



R1 Modified Signaling for the Cisco AS5800 Access Server

Feature Summary

Enabling R1 Modified Signaling allows a Cisco AS5800 universal access server to talk to central office trunks that also use R1 Modified Signaling. R1 Signaling is an international signaling standard that is common to channelized T1/E1 networks; however, Cisco only has made this feature available in Taiwan. You can configure a channelized T1/E1 interface to support different types of R1 Modified Signaling, which is used in older analog telephone networks.

Note This type of signaling is not the same as ITU R1 signaling; it is R1 signaling modified for Taiwan specifically.

Note In the future, R1 Modified Signaling will be available in Turkey as well as Taiwan.

Benefits

Cisco now supports native R1 signaling on both E1 and T1 interfaces. This version of software supports R1 signaling customized for Taiwan only. This feature allows enterprises and service providers to fully interoperate with the installed Taiwanese telecommunications standards, providing interoperability in addition to the vast array of Cisco's IOS troubleshooting and diagnostic capability. This will provide customers with a seamless, single-box, solution for their Taiwan signaling requirements.

List of Terms

line signaling—States of call setup on the Trunk A/B/C/D signaling bits.

R1 Trunk—A type of trunk to carry telephony traffic.

register signaling—Multi-frequency tone signaling in the voice channel.

Restrictions

The following are restrictions to the use of R1 Modified Signaling:

- Because different line signaling uses different A/B/C/D bit definitions to represent the line state, users need to know the configuration of the T1/E1 trunk before configuring the cas-group. If the wrong type of provision is configured, the access server might interpret the wrong A/B/C/D bit definitions and behave strangely.
- Cisco access servers with Microcom modems cannot support this feature.

Platforms

This feature is supported on the Cisco AS5800 universal access server.

Note This feature is already available on the Cisco AS5200 and Cisco AS5300 access servers.

Prerequisites

The following are hardware and software prerequisites to enable R1 Modified Signaling:

- Cisco AS5800 access server (without a Microcom modem)
- Cisco IOS Release 11.3(5)AA or later
- MICA feature module
- Portware Version 2.3.1.0 or later

For information on upgrading your Cisco IOS images, modem portware, or modem code, go to the following locations:

- On Cisco Connection Online (CCO)—
http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5800/5800_pw/index.htm
Or, follow this path: **Cisco Product Documentation: Access Servers and Access Routers: Access Servers: Cisco AS5800: Portware.**
- On the Documentation CD-ROM—
Cisco Product Documentation: Access Servers and Access Routers: Access Servers: Cisco AS5800: Portware.

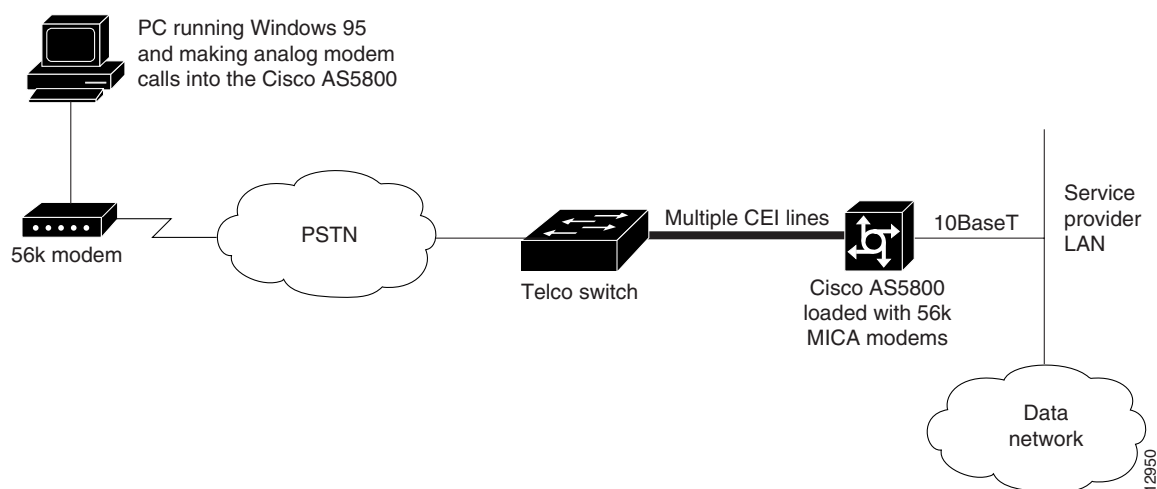
Supported MIBs and RFCs

None.

Functional Description

The following diagram illustrates a service provider using R1 Signaling with E1 and a Cisco AS5800 access server.

Figure 1 Service Provider using E1 R1 Signaling with a Cisco AS5800



Configuration Tasks

This section describes how to enable R1 Modified Signaling on your Cisco AS5800 access server.

Table 1 describes how to configure this feature on a T1 interface, and Table 2 describes how to configure this feature on an E1 interface.

Table 1 Configuring R1 Modified Signaling on a T1 Interface

Step	Command	Purpose
1	5800> enable Password: <i>password</i> 5800#	Enter enable mode. Enter the password. You have entered enable mode when the prompt changes to 5800#.
2	5800# configure terminal Enter configuration commands, one per line. End with CNTL/Z. 5800(config)#	Enter global configuration mode. You have entered global configuration mode when the prompt changes to 5800 (config) #.
3	5800(config)# controller t1 shelf/slot/port 5800(config-controller)#	Enter controller configuration mode to configure your T1 controller port. See the <i>Cisco AS5800 Universal Access Server Software Installation and Configuration Guide</i> for details.

Table 1 Configuring R1 Modified Signaling on a T1 Interface (Continued)

Step	Command	Purpose
4	5800 (config-controller)# framing {sf esf}	Entering framing sf configures framing to T1 with sf. Entering framing esf configures framing to T1 only.
5	5800 (config-controller)# linecode {ami b8zs}	Entering linecode ami configures line code to AMI ¹ encoding. Entering linecode b8zs configures line code to b8zs encoding.
6	5800 (config-controller)# clock source {internal line [primary secondary]}	Entering clock source internal configures the clock source to the internal clock. Entering clock source line primary configures the clock source to the primary recovered clock. Entering clock source secondary configures the clock source to the secondary recovered clock.
7	5800 (config-controller)# cas-group 1 timeslots 1-24 type r1-modified {ani-dnis dnis}	Configure the timeslots that belong to each T1 circuit for R1 Modified Signaling. ² <ul style="list-style-type: none"> • The cas-group # ranges from 0 to 23 for CT1. • The timeslot # ranges from 1 to 24 for CT1. • For the type, each cas-group can be configured as one of the Robbed Bit Signaling provisions. • ani-dnis indicates R1 will collect ani and dnis information; dnis indicates R1 will collect only dnis information.
8	5800 (config-if)# ^Z 5800# %SYS-5-CONFIG_I: Configured from console by console	Return to enable mode by simultaneously pressing the Ctrl key and the z key. This message is normal and does not indicate an error.

1. AMI = Alternate Mark Inversion..

2. For a more detailed description of the syntax and variables of this command see the section "Command Reference" later in this document.

Table 2 Configuring R1 Modified Signaling on an E1 Interface

Step	Command	Purpose
1	5800> enable Password: <i>password</i> 5800#	Enter enable mode. Enter the password. You have entered enable mode when the prompt changes to 5800#.
2	5800# configure terminal Enter configuration commands, one per line. End with CNTL/Z. 5800(config)#	Enter global configuration mode. You have entered global configuration mode when the prompt changes to 5800(config)#.
3	5800(config)# controller e1 shelf/slot/port 5800(config-controller)#	Enter controller configuration mode to configure your E1 controller ports. See the <i>Cisco AS5800 Universal Access Server Software Installation and Configuration Guide</i> for details.
4	5800 (config-controller)# framing {crc4 no-crc4}	Entering framing crc4 configures framing to E1 with CRC ¹ . Entering framing no-crc4 configures framing to E1 only.
5	5800 (config-controller)# linecode {ami hdb3}	Entering linecode ami configures line code to AMI ² encoding. Entering linecode hdb3 configures line code to HDB ³ encoding.
6	5800 (config-controller)# clock source {internal line [primary secondary]}	Entering clock source internal configures the clock source to the internal clock. Entering clock source line primary configures the clock source to the primary recovered clock. Entering clock source secondary configures the clock source to the secondary recovered clock.
7	5800(config-controller)# cas-group 1 timeslots 1-15, 17-31 type r1-modified {ani-dnis dnis}	Configure the timeslots that belong to each E1 circuit for R1 Modified Signaling. ⁴ <ul style="list-style-type: none"> The cas-group # ranges from 0 to 30 for CE1. The timeslot # ranges from 1 to 31 for CE1. For the type, each cas-group can be configured as one of the Robbed Bit Signaling provisions. ani-dnis indicates R1 will collect ani and dnis information; dnis indicates R1 will collect only dnis information.
8	5800(config-controller-cas)# cas-custom 1	(Optional.) Enter the channel number to customize.

Table 2 Configuring R1 Modified Signaling on an E1 Interface (Continued)

Step	Command	Purpose
9	5800 (config-controller-cas)# ^z 5800# %SYS-5-CONFIG_I: Configured from console by console	Return to enable mode by simultaneously pressing the Ctrl key and the z key. This message is normal and does not indicate an error.

1. CRC = Cyclic Redundancy Check.
2. AMI = Alternate Mark Inversion.
3. HDB = High-Density Bipolar 3.
4. For a more detailed description of the syntax and variables of this command see the section "Command Reference" later in this document.

Configuration Examples

The following is a sample R1 Modified Signaling configuration in Taiwan:

```
Current configuration:
!
version 11.3
service timestamps debug datetime msec
no service password-encryption
!
hostname router
!
enable secret 5 $1$YAaG$L0jTcQ.nMH.gpFYXaOU5c.
!
no modem fast-answer
ip host dirt 223.255.254.254
ip multicast rpf-check-interval 0
isdn switch-type primary-dms100
!
!
controller T1 1/1/0
framing esf
linecode b8zs
cablelength short 133
pri-group timeslots 1-24
fdl att
!
controller T1 1/1/1
framing esf
linecode b8zs
cablelength short 133
pri-group timeslots 1-24
fdl att
!
controller T1 1/1/2
framing esf
linecode b8zs
cablelength short 133
pri-group timeslots 1-24
fdl att
!
controller T1 1/1/3
framing esf
linecode b8zs
```

```

cablelength short 133
pri-group timeslots 1-24
fdl att
!
.
.
.

```

Command Reference

The following command applies to R1 Modified Signaling.

cas-group

To configure R1 channel-associated signaling, 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 r1-modified {ani-dnis | dnis}
no cas-group channel timeslots range type r1-modified {ani-dnis | dnis}

```

Syntax Description

<i>channel</i>	Specifies a single channel group number. Replace the <i>channel</i> variable with a number between 0 and 30.
<i>range</i>	Specifies a timeslot range, which can be from 1 to 24 for T1, and from 1 to 31 for E1. 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 1-7, 8, 17-31). The 16th time slot is reserved for out-of-band signaling.
ani-dnis	Indicates R1 Signaling will collect ani and dnis information.
dnis	Indicates R1 Signaling will collect only dnis information.

Default

ani-dnis.

Command Mode

Controller configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 11.3 P.

Examples

The following example would configure R1 Signaling on a Cisco AS5800 (T1 interface) and specify the collection of both ani and dnis information:

```
5800(config-controller)# cas-group 1 timeslots 1-24 type r1-modified ani-dnis
```

Related Commands

debug modem csm

Debug Command

The following debug command applies to R1 Modified Signaling.

debug modem

If you are having trouble, use the **debug modem** command to enable the modem management Call Switching Module (CSM) debug mode:

```
debug modem csm [slot/port]
```

Syntax Description

slot (Optional) Specifies the slot number you want to debug.

port (Optional) Specifies the port number you want to debug.

Default

All slots and ports will be debugged.

Command Mode

EXEC mode

Usage Guidelines

This command first appeared in Cisco IOS Release 11.3.

Sample Output

The following is the output of **debug modem csm** for an incoming call:

```
5800# debug modem csm
5800#1.19.36.7 2001
Trying 1.19.36.7, 2001 ... Open
atdt111222333444555666
*Apr  7 12:39:42.475: Mica Modem(1/0): Rcvd Dial String(111222333444555666)
*Apr  7 12:39:42.475: CSM_PROC_IDLE: CSM_EVENT_MODEM_OFFHOOK at slot 1, port 0
```

```
*Apr 7 12:39:42.479: CSM_RX_CAS_EVENT_FROM_NEAT:(A001): EVENT_CHANNEL_LOCK at slot
1 and port 0
*Apr 7 12:39:42.479: CSM_PROC_OC4_DIALING: CSM_EVENT_DSX0_BCHAN_ASSIGNED at slot 1,
port 0
*Apr 7 12:39:42.479: Mica Modem(1/0): Configure(0x1)
*Apr 7 12:39:42.479: Mica Modem(1/0): Configure(0x5)
*Apr 7 12:39:42.479: Mica Modem(1/0): Call Setup
*Apr 7 12:39:42.479: neat msg at slot 0: (1/0): Tx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:42.491: neat msg at slot 0: (0/0): Rx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:42.531: VDEV_ALLOCATE: slot 1 and port 3 is allocated.
*Apr 7 12:39:42.531: CSM_RX_CAS_EVENT_FROM_NEAT:(0004): EVENT_CALL_DIAL_IN at slot
1 and port 3
*Apr 7 12:39:42.531: CSM_PROC_IDLE: CSM_EVENT_DSX0_CALL at slot 1, port 3
*Apr 7 12:39:42.531: Mica Modem(1/3): Configure(0x0)
*Apr 7 12:39:42.531: Mica Modem(1/3): Configure(0x5)
*Apr 7 12:39:42.531: Mica Modem(1/3): Call Setup
*Apr 7 12:39:42.595: Mica Modem(1/0): State Transition to Call Setup
*Apr 7 12:39:42.655: Mica Modem(1/3): State Transition to Call Setup
*Apr 7 12:39:42.655: Mica Modem(1/3): Went offhook
*Apr 7 12:39:42.655: CSM_PROC_IC1_RING: CSM_EVENT_MODEM_OFFHOOK at slot 1, port 3
*Apr 7 12:39:42.671: neat msg at slot 0: (0/0): Tx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:42.691: neat msg at slot 0: (1/0): Rx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:42.731: CSM_RX_CAS_EVENT_FROM_NEAT:(A001): EVENT_START_TX_TONE at
slot 1 and port 0
*Apr 7 12:39:42.731: CSM_PROC_OC4_DIALING: CSM_EVENT_DSX0_START_TX_TONE at slot 1,
port 0
*Apr 7 12:39:42.731: Mica Modem(1/0): Generate digits:called_party_num= len=1
*Apr 7 12:39:42.835: Mica Modem(1/3): Rcvd Digit detected(#)
*Apr 7 12:39:42.835: CSM_PROC_IC2_COLLECT_ADDR_INFO: CSM_EVENT_KP_DIGIT_COLLECTED
(DNIS=, ANI=) at slot 1, port 3
*Apr 7 12:39:42.855: neat msg at slot 0: (0/0): Tx LOOP_OPEN (ABCD=0101)
*Apr 7 12:39:42.871: neat msg at slot 0: (1/0): Rx LOOP_OPEN (ABCD=0101)
*Apr 7 12:39:42.899: Mica Modem(1/0): Rcvd Digits Generated
*Apr 7 12:39:42.911: CSM_RX_CAS_EVENT_FROM_NEAT:(A001): EVENT_END_TX_TONE at slot
1 and port 0
*Apr 7 12:39:42.911: CSM_PROC_OC4_DIALING: CSM_EVENT_DSX0_END_TX_TONE at slot 1,
port 0
*Apr 7 12:39:42.911: Mica Modem(1/0): Generate digits:called_party_num=A len=1
*Apr 7 12:39:43.019: Mica Modem(1/0): Rcvd Digits Generated
*Apr 7 12:39:43.019: CSM_PROC_OC4_DIALING: CSM_EVENT_TONE_GENERATED at slot 1, port
0
*Apr 7 12:39:43.019: Mica Modem(1/3): Rcvd Digit detected(A)
*Apr 7 12:39:43.335: CSM_RX_CAS_EVENT_FROM_NEAT:(A001): EVENT_START_TX_TONE at
slot 1 and port 0
*Apr 7 12:39:43.335: CSM_PROC_OC4_DIALING: CSM_EVENT_DSX0_START_TX_TONE at slot 1,
port 0
```

```
*Apr 7 12:39:43.335: Mica Modem(1/0): Generate
digits:called_party_num=111222333444555666 len=19
*Apr 7 12:39:43.439: Mica Modem(1/3): Rcvd Digit detected(1)
*Apr 7 12:39:43.559: Mica Modem(1/3): Rcvd Digit detected(1)
*Apr 7 12:39:43.619: Mica Modem(1/3): Rcvd Digit detected(1)
*Apr 7 12:39:43.743: Mica Modem(1/3): Rcvd Digit detected(2)
*Apr 7 12:39:43.859: Mica Modem(1/3): Rcvd Digit detected(2)
*Apr 7 12:39:43.919: Mica Modem(1/3): Rcvd Digit detected(2)
*Apr 7 12:39:44.043: Mica Modem(1/3): Rcvd Digit detected(3)
*Apr 7 12:39:44.163: Mica Modem(1/3): Rcvd Digit detected(3)
*Apr 7 12:39:44.223: Mica Modem(1/3): Rcvd Digit detected(3)
*Apr 7 12:39:44.339: Mica Modem(1/3): Rcvd Digit detected(4)
*Apr 7 12:39:44.459: Mica Modem(1/3): Rcvd Digit detected(4)
*Apr 7 12:39:44.523: Mica Modem(1/3): Rcvd Digit detected(4)
*Apr 7 12:39:44.