```
clock source {line {primary | secondary} | internal}  
no clock source line {primary | secondary}
```

### Syntax Description

<b>line</b>	Clock source on the active line.
<b>primary</b>	Primary TDM clock source.
<b>secondary</b>	Secondary TDM clock source.
<b>internal</b>	Free-running clock (also known as internal clock) as the clock source.

### Defaults

Primary TDM clock source from the T1 0 controller  
Secondary TDM clock source from the T1 1 controller

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

To use the clocking coming in from a T1 line, configure the **clock source line primary** command on the T1 interface that has the most reliable clocking. Configure the **clock source line secondary** command on the T1 interface that has the next best known clocking. With this configuration, the primary line clocking is backed up to the secondary line if the primary clocking shuts down.

### Example

The following example configures the Cisco AS5200 access server to use T1 controller 0 as the primary clock source and T1 controller 1 as the secondary clock source:

```
controller t1 0  
  clock source line primary  
controller t1 1  
  clock source line secondary
```

## controller

To configure a T1 or E1 controller and enter controller configuration mode, use the **controller** global configuration command.

**controller** {**t1** | **e1**} *slot/port* (on the Cisco 7200 and Cisco 7500 series)

**controller** {**t1** | **e1**} *number* (on the Cisco AS5200 and Cisco AS5300 series)

### Syntax Description

<b>t1</b>	T1 controller.
<b>e1</b>	E1 controller.
<i>slot/port</i>	Backplane slot number and port number on the interface. See your hardware installation manual for the specific values and slot numbers.
<i>number</i>	Network processor module (NPM) number, in the range 0 through 2.

### Default

No T1 or E1 controller is configured.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Release 10.0; the **e1** keyword was added in Release 10.3

This command is used in configurations where the router or access server is intended to communicate with a T1 or E1 fractional data line. Additional parameters for the T1 or E1 line must be configured for the controller before the T1 or E1 circuits can be configured by means of the **interface** global configuration command.

This command is used on a Cisco 7500 series router.

This command does not apply to the Cisco 7200 series.

### Examples

The following example configures the MIP in slot 4, port 0 of a Cisco 7500 as a T1 controller:

```
controller t1 4/0
```

The following example configures NIM 0 of a Cisco 4000 as a T1 controller:

```
controller t1 0
```

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**channel-group**  
**clear controller lex**  
**clear controller t1**  
**clock source (controller)**  
**framing**  
**linecode**  
**show controllers e1**  
**show controller t1**

## cpp authentication

To enable negotiation of authentication with a router or bridge that supports the Combinet Proprietary Protocol (CPP) and that is calling in to this router, use the **cpp authentication** interface configuration command. To disable negotiation of CPP authentication, use the **no** form of this command.

```
cpp authentication  
no cpp authentication
```

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

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

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

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

This command is supported on ISDN and dialer interfaces.

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

### Example

The following example configures a Primary Rate Interface to communicate with a Combinet bridge that does not support PPP:

```
controller t1 1/1  
  framing esf  
  linecode b8zs  
  pri-group timeslots 1-23  
  isdn switchtype primary-4ess  
  
interface Serial1/1:23  
  encapsulation cpp  
  cpp callback accept  
  cpp authentication
```

Related Commands

You can use the master indexes or search online to find documentation of related commands.

**cpp callback accept**  
**encapsulation cpp**  
**username password**

## cpp callback accept

To enable the router to accept callback from a Combinet router or bridge that supports the Combinet Proprietary Protocol (CPP), use the **cpp callback accept** interface configuration command. use the no form of this command to disable callback acceptance.

```
cpp callback accept  
no cpp callback accept
```

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

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

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

This command is supported on ISDN and dialer interfaces.

### Example

The following example configures the PRI interface serial1/1:23 to communicate with a Combinet router or bridge that does not support PPP:

```
controller t1 1/1  
  framing esf  
  linecode b8zs  
  pri-group timeslots 1-23  
  isdn switchtype primary-4ess  
!  
interface Serial1/1:23  
  encapsulation cpp  
  cpp callback accept  
  cpp authentication
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
cpp authentication  
encapsulation cpp
```

## description (controller)

To add a description to an E1 or T1 controller, use the **description** controller configuration command. Use the **no** form of this command to remove the description.

**description** *string*  
**no description**

### Syntax Description

*string*                      Comment or a description to help you remember what is attached to the controller.

### Default

No description is added.

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

The **description** command is meant solely as a comment to be put in the configuration to help you remember what certain E1 or T1 controllers are used for. The description affects the MIP interfaces only and appears in the output of the **show controllers e1**, **show controllers t1**, and **more system:running-config EXEC** commands.

### Example

The following example describes a 3174 controller:

```
controller t1
  description 3174 Controller for test lab
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**more system:running-config**  
**show controllers e1**  
**show controller t1**

## description (interface)

To add a description to an interface configuration, use the **description** interface configuration command. Use the **no** form of this command to remove the description.

**description** *string*  
**no description**

### Syntax Description

*string*                      Comment or a description to help you remember what is attached to this interface.

### Default

No description is added.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 9.21.

The **description** command is meant solely as a comment to be put in the configuration to help you remember what certain interfaces are used for. The description appears in the output of the following EXEC commands: **more nvram:startup-config**, **show interfaces**, and **more system:running-config**.

### Example

The following example shows how to add a description for a T1 interface:

```
interface serial 0
  description Fractional T1 line to Mountain View -- 128 kbps
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**more nvram:startup-config**  
**more system:running-config**  
**show interfaces**

## dialer outgoing

To configure the dialer map class for a Network Specific Facilities (NSF) dialing plan to support outgoing calls, use the **dialer outgoing** map-class dialer configuration command.

**dialer outgoing** *classname*

### Syntax Description

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

### Default

This command is disabled; no classname is provided.

### Command Mode

Map-class dialer configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

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

### Example

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

```
dialer outgoing sdn
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**dialer map class**  
**dialer voice-call**  
**isdn nsf-service**  
**map-class dialer**

## dialer voice-call

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

**dialer voice-call**

### Syntax Description

This command has no arguments and keywords.

### Default

This command is disabled.

### Command Mode

Map-class dialer configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

### Example

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

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

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**dialer map class**  
**map-class dialer**  
**dialer outgoing**

## encapsulation cpp

To enable encapsulation for communication with routers or bridges using the Combinet Proprietary Protocol (CPP), use the **encapsulation cpp** interface configuration command. Use the no form of this command to disable CPP encapsulation.

**encapsulation cpp**  
**no encapsulation cpp**

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

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

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

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

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

### Example

The following example configures PRI interface serial 1/1:23 to communicate with a Combinet router or bridge that does not support PPP:

```
controller t1 1/1
  framing esf
  linecode b8zs
  pri-group timeslots 1-23
  isdn switchtype primary-4ess
!
interface Serial1/1:23
  encapsulation cpp
  cpp callback accept
  cpp authentication
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**cpp authentication**  
**cpp callback accept**

## framing

Use the **framing** controller configuration command to select the frame type for the T1 or E1 data line.

**framing** {**sf** | **esf**} (for T1 lines)

**framing** {**crc4** | **no-crc4**} [**australia**] (for E1 lines)

### Syntax Description

<b>sf</b>	Specifies Super Frame as the T1 frame type.
<b>esf</b>	Specifies Extended Super Frame as the T1 frame type.
<b>crc4</b>	Specifies CRC4 frame as the E1 frame type.
<b>no-crc4</b>	Specifies no CRC4 frame as the E1 frame type.
<b>australia</b>	(Optional) Specifies the E1 frame type used in Australia.

### Defaults

Super Frame is the default on a T1 line.

CRC4 frame is the default on an E1 line.

### Command Mode

Controller configuration

### Usage Guidelines

Use this command in configurations where the router or access server is intended to communicate with T1 or E1 fractional data line. The service provider determines which framing type, either **sf**, **esf**, or **crc4**, is required for your T1/E1 circuit.

### Example

The following example selects Extended Super Frame as the T1 frame type:

```
framing esf
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**channel-group**  
**linecode**

## interface serial

To specify a serial interface created on a channelized E1 or channelized T1 controller (for ISDN PRI, channel-associated signaling, or robbed-bit signaling), use the **interface serial** global configuration command.

**interface serial** *slot/port:timeslot* (on the Cisco 7200 and Cisco 7500 series)  
**interface serial** *number:timeslot* (on the Cisco AS5200 and Cisco 4000 series)

### Syntax Description

<i>slot/port</i>	Slot number and port number where the channelized E1 or T1 controller is located.
<i>number</i>	Channelized E1 or T1 controller number.
<i>timeslots</i>	<p>For ISDN, the D channel timeslot, which is <b>:23</b> channel for channelized T1 and the <b>:15</b> for channelized E1. PRI timeslots are in the range 0 to 23 for channelized T1 and in the range 0 to 30 for channelized E1.</p> <p>For channel-associated signaling or robbed-bit signaling, the channel group number.</p> <p>The colon (:) is required.</p> <p>On a dual port card, it is possible to run channelized on one port and primary rate on the other port.</p>

### Default

You must explicitly specify a serial interface.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared prior to Release 10.0.

The D channel is always the **:23** channel for T1 and the **:15** for E1.

### Examples

The following example configures channel groups on timeslots 1 to 11 and ISDN PRI on timeslots 12 to 24 of T1 controller 0. Then the examples configures the first two channel groups as serial interfaces 0:0 and 0:1.

```
controller t1 0
channel-group 0 timeslot 1-6
channel-group 1 timeslot 7
channel-group 2 timeslot 8
channel-group 3 timeslot 9-11
pri-group timeslots 12-24
!
interface serial 0:0
```

```
ip address 131.108.13.2 255.255.255.0
encapsulation ppp
!
interface serial 0:1
ip address 131.108.13.3 255.255.255.0
encapsulation ppp
```

The following example configures ISDN PRI on T1 controller 4/1 and then configures the D channel on the resulting serial interface 4/1:23:

```
controller t1 4/1
framing crc4
linecode hdb3
pri-group timeslots 1-24

interface serial 4/1:23
ip address 131.108.13.1 255.255.255.0
encapsulation ppp
```

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**circuit**  
**controller**  
**show interfaces**  
**show controllers t1 call-counters**

## isdn answer1, isdn answer2

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

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

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

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

### Syntax Description

<i>called-party-number</i>	(Optional) Telephone number of the called party. At least one value— <i>called-party-number</i> or <i>subaddress</i> —must be specified.
<i>:subaddress</i>	(Optional) Subaddress number, 20 or fewer characters long, used for ISDN multipoint connections. At least one value— <i>called-party-number</i> or <i>subaddress</i> —must be specified.  Use the colon (:) when you configure both the called party number and the subaddress, or when you configure only the subaddress.

### Default

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

### Command Mode

Interface configuration

### Usage Guidelines

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

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

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

## Examples

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

```
interface serial 4/1:0
  isdn answer1 5552222:1234
```

In the following partial configuration example, only the subaddress is configured:

```
interface serial 4/1:0
  isdn answer1 :1234
```

## isdn bchan-number-order

To configure a PRI ISDN interface to make outgoing call selection in ascending or descending order, use the **isdn bchan-number-order** interface configuration command. To restore the default (descending order), either use the **no** form of this command or simply reconfigure the interface with the new value.

```
isdn bchan-number-order {ascending | descending}
no isdn bchan-number-order
```

### Syntax Description

<b>ascending</b>	Makes the outgoing B channel selection in ascending order as follows: <ul style="list-style-type: none"><li>• Channels 1 to 24 for a T1 controller</li><li>• Channels 1 to 31 for an E1 controller</li></ul>
<b>descending</b>	Makes the outgoing B channel selection in descending order as follows: <ul style="list-style-type: none"><li>• Channels 24 to 1 for a T1 controller</li><li>• Channels 31 to 1 for an E1 controller</li></ul>

### Default

Descending

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 T.

This command instructs the router to select the lowest or highest available B channel starting at either channel B1 (ascending) or channel B23 for a T1 and channel B30 for an E1 (descending).

This command is for PRI configuration only.

### Example

The following example configures the outgoing B channel order on a PRI interface to be in ascending order. The router will select the lowest available B channel beginning with channel B1.

```
interface serial5:10
  isdn bchan-number-order ascending
```

## isdn caller

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

**isdn caller** *number*  
**no isdn caller** *number*

### Syntax Description

*number* Telephone number for which to screen. Specify an *x* or *X* to represent a single “don’t-care” character. The maximum length of each number is 25 characters.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Release 11.2 F.

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

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.

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

---

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

---

### Examples

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

```
isdn caller 4155551234
```

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

```
isdn caller 41555512xx
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show dialer**

## isdn calling-number

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

```
isdn calling-number calling-number  
no isdn calling number
```

### Syntax Description

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

### Default

No calling number is presented.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

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

This command is intended for use when the 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 can be used with all ISDN PRI switches.

---

### Example

The following example first configures the T1 and then, configures 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 7.1.1.1 255.255.255.0  
  encapsulation ppp  
  isdn calling-number 4233570925  
  dialer map ip 7.1.1.2 name dallas 14193460913
```

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**interface serial**

## isdn modem-busy-cause

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

**isdn modem-busy-cause** {*cause-code-number* | **busy** | **not-available**}  
**no isdn modem-busy-cause** {*cause-code-number* | **busy** | **not-available**}

### Syntax Description

<i>cause-code-number</i>	Sends a cause code number (submitted as an interger in the range of 1 through 127) to the switch.
<b>busy</b>	Sends the USER-BUSY code to the switch.
<b>not-available</b>	Sends the CHANNEL-NOT-AVAILABLE code to the switch.

### Default

No calling number is presented.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3.

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

### Example

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

```
interface serial0:20
  isdn busy-cause-code not-available
```

## isdn fast-rollover-delay

To specify the time delay between successive attempts to dial out to a number, use the **isdn fast-rollover-delay** interface configuration command. Use the **no** form of this command to disable the fast-rollover-delay feature.

```
isdn fast-rollover-delay seconds  
no isdn fast-rollover-delay
```

### Syntax Description

<i>seconds</i>	Number of seconds to delay before dialing the next dialer map after receiving an ISDN message indicating the current call will not succeed.
----------------	---

### Default

This command is disabled by default. If enabled, the default value of the timer is 0 seconds.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared at Cisco IOS Release 11.1.

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.

When using PPP callback, this command specifies the time delay before the callback is done. This command is necessary on some ISDN switches because the new call may be attempted before the old call is completely torn down. This causes the call back to fail.

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

- You are dialing into a BRI that has two phone numbers configured, one for each B-channel.
- You have a dialer map for each phone number.
- The first call succeeds but the second call fails with no channel available.

If this has occurred, set **isdn fast-rollover-delay** to 5 seconds and try again.

A delay of 5 seconds should cover most cases. Configure sufficient delay to make sure the ISDN RELEASE\_COMPLETE message has been sent or received before making the fast rollover call. Use the **debug isdn q931** command to display this information.

### Example

The following partial example sets the fast-rollover delay that is suggested when all the conditions specified above are true.

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

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**dialer map**  
**dialer wait-for-carrier**  
**ppp callback**

## isdn incoming-voice data

To answer incoming voice calls at a configured rate (overriding the incoming data rate in the call), use the **isdn incoming-voice data** interface configuration command. Use the **no** form of this command to disable ISDN incoming-voice data.

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

### Syntax Description

**56** (Optional) Answers all voice calls at 56 kbps.  
**64** (Optional) Answers all voice calls at 64 kbps.

### Default

ISDN incoming-voice data is not applied.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

When used without a keyword, this command checks the bearer capacity.

If this command is used, the dialing side must dial at 56 kbps.

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.

### Example

The following partial 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
```

## isdn incoming-voice modem

To allow all incoming ISDN voice calls to access onboard modems, use the **isdn incoming-voice modem** interface configuration command. Use the **no** form of this command to stop all incoming voice calls from accessing the modems.

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

### Syntax Description

- 56** (Optional) Answers all modem calls at 56 kbps.
- 64** (Optional) Answers all modem calls at 64 kbps.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1 AA.

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

This command is not used for channelized T1 or channelized E1 network scenarios. These networks use traditional analog trunks that have in-band signaling. Use the **isdn incoming-voice modem** command only when you are using ISDN.

### Example

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 56
```

## isdn not-end-to-end

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

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

### Syntax Description

<b>56</b>	Answers all voice calls at 56 kbps.
<b>64</b>	Answers all voice calls at 64 kbps.

### Default

The default line speed is 64 kbps.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

This command 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.

### Example

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. 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

<b>megacom</b>	Dial voice calls using AT&T Megacom NSF.
<b>sdn</b>	Dial voice calls using AT&T SDN NSF.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3(5)T.

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

### Example

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

```
int s0:23  
  isdn-nsf-service sdn
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

```
dialer map class  
dialer voice-call  
map-class dialer
```

## isdn sending-complete

To specify that the Sending Complete information element (IE) is included in the outgoing SETUP message, use the **isdn sending-complete** interface configuration command. Use the **no** form of this command to disable the Sending Complete IE.

**isdn sending-complete**  
**no isdn sending-complete**

### Syntax Description

This command has no arguments and keywords.

### Default

This command is disabled by default.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3.

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

### Example

The following example enables sending complete IE information:

```
interface serial 0:15
description connected to PBX 61886
ip address 7.1.1.1 255.255.255.0
encapsulation ppp
isdn sending-complete
dialer idle-timeout 20
dialer map ip 7.1.1.2 name rudder 61884
dialer map ip 7.1.1.3 name goodie 61885
dialer-group 1
ppp authentication chap
```

## isdn switch-type

To specify the central office switch type on the ISDN interface, use the **isdn switch-type** global and interface configuration command. Use the **no** form of this command to disable the switch on the ISDN interface.

```
isdn switch-type switch-type
no isdn switch-type
```

### Syntax Description

*switch-type* Service provider switch type; see Table 46 for a list of supported switches.

### Default

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

### Command Mode

This command first appeared as a global command in Cisco IOS Release 9.21  
 This command first appeared as an interface command in Cisco IOS Release 11.3 T.

### Usage Guidelines

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

Table 46 lists supported PRI switch types by geographic area.

---

**Note** If you are using the Multiple ISDN Switch Types feature to apply the ISDN switch types to different interfaces, refer to the “Setting up ISDN Basic Rate Service” chapter in the *Dial Solutions Configuration Guide*.

---

**Table 46 ISDN Service Provider PRI Switch Types**

Keywords by Area	Switch Type
<b>none</b>	No switch defined
<b>Australia and Europe</b>	
<b>primary-net5</b>	European, Australian, New Zealand, and Asian ISDN PRI switches (covers the Euro-ISDN E-DSS1 signaling system and is ETSI-compliant)
<b>Japan</b>	
<b>primary-ntt</b>	Japanese ISDN PRI switches
<b>North America</b>	
<b>primary-4ess</b>	AT&T 4ESS switch type for the U.S.
<b>primary-5ess</b>	AT&T 5ESS switch type for the U.S.
<b>primary-dms100</b>	NT DMS-100 switch type for the U.S.
<b>primary-ni</b>	National ISDN switch type

---

**Note** Cisco IOS Release 11.3T introduced ISDN switch type changes. The command parser will still accept the following switch types: basic-nwnet3, vn2, and basic-net3; however, when viewing the NVRAM configuration, the basic-net3 or vn3 switch types are displayed respectively.

---

## Examples

The first example configures the French VN3 ISDN switch type:

```
isdn switch-type vn3
```

The following example demonstrates the Multiple ISDN Switch Type Feature. The global ISDN switch type setting is basic-net3. The PRI interface (channelized T1 controller), is configured to use **isdn switch-type primary-net5** and BRI interface 0 is configured for **isdn switch-type basic-ni** (formerly **isdn switch-type basic-ni1**).

```
isdn switch-type basic-net3
!
interface serial0:23
  isdn switch-type primary-net5
  ip address 172.21.24.85 255.255.255.0
!
interface BRI0
  isdn switch-type basic-ni
```

## linecode

Use the **linecode** controller configuration command to select the line-code type for the T1 or E1 line.

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

### Syntax Description

<b>ami</b>	Specifies alternate mark inversion (AMI) as the line-code type. Valid for T1 or E1 controllers; the default for T1 lines.
<b>b8zs</b>	Specifies B8ZS as the line-code type. Valid for T1 controller only.
<b>hdb3</b>	Specifies high-density bipolar 3 (hdb3) as the line-code type. Valid for E1 controller only; the default for E1 lines.

### Defaults

AMI is the default for T1 lines.

High-density bipolar 3 is the default for E1 lines.

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Use this command in configurations where the router or access server must communicate with T1 fractional data lines. The T1 service provider determines which line-code type, either **ami** or **b8zs**, is required for your T1 circuit. Likewise, the E1 service provider determines which line-code type, either **ami** or **hdb3**, is required for your E1 circuit.

### Example

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

```
linecode b8zs
```

## loopback (controller e1)

To loop an entire E1 line (including all channel-groups defined on the controller) toward the line and back toward the router or access server, use the **loopback** controller configuration command. To remove the loop, use the **no** form of this command.

```
loopback  
no loopback
```

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

This command is useful for testing the DCE device (CSU/DSU) itself.

To show interfaces currently in loopback operation, use the **show interfaces loopback EXEC** command.

### Example

The following example configures the loopback test on the E1 line:

```
controller e1 0  
  loopback
```

## loopback local (controller)

To loop an entire T1 line (including all channel-groups defined on the controller) toward the line and the router or access server, use the **loopback local** controller configuration command. To remove the loop, use the **no** form of this command.

```
loopback local  
no loopback local
```

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

This command is useful for testing the DCE device (CSU/DSU) itself.

To show interfaces currently in loopback operation, use the **show interfaces loopback EXEC** command.

### Example

The following example configures the loopback test on the T1 line:

```
controller t1 0  
  loopback local
```

## loopback local (interface)

To loop a channelized T1 or channelized E1 channel-group, use the **loopback local** interface configuration command. To remove the loop, use the **no** form of this command.

**loopback local**  
**no loopback local**

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

This command is useful for looping a single channel-group in a channelized environment without disrupting the other channel-groups.

To show interfaces currently in loopback operation, use the **show interfaces loopback EXEC** command.

### Example

The following example configures the loopback test on the T1 line:

```
interface serial 1/0:22
 loopback local
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show interfaces loopback**

## loopback remote (controller)

To loop packets from a MIP through the CSU/DSU, over a dedicated T1 link, to the remote CSU at the single destination for this T1 link and back, use the **loopback remote** controller configuration command. To remove the loop, use the **no** form of this command.

**loopback remote**  
**no loopback remote**

### Syntax Description

This command has no arguments or keywords.

### Default

Disabled

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

This command applies only when the device supports the remote function. It is used for testing the data communication channels.

For MIP cards, this controller configuration command applies if *only one* destination exists at the remote end of the cloud, the entire T1 line is dedicated to it, and the device at the remote end is a CSU (not a CSU/DSU). This is an uncommon case; MIPs are not usually used in this way.

To show interfaces currently in loopback operation, use the **show interfaces loopback EXEC** command.

### Example

The following example configures a remote loopback test:

```
interface serial 0
 loopback remote
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show interfaces loopback**

## loopback remote (interface)

To loop packets through a CSU/DSU, over a DS-3 link or a channelized T1 link, to the remote CSU/DSU and back, use the **loopback remote** interface configuration command. To remove the loop, use the **no** form of this command.

**loopback remote**  
**no loopback remote**

### Default

This command is disabled.

### Command Mode

Interface configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

This command applies only when the remote CSU/DSU device supports the function. It is used for testing the data communication channels. The loopback usually is performed at the line port, rather than the DTE port, of the remote CSU/DSU.

For a multiport interface processor (MIP) connected to a network via a channelized T1 link, the **loopback remote** interface configuration command applies if the remote interface is served by a DDS line (56 kbps or 64 kbps) and the device at the remote end is a CSU/DSU. In addition, the CSU/DSU at the remote end *must* react to latched DDS CSU loopback codes. Destinations that are served by other types of lines or that have CSU/DSUs that do not react to latched DDS CSU codes cannot participate in an interface remote loopback. Latched DDS CSU loopback code requirements are described in AT&T specification TR-TSY-000476, "OTGR Network Maintenance Access and Testing."

To show interfaces currently in loopback operation, use the **show interfaces loopback EXEC** command.

### Example

The following example configures a remote loopback test:

```
interface serial 0
 loopback remote
```

### Related Commands

You can use the master indexes or search online to find documentation of related commands.

**show interfaces loopback**

## map-class dialer

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

**map-class dialer** *classname*

### Syntax Description

*classname* Unique class identifier.

### Default

Disabled; no class name is provided.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.0.

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

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

For NSF call-by-call support on ISDN Primary-4ESS switches only, use one of the dialing-plan keywords listed in Table 47.

**Table 47 NSF Keywords and Supported Services**

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

## Examples

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

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

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

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

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**dialer map class**  
**map-class dialer**  
**dialer outgoing**

## pri-group

To specify ISDN Primary Rate Interface (PRI) on a channelized T1 or channelized E1 controller, use the **pri-group** controller configuration command. Use the **no** form of this command to remove the ISDN PRI configuration.

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

### Syntax Description

**timeslots** *range* (Optional) Specifies a single range of values from 1 to 23 for channelized T1 and from 1 to 31 for channelized E1.

### Default

This command is disabled.

### Command Mode

Controller configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 10.3.

Before you enter the **pri-group** command, you must specify an ISDN PRI switch type and an E1 or T1 controller.

### Examples

The following example configures ISDN PRI on all timeslots of the T1 controller in slot 1 port 0 on a Cisco 7200 series router:

```
isdn switch-type primary-4ess  
controllers t1 1/0  
framing esf  
linecode b8zs  
pri-group timeslots 1-24
```

The following example configures E1 controller 0 on a Cisco 4000 series router for ISDN PRI on all timeslots:

```
isdn switch-type primary-net5  
controllers e1 0/0  
framing esf  
linecode b8zs  
pri-group timeslots 1-31
```

## Related Commands

You can use the master indexes or search online to find documentation of related commands.

**controllers e1**  
**controllers t1**  
**framing**  
**isdn switch-type**  
**linecode b8zs**

## show controllers e1

Use the **show controllers e1** privileged EXEC command to display information about the E1 links supported by the Network Processor Module (NPM) (Cisco 4000) or MultiChannel Interface Processor (MIP) (Cisco 7500 series).

**show controllers e1** [*slot/port*] (on the Cisco 7500 series)

**show controller e1** *number* (on the Cisco 4000 series)

### Syntax Description

<i>slot/port</i>	(Optional) Backplane slot number and port number on the interface. See your hardware installation manual for the specific slot and port numbers.
<i>number</i>	Network processor module (NPM) number, in the range 0 through 2.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

The NPM or MIP can query the port adapters to determine their current status. Issue a **show controllers e1** command to display statistics about the E1 link.

If you specify a slot and port number, each 15-minute period will be displayed.

This command displays controller status that is specific to the controller hardware. The information displayed is generally useful for diagnostic tasks performed by technical support personnel only.

### Sample Displays

The following is sample output from the **show controllers e1** command on the Cisco 7500 series:

```
Router# show controllers e1

e1 0/0 is up.
  Applique type is Channelized E1 - unbalanced
  Framing is CRC4, Line Code is HDB3
  No alarms detected.
  Data in current interval (725 seconds elapsed):
    0 Line Code Violations, 0 Path Code Violations
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
  Total Data (last 24 hours)
    0 Line Code Violations, 0 Path Code Violations,
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins,
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
```

Following is an example of the **show controllers e1** display including the board identifier type:

```
Router# show controllers e1

E1 4/1 is up.
No alarms detected.
Framing is CRC4, Line Code is hdb3
Data in current interval (0 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations 0 Slip Secs, 0 Fr Loss Secs,
  0 Line Err Secs, 0 Degraded Mins 0 Errored Secs, 0 Bursty Err Secs,
  0 Severely Err Secs, 0 Unavail Secs
Total Data (last 79 15 minute intervals):
  0 Line Code Violations, 0 Path Code Violations, 0 Slip Secs, 0 Fr Loss Secs,
  0 Line Err Secs, 0 Degraded Mins, 0 Errored Secs, 0 Bursty Err Secs,
  0 Severely Err Secs, 0 Unavail Secs
```

Table 48 describes the **show controllers e1** display fields.

**Table 48 Show Controllers E1 Field Descriptions**

Field	Description
e1 0/0 is up.	The E1 controller 0 in slot 0 is operating. The controller's state can be up, down, or administratively down. Loopback conditions are shown by (Locally Looped) or (Remotely Looped).
Applique type	The applique type is shown and will indicate balanced or unbalanced.
Framing is	Shows the current framing type.
Linecode is	Shows the current linecode type.
No alarms detected.	Any alarms detected by the controller are displayed here. Possible alarms are as follows: <ul style="list-style-type: none"> <li>• Transmitter is sending remote alarm.</li> <li>• Transmitter is sending AIS.</li> <li>• Receiver has loss of signal.</li> <li>• Receiver is getting AIS.</li> <li>• Receiver has loss of frame.</li> <li>• Receiver has remote alarm.</li> <li>• Receiver has no alarms.</li> </ul>
Data in current interval (725 seconds elapsed)	Shows the current accumulation period, which rolls into the 24 hour accumulation every 15 minutes. Accumulation period is from 1 to 900 seconds. The oldest 15-minute period falls off the back of the 24-hour accumulation buffer.
Line Code Violations	Indicates the occurrence of either a Bipolar Violation (BPV) or Excessive Zeros (EXZ) error event.
Path Code Violations	Indicates a frame synchronization bit error in the D4 and E1-noCRC formats, or a CRC error in the ESF and E1-CRC formats.
Slip Secs	Indicates the replication or deletion of the payload bits of a DS1 frame. A slip might be performed when there is a difference between the timing of a synchronous receiving terminal and the received signal.
Fr Loss Secs	Indicates the number of seconds an Out Of Frame (OOF) error is detected.
Line Err Secs	Line Errored Seconds (LES) is a second in which one or more Line Code Violation errors are detected.

**Table 48 Show Controllers E1 Field Descriptions (continued)**

Field	Description
Degraded Mins	A Degraded Minute is one in which the estimated error rate exceeds 1E-6 but does not exceed 1E-3.
Errored Secs	In ESF and E1 CRC links, an Errored Second is a second in which one of the following are detected: one or more Path Code Violations; one or more Out of Frame defects; one or more Controlled Slip events; a detected AIS defect. For SF and E1 no-CRC links, the presence of Bipolar Violations also triggers an Errored Second.
Bursty Err Secs	A second with fewer than 320 and more than 1 Path Coding Violation error, no Severely Errored Frame defects and no detected incoming AIS defects. Controlled slips are not included in this parameter.
Severely Err Secs	For ESF signals, a second with one of the following errors: 320 or more Path Code Violation errors; one or more Out of Frame defects; a detected AIS defect. For E1-CRC signals, a second with one of the following errors: 832 or more Path Code Violation errors; one or more Out of Frame defects. For E1-nonCRC signals, a second with 2048 Line Code Violations or more. For D4 signals, a count of 1-second intervals with Framing Errors, or an Out of Frame defect, or 1544 Line Code Violations.
Unavail Secs	A count of the total number of seconds on the interface.

## show controllers e1 call-counters

To view the total number of calls and call durations on a E1 controller, use the **show controllers e1 call-counters** Privileged EXEC command.

**show controllers e1** *number* **call-counters**

### Syntax Description

*number* Controller number (for example 0, 1, 2, or 3).

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 T.

This command displays the E1 controller status as calls, such as switched 56K digital calls, pass through the hardware.

### Sample Display

The following is sample display output for the **show controller e1 1 call-counters** command.

```
router# show controller E1 1 call-counters
E1 1:
  DS0's Active: 0
  DS0's Active High Water Mark: 0
  TimeSlot  Type  TotalCalls  TotalDuration
    1       cas         0      00:00:00
    2       cas         0      00:00:00
    3       cas         0      00:00:00
    4       cas         0      00:00:00
    5       cas         0      00:00:00
    6       cas         0      00:00:00
    7       cas         0      00:00:00
    8       cas         0      00:00:00
    9       cas         0      00:00:00
   10       cas         0      00:00:00
   11       cas         0      00:00:00
   12       cas         0      00:00:00
   13       cas         0      00:00:00
   14       cas         0      00:00:00
   15       cas         0      00:00:00
   16       cas         0      00:00:00
   17       cas         0      00:00:00
   18       cas         0      00:00:00
   19       cas         0      00:00:00
   20       cas         0      00:00:00
   21       cas         0      00:00:00
   22       cas         0      00:00:00
   23       cas         0      00:00:00
   24       cas         0      00:00:00

  Total DS0's Active High Water Mark: 7
```

Table 49 describes the sample display output for the **show controller e1 1 call-counters** command.

**Table 49 Show Controllers E1 Call-Counters Field Descriptions**

<b>Field</b>	<b>Description</b>
E1 <i>number</i> :	Number of the E1 controller.
DS0's Active:	Displays the number of DS0s channels that are currently active.
DS0's Active High Water Mark:	Number of active DS0s that are approaching the threshold ceiling of the system.
TimeSlot	Timeslot number used on the controller for the specified DS0.
Type	Type of call occupying the timeslot. This entry is usually CAS or ISDN PRI.
TotalCalls	How many calls came in on this timeslot or DS0.
TotalDuration	How long the last call lasted.
Total DS0's Active High Water Mark:	Total number of active DS0s that are approaching the threshold ceiling of the system.

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

**show controllers e1 cas-data  
cas-group (controller e1)**

## show controllers e1 cas-data

To display internal call switching module information about the switched 56k data channels, use the **show controllers e1 cas-data** Privileged EXEC command.

**show controllers e1** *number* **cas-data**

### Syntax Description

*number* Controller number (for example 0, 1, 2, or 3).

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 T.

### Sample Display

The following is sample output for the **show controller e1 1 cas-data** command.

```
router# show controller e1 1 cas-data
Device Pool: Dev-SW56-pool
Number of SW56 vdev in pool: 48
Number of active connections: 0
No free SW56 device in pool: 0
SW56 max allocated messages: 96

E1 1:
SW56(slot/subcont/bchan)=0/1/0, hwidb=0x00867348
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
SW56(slot/subcont/bchan)=0/1/1, hwidb=0x0086EC58
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
SW56(slot/subcont/bchan)=0/1/2, hwidb=0x00876568
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
SW56(slot/subcont/bchan)=0/1/3, hwidb=0x0087DE78
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
```

```
SW56(slot/subcont/bchan)=0/1/4, hwidb=0x00885788
csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
total_call_duration=00:00:00
invalid_event_count=0, wdt_timeout_count=0
ic_failure=0, ic_complete=0, remote_link_disc=0
csm_status(0): VDEV_STATUS_UNLOCKED
wdt_timestamp_started is not activated
```

Table 53 describes the sample display output for the **show controller e1 1 cas-data** command.

**Table 50 Show Controllers E1 Cas-Data Field Descriptions**

Field	Description
Device Pool:	Type of pool in service, which is a logical grouping used to achieve a specific service.
Number of SW56 vdev in pool:	Number of serial devices used in the pool.
Number of active connections:	Number of active switched 56K active connections.
No free SW56 device in pool:	Number of switched 56K channels are available to accept calls.
SW56 max allocated messages:	Number of messages that are allocated to switched 56K services.
E1 <i>number</i> :	Number of the controller E1.
SW56(slot/subcont/bchan)=	Specified DS0 or timeslot used for the switched 56K service.
csm_state(0x00000100)=	Call state machine register.
total_call_duration=	How long the call lasted.
invalid_event_count=	Number of invalid event counters for the specified channel.
ic_failure=	Number of incoming call failures.
csm_status(0):	Call state machine register.
wdt_timestamp_started is not activated	Watch dog timer.

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

**show controllers e1 call-counters**  
**cas-group (controller e1)**

## show controllers t1

To display information about the T1 links, use the **show controllers t1** privileged EXEC command.

**show controllers t1** [*slot/port*] (Cisco 7500 series)

**show controllers t1** *number* (Cisco 4000 series)

### Syntax Description

<i>slot/port</i>	(Optional) Backplane slot number and port number on the interface. See your hardware installation manual for the specific slot and port numbers.
<i>number</i>	Network processor module (NPM) number, in the range 0 through 2.

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2.

This command displays controller status that is specific to the controller hardware. The information displayed is generally useful for diagnostic tasks performed by technical support personnel only.

The NPM or MIP can query the port adapters to determine their current status. Issue a **show controllers t1** command to display statistics about the T1 link.

If you specify a slot and port number, each 15 minute period will be displayed.

### Sample Display

The following is sample output from the **show controllers t1** command on the Cisco 7500 series:

```
Router# show controllers t1

T1 4/1 is up.
No alarms detected.
Framing is ESF, Line Code is AMI, Clock Source is line
Data in current interval (0 seconds elapsed):
  0 Line Code Violations, 0 Path Code Violations 0 Slip Secs, 0 Fr Loss Secs,
  0 Line Err Secs, 0 Degraded Mins 0 Errored Secs, 0 Bursty Err Secs,
  0 Severely Err Secs, 0 Unavail Secs
Total Data (last 79 15 minute intervals):
  0 Line Code Violations, 0 Path Code Violations, 0 Slip Secs, 0 Fr Loss Secs,
  0 Line Err Secs, 0 Degraded Mins, 0 Errored Secs, 0 Bursty Err Secs,
  0 Severely Err Secs, 0 Unavail Secs
```

Table 51 describes the **show controllers t1** display fields.

**Table 51 Show Controllers T1 Field Descriptions**

<b>Field</b>	<b>Description</b>
T1 0/0 is up.	The T1 controller 0 in slot 0 is operating. The controller's state can be up, down, administratively down. Loopback conditions are shown by (Locally Looped) or (Remotely Looped).
No alarms detected.	Any alarms detected by the controller are displayed here. Possible alarms are as follows: Transmitter is sending remote alarm. Transmitter is sending AIS. Receiver has loss of signal. Receiver is getting AIS. Receiver has loss of frame. Receiver has remote alarm. Receiver has no alarms.
Data in current interval (725 seconds elapsed)	Shows the current accumulation period, which rolls into the 24-hour accumulation every 15 minutes. Accumulation period is from 1 to 900 seconds. The oldest 15 minute period falls off the back of the 24-hour accumulation buffer.
Line Code Violations	Indicates the occurrence of either a Bipolar Violation (BPV) or Excessive Zeros (EXZ) error event.
Path Code Violations	Indicates a frame synchronization bit error in the D4 and E1-noCRC formats, or a CRC error in the ESF and E1-CRC formats.
Slip Secs	Indicates the replication or deletion of the payload bits of a DS1 frame. A slip may be performed when there is a difference between the timing of a synchronous receiving terminal and the received signal.
Fr Loss Secs	Indicates the number of seconds an Out Of Frame (OOF) error is detected.
Line Err Secs	Line Errored Seconds (LES) is a second in which one or more Line Code Violation errors are detected.
Degraded Mins	A Degraded Minute is one in which the estimated error rate exceeds 1E-6 but does not exceed 1E-3.
Errored Secs	In ESF and E1-CRC links, an Errored Second is a second in which one of the following are detected: one or more Path Code Violations; one or more Out of Frame defects; one or more Controlled Slip events; a detected AIS defect.  For D4 and E1-noCRC links, the presence of Bipolar Violations also triggers an Errored Second.
Bursty Err Secs	A second with fewer than 320 and more than 1 Path Coding Violation error, no Severely Errored Frame defects and no detected incoming AIS defects. Controlled slips are not included in this parameter.
Severely Err Secs	For ESF signals, a second with one of the following errors: 320 or more Path Code Violation errors; one or more Out of Frame defects; a detected AIS defect.  For E1-CRC signals, a second with one of the following errors: 832 or more Path Code Violation errors; one or more Out of Frame defects.  For E1-noCRC signals, a second with 2048 Line Code Violations or more.  For D4 signals, a count of 1-second intervals with Framing Errors, or an Out of Frame defect, or 1544 Line Code Violations.
Unavail Secs	A count of the total number of seconds on the interface.

## show controllers t1 call-counters

To view the total number of calls and call durations on a T1 controller, use the **show controllers t1 call-counters** Privileged EXEC command.

**show controllers t1** *number* **call-counters**

### Syntax Description

*number* Controller number (for example 0, 1, 2, or 3).

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 T.

This command displays the T1 controller status as calls, such as switched 56K digital calls, pass through the hardware.

### Sample Display

The following is sample output for the **show controllers t1 1 call-counters** command.

```
router# show controllers t1 1 call-counters
T1 1:
  DS0's Active: 0
  DS0's Active High Water Mark: 0
  TimeSlot   Type   TotalCalls   TotalDuration
    1         cas     0           00:00:00
    2         cas     0           00:00:00
    3         cas     0           00:00:00
    4         cas     0           00:00:00
    5         cas     0           00:00:00
    6         cas     0           00:00:00
    7         cas     0           00:00:00
    8         cas     0           00:00:00
    9         cas     0           00:00:00
   10         cas     0           00:00:00
   11         cas     0           00:00:00
   12         cas     0           00:00:00
   13         cas     0           00:00:00
   14         cas     0           00:00:00
   15         cas     0           00:00:00
   16         cas     0           00:00:00
   17         cas     0           00:00:00
   18         cas     0           00:00:00
   19         cas     0           00:00:00
   20         cas     0           00:00:00
   21         cas     0           00:00:00
   22         cas     0           00:00:00
   23         cas     0           00:00:00
   24         cas     0           00:00:00

Total DS0's Active High Water Mark: 7
```

Table 52 describes the sample output for the **show controllers t1 1 call-counters** command.

**Table 52 Show Controllers T1 Call-Counters Field Descriptions**

<b>Field</b>	<b>Description</b>
T1 <i>number</i> :	Number of the T1 controller.
DS0's Active:	Displays the number of DS0s channels that are currently active.
DS0's Active High Water Mark:	Number of active DS0s that are approaching the threshold ceiling of the system.
TimeSlot	Timeslot number used on the controller for the specified DS0.
Type	Type of call occupying the timeslot. This entry is usually CAS or ISDN PRI.
TotalCalls	How many calls came in on this timeslot or DS0.
TotalDuration	How long the last call lasted.
Total DS0's Active High Water Mark:	Total number of active DS0s that are approaching the threshold ceiling of the system.

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

**show controllers t1 cas-data  
cas-group (controller t1)**

## show controllers t1 cas-data

To display internal call switching module information about the switched 56k data channels, use the **show controllers t1 cas-data** Privileged EXEC command.

**show controllers t1 *number* cas-data**

### Syntax Description

*number* Controller number (for example 0, 1, 2, or 3).

### Command Mode

Privileged EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 T.

### Sample Display

The following is sample output for the **show controllers t1 1 cas-data** command.

```
router# show controllers t1 1 cas-data
Device Pool: Dev-SW56-pool
Number of SW56 vdev in pool: 48
Number of active connections: 0
No free SW56 device in pool: 0
SW56 max allocated messages: 96

T1 1:
SW56(slot/subcont/bchan)=0/1/0, hwidb=0x00867348
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
SW56(slot/subcont/bchan)=0/1/1, hwidb=0x0086EC58
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
SW56(slot/subcont/bchan)=0/1/2, hwidb=0x00876568
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
SW56(slot/subcont/bchan)=0/1/3, hwidb=0x0087DE78
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
```

```
SW56(slot/subcont/bchan)=0/1/4, hwidb=0x00885788
  csm_state(0x00000100)=CSM_IDLE_STATE, csm_event_proc=0x0006CCC2
  total_call_duration=00:00:00
  invalid_event_count=0, wdt_timeout_count=0
  ic_failure=0, ic_complete=0, remote_link_disc=0
  csm_status(0): VDEV_STATUS_UNLOCKED
  wdt_timestamp_started is not activated
```

Table 53 describes the sample display output for the **show controller t1 1 cas-data** command.

**Table 53 Show Controllers T1 Cas-Data Field Descriptions**

Field	Description
Device Pool:	Type of pool in service, which is a logical grouping used to achieve a specific service.
Number of SW56 vdev in pool:	Number of serial devices used in the pool.
Number of active connections:	Number of active switched 56K active connections.
No free SW56 device in pool:	Number of switched 56K channels are available to accept calls.
SW56 max allocated messages:	Number of messages that are allocated to switched 56K services.
T1 number:	Number of the controller T1.
SW56(slot/subcont/bchan)=	Specified DS0 or timeslot used for the switched 56K service.
csm_state(0x00000100)=	Call state machine register.
total_call_duration=	How long the call lasted.
invalid_event_count=	Number of invalid event counters for the specified channel.
ic_failure=	Number of incoming call failures.
csm_status(0):	Call state machine register.
wdt_timestamp_started is not activated	Watch dog timer.

**Related Commands**

You can use the master indexes or search online to find documentation of related commands.

**show controllers t1 call-counters  
cas-group (controller t1)**

## show interfaces serial bchannel

To display information about the physical attributes of the ISDN PRI over channelized E1 or channelized T1 B and D channels, use the **show interfaces serial bchannel EXEC** command.

**show interfaces serial** *slot/port* **bchannel** *channel-number*  
**show interfaces serial** *number* **bchannel** *channel-number*

### Syntax Description

<i>slot/port</i>	Backplane slot number and port number on the interface. See your hardware installation manual for the specific slot and port numbers.
<i>number</i>	Network processor module (NPM) number, in the range 0 through 2.
<i>channel-number</i>	E1 channel number in the range 1 to 31 or T1 channel number in the range 1 to 23; 1-24 if using NFAS.

### Command Mode

EXEC

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.2 F.

## show isdn

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

**show isdn** { **active** | **history** | **memory** | **services** | **status** [*dsl* | *serial number*] | **timers** }

### Syntax Description

<b>active</b>	Displays current call information, including called number, the time until the call is disconnected, AOC charging units used during the call, and whether the AOC information is provided during calls or at end of calls.
<b>history</b>	Displays historic and current call information, including the called number, the time until the call is disconnected, AOC charging time units used during the call, and whether the AOC information is provided during calls or at the end of calls.
<b>memory</b>	Displays memory pool statistics. This keyword is for use by technical development staff only.
<b>services</b>	Displays the status of PRI channels.
<b>status</b> [ <i>dsl</i>   <i>serial number</i> ]	Displays the status of all ISDN interfaces or, optionally, a specific digital signal link (DSL) or a specific ISDN PRI interface (created and configured as a serial interface). Values of <i>dsl</i> range 0 to 15.
<b>timers</b>	Displays the values of Layer 2 and Layer 3 timers.

### Command Mode

Global configuration

### Usage Guidelines

This command first appeared in Cisco IOS Release 11.1.

### Sample Displays

The following is sample output from the **show isdn active** command:

```
Router# show isdn active

-----
                          ISDN ACTIVE CALLS
-----
History Table MaxLength = 320 entries
History Retain Timer = 15 Minutes
-----
Call Calling      Called      Duration  Remote   Time until  Recorded Charges
Type Number      Number      Seconds   Name     Disconnect  Units/Currency
-----
Out              9876543222  Active(10) idacom    11        u(E)
Out              9876543210  Active(34) idacom 115      5         u(D)
-----
```

The following is sample output from the **show isdn history** command:

```

rudder# show isdn history

-----
                          ISDN CALL HISTORY
-----
History Table MaxLength = 320 entries
History Retain Timer = 15 Minutes
-----
Call Calling      Called      Duration  Remote   Time until  Recorded Charges
Type Number      Number      Seconds   Name     Disconnect  Units/Currency
-----
Out              47887654    240       blackcanary          5          u(D)
In   67893                90       delorean
Out              56745678    Active(90) blackcanary  240       13          u(D)
-----

```

Table 54 describes the fields in the **show isdn active** and **show isdn history** output displays.

**Table 54 Show ISDN Active and Show ISDN History Field Descriptions**

Field	Description
History Table MaxLength	Maximum number of entries that can be retained in the Call History table.
History Retain Timer	Maximum number of seconds any entry can be retained in Call History table.
Call Type	Type of call: incoming or outgoing.
Calling Number	For incoming calls, the number from which the call was received.
Called Number	For outgoing calls, the number to which the call was placed.
Duration Seconds	Number of seconds the call lasted. Indicates whether the call is still active, and how many seconds it has lasted so far.
Remote Name	Name of the host placing the call or the host called.
Time until Disconnect	Number of seconds before the call is configured to disconnect because of the static idle timer for the map class or the interface.
Recorded Charges Units/Currency	For outgoing calls, number of ISDN AOC charging units used or the currency cost of the call.

The following sample display shows the output of the **show isdn service** command when PRI is configured on a T1 controller:

```
Router# show isdn service
PRI Channel Statistics:
ISDN Se0:15, Channel (1-31)
  Activated dsl 8
  State (0=Idle 1=Propose 2=Busy 3=Reserved 4=Restart 5=Maint)
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0
  Channel (1-31) Service (0=Inservice 1=Maint 2=Outofservice)
  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

Table 55 describes the fields in the sample output of the **show isdn service** command.

**Table 55 Show ISDN Service Field Descriptions**

Field	Description
ISDN Se1/0:23	ISDN PRI interface corresponding to serial interface 1/0:23.
Channel (1-31)	Channel range “1-31” is a standard format for both T1 and E1 outputs, but the state value shown identifies whether the channel is used.
Activated dsl 0	The digital signal link (DSL) value is 0.
State (0=Idle 1=Propose 2=Busy 3=Reserved 4=Restart 5=Maint)	Current state of each channel. Channels 24 through 31 are marked as reserved when the output is from T1.
Channel (1-31) Service (0=Inservice 1=Maint 2=Outofservice)	Service state assigned to each channel. Channel 24 is marked as out of service. <sup>1</sup>

<sup>1</sup> If channel 24 (marked as out of service) is configured as the NFAS primary D channel, NFAS will roll over to the backup D channel if one is configured. If channel 24 is a B channel, it will not accept calls.

The following shows sample output from the **show isdn status** command for PRI interfaces configured on two different ports of the same controller. This example shows one active call.

```
Router# show isdn status

rudder#show isdn status
Global ISDN Switchtype = basic-5ess
ISDN BRI0 interface
  dsl 0, interface ISDN Switchtype = basic-5ess
  Layer 1 Status:
    ACTIVE
  Layer 2 Status:
    TEI = 64, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
  Layer 3 Status:
    0 Active Layer 3 Call(s)
  Activated dsl 0 CCBs = 0
ISDN BRI1 interface
  dsl 1, interface ISDN Switchtype = basic-5ess
  Layer 1 Status:
    DEACTIVATED
  Layer 2 Status:
    Layer 2 NOT Activated
  Layer 3 Status:
    0 Active Layer 3 Call(s)
  Activated dsl 1 CCBs = 0
ISDN BRI2 interface
  dsl 2, interface ISDN Switchtype = basic-5ess
```

```
Layer 1 Status:
  DEACTIVATED
Layer 2 Status:
  Layer 2 NOT Activated
Layer 3 Status:
  0 Active Layer 3 Call(s)
Activated dsl 2 CCBs = 0
ISDN BRI3 interface
  dsl 3, interface ISDN Switchtype = basic-5ess
Layer 1 Status:
  ACTIVE
Layer 2 Status:
  TEI = 75, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
Layer 3 Status:
  0 Active Layer 3 Call(s)
Activated dsl 3 CCBs = 0
ISDN BRI4 interface
  dsl 4, interface ISDN Switchtype = basic-5ess
Layer 1 Status:
  DEACTIVATED
Layer 2 Status:
  Layer 2 NOT Activated
Layer 3 Status:
  0 Active Layer 3 Call(s)
Activated dsl 4 CCBs = 0
ISDN BRI5 interface
  dsl 5, interface ISDN Switchtype = basic-5ess
Layer 1 Status:
  DEACTIVATED
Layer 2 Status:
  Layer 2 NOT Activated
Layer 3 Status:
  0 Active Layer 3 Call(s)
Activated dsl 5 CCBs = 0
ISDN BRI6 interface
  dsl 6, interface ISDN Switchtype = basic-5ess
Layer 1 Status:
  DEACTIVATED
Layer 2 Status:
  Layer 2 NOT Activated
Layer 3 Status:
  0 Active Layer 3 Call(s)
Activated dsl 6 CCBs = 0
ISDN BRI7 interface
  dsl 7, interface ISDN Switchtype = basic-5ess
Layer 1 Status:
  DEACTIVATED
Layer 2 Status:
  Layer 2 NOT Activated
Layer 3 Status:
  0 Active Layer 3 Call(s)
Activated dsl 7 CCBs = 0
ISDN Serial0:15 interface
  dsl 8, interface ISDN Switchtype = primary-ni
Layer 1 Status:
  ACTIVE
Layer 2 Status:
  TEI = 0, Ces = 1, SAPI = 0, State = MULTIPLE_FRAME_ESTABLISHED
Layer 3 Status:
  0 Active Layer 3 Call(s)
Activated dsl 8 CCBs = 0
Total Allocated ISDN CCBs = 0
```

Table 56 describes significant fields in the output of the **show isdn status** command.

**Table 56 Show ISDN Status Field Descriptions**

<b>Field</b>	<b>Description</b>
ISDN Switchtype = primary-5ess	PRI switch type the router is connected to.
ISDN Serial1/0:23 interface	Serial slot, port, and timeslot numbers that define the PRI interface location.
<b>Layer 1 Status</b>	
ACTIVE	Status of ISDN Layer 1.
<b>Layer 2 Status</b>	
TEI = 65, State = MULTIPLE_FRAME_ESTABLISHED	Status of ISDN Layer 2. Terminal endpoint identifier number and multiframe structure state.
<b>Layer 3 Status:</b>	
1 Active Layer 3 Call(s)	Number of active calls.
Activated dsl 1 CCBs =	Number of the Digital Signal Link activated. Number of call control blocks in use.
CCB:callid=8001, callref=0, sapi=0, ces=1, B-chan=23	Call control block information about the active call.
Number of active calls =	Number of active calls.
Number of available B-channels =	Number of B channels that are not being used.
Total Allocated ISDN CCBs =	Number of ISDN call control blocks that are allocated.