

# E1 R2 Customization with the `cas-custom` Command

Document ID: 12153

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## Introduction

The `cas-custom` command under the controller E1 is used to customize the E1 R2 country variants and channel associated signaling (CAS) parameters. This document needs to be used in conjunction with the E1 R2 Signaling Theory and the E1 R2 Configuration and Troubleshooting documents.

## Prerequisites

### Requirements

There are no specific requirements for this document.

### Components Used

This document is not restricted to specific software and hardware versions. However, the information in this document was tested with the Cisco 3640 router and Cisco IOS® Software Release 12.2(26).

### Conventions

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

## E1 R2 Customization

The subcommands under the command `cas-custom` are used to accommodate the country variants and to customize channel associated signaling (CAS) parameters.

This command sequence illustrates how you can view all `cas-custom` subcommand options:

```
E1R2Router(config)#controller E1 0
E1R2Router(config-controller)#ds0-group 1 timeslots 2 type r2-digital r2-compelled ani
E1R2Router(config-controller)#cas-custom 1
E1R2Router(config-ctrl-cas)#?
CAS custom commands:
  alert-wait-time      Time to wait for alert indication for incoming R2 calls
  ani-digits           Expected number of ANI digits
  ani-timeout          Timeout for ANI digits
  answer-guard-time    Wait Between Group-B Answer Signal And Line Answer
```

answer-signal	Answer signal to be used
caller-digits	Digits to be collected before requesting CallerID
category	Category signal
country	Country Name
debounce-time	Debounce Timer
default	Set a command to its defaults
disconnect-tone	Provide tone to the calling party after sending group B
dnis-complete	Send I-15 after DNIS digits for dial-out
dnis-digits	Expected number of DNIS digits
exit	Exit from cas custom mode
groupa-callerid-end	Send Group-A Caller ID End
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
proceed-to-send	Suppress proceed-to-send signal for pulsed line signaling
release-ack	Send Release Acknowledgment to Clear Forward
release-guard-time	Release Guard Timer
request-category	DNIS Digits to be collected before requesting category
seizure-ack-time	Seizure to Acknowledge timer
signal-end-to-end	Transfer R2 Category and Answer signals end-to-end
timer	configure timer
trunk-group	Configure interface to be in a trunk group
unused-abcd	Unused ABCD bit values

The command **ds0-group 1 timeslots 2 type r2-digital r2-compelled ani** needs to be used initially only to create the ds0-group. The **cas-custom** command with group number can be used whenever needed in order to customize the group.

Cisco recommends that you first configure the **country** *country name* **use-default** parameter to set all related parameters accordingly to the country supported. Use the other **cas-custom** subcommands for further customization required in order to accommodate a certain private branch exchange (PBX) or switch.

**Note:** The flexibility to customize the CAS parameters can increase the margin of user errors. Customization needs to be entered after the country has been selected, or the CAS parameters return to default. In this example, the last statement returns all CAS parameters to the default settings for Brazil which voids the **caller-digits 4** command:

```
(config-controller)#cas-custom 1
(config-ctrl-cas)#country brazil use-default
(config-ctrl-cas)#caller-digits 4
(config-ctrl-cas)#country brazil use-default
```

Now that you know how to view the **cas-custom** command parameters, this table details these parameters and their respective uses.

Command Parameter	Description
<b>ani-digits min 0-64 max 0-64</b>	If your router does not receive the minimum number of automatic number identification (ANI) digits, it clears the call. After the router collects the maximum number of ANI digits, it sends Caller ID End and does not wait for the Forward Group-I-15 signal.
<b>ani-timeout 1-15 seconds</b>	Default last-tone-timeout is three seconds. Some switches take longer

	<p>than three seconds to pulse out ANI digits. Therefore, this is made configurable. If the router times out while it waits for ANI digits and aborts the call, increase this timer argument.</p>
<b>caller-digits</b> 1-64	<p>International Telecommunication Union (ITU) default is 1. This means that the router requests ANI after it receives the first Dialed Number Information Service (DNIS) digit.</p>
<b>groupa-callerid-end</b>	<p>Countries like China, Thailand, and Mexico use Group-C signals for ANI collection. If this is configured, the router uses the Backward Group-A-1 signal as Caller ID End. If it is not configured, the router uses the country default, which might be a Group-C signal.</p>
<b>kA</b> 1-15	<p>This is used in China. This is the category of the calling party sent in response to Backward Group-A-6 signal. For incoming calls, the router collects the kA value. For outgoing calls, the router sends kA if configured. Otherwise, the router sends the default category for the country.</p>
<b>kd</b> 1-15	<p>This is used in China. This is the category sent in response to Backward Group-A-3 signal. For incoming calls, the router collects the kd value. For outgoing calls, the router sends kd if configured. Otherwise, it sends the default category for the country.</p>
<b>dnis-digits min 1 max</b> 1-64	<p>If the router does not know the number of DNIS digits beforehand, it has to rely on a timeout mechanism (three seconds) in order to detect the end of DNIS. The configuration of max speeds up the call setup time by three seconds.</p>
<b>dnis-complete</b>	<p>Sends Forward Group-I-15 signal after dialing out all the DNIS digits. Effective for outgoing calls only. Configure this if the switch requires it, or if it improves call setup time by three seconds. The <i>dnis-complete</i> parameter is a requirement on the switch side. For instance, in the Philippines, if the Forward Group-I-15 signal is not sent,</p>

	<p>outgoing calls do not complete. Therefore, this was implemented.</p>
<p><b>answer-signal</b> <b>{group-a   group-b}</b> <i>1-15</i></p>	<p>By default, the router sends Backward Group-A-3 (address complete, change over to Group-B) after DNIS/ANI collection. When a switch sends the Group-II category, the router sends a Group-B answer signal and connects. If Group-A answer signal (A-6) is configured, then the router does not send A-3 after address collection. It sends A-6 and then connects.</p>
<p><b>request-category</b> <i>1-64</i></p>	<p>If this is configured, the router requests for the category after it collects "request-category" number of DNIS digits for incoming calls only. If this parameter is not configured, the router asks for the category only after address collection by sending the Backward Group-A-3 signal.</p>
<p><b>category</b> <i>1-15</i></p>	<p>Specifies the type of call (subscriber with priority or normal subscriber). ITU default is 1 (normal subscriber). For outgoing calls, the router sends this category. If this is not configured, the router sends the country default category. For incoming calls, the router collects the category from the switch. No special handling is based on the category.</p>
<p><b>NC-congestion</b> <i>1-15</i></p>	<p>This is the Backward Group-B congestion signal for non-compelled signaling. If this is not configured, the router uses the default Backward Group-B-4 signal.</p>
<p><b>country use-defaults</b></p>	<p>Always initially configure with the <b>country use-defaults</b> parameter. This loads the default register signals for that country. You can then customize based on the switch after the register signals load.</p>
<p><b>answer-guard-time</b> <i>1-1000 msec</i></p>	<p>This is the wait between the router that sends register answer Backward Group-(B1 or B6) signal and line ANSWER (01). Default is one second. If Ring No Answers (RNAs, which are calls that fail in the signaling stage) happen during this wait, or if you want to speed up the call setup time, decrease this timer.</p>

<b>debounce-time</b> <i>10-40 msec</i>	Any line signaling change is considered valid only if it lasts at least the length of this timer. The default is 40 msec for all countries. Tune this based on the switch.
<b>release-guard-time</b> <i>1-2000 msec</i>	The router starts this timer on receiving the clear-forward signal from the switch. It then sends idle up on expiration of this timer. The default is two seconds. Match this timer to the switch configuration.
<b>seizure-ack-time</b> <i>2-100 msec</i>	This is the delay between the router that receives seizure and sends seizure acknowledgment (ACK). This timer is configurable only on AS5200s and AS5300s. On AS5800s, there is no delay. Tune this based on the switch requirements.
<b>metering</b>	Metering signals are pulse type signals transmitted backwards during the call from call charging point to subscriber's call meter in the originating exchange. This pulse can be "pulsed clear-back" (01 to 11 and back) or "pulsed answer" (11 to 01 and back). In order to avoid confusion with metering signals, clear-back signal is not allowed. If metering is on, the router sends Forced Release (00) instead of Clear-Back (11).
<b>invert-abcd</b> <i>0/1 0/1 0/1 0/1</i>	Inverts the ABCD status bits in time-slot 16 before TX and after rx. If A bit is set to 1, the router inverts the bit before it transmits and after it receives. For example, <b>invert-abcd 1 0 0 0</b> causes only bit A to be inverted.
<b>unused-abcd</b> <i>0/1 0/1 0/1 0/1</i>	R2 signaling uses the A,B status bits only. This command sets the unused C,D bits. Default unused C,D bits for all countries except China is 01. For China, C,D bits are 11.
<b>release-ack</b>	If this is configured, the router sends ACK (11) to the clear-forward signal from the switch. Currently not supported on AS5800. Originally implemented for Malta.
<b>proceed-to-send</b>	ITU pulsed line signaling (S-7) ACKs the seizure with a proceed-to-send signal (150 ms pulse). A variant of this signaling over satellite links does not

use this signal. If this is configured, the router does not ACK the seizure for incoming calls and does not expect ACK for outgoing calls. This affects pulsed line signaling calls only. Not supported on AS5800 yet.

**Note:** **ka** and **kd** stand for category. China has group-k signals. The **ka** parameter is sent first, in response to the Backward Group-A-6 (calling party category request). **kd** is sent in response to the Backward Group-A-3 (address complete). These two can potentially be different for China. For other countries, the same category is sent to both requests.

More information on Country Options, refer to Country Options Configuration for E1 R2 Signaling.

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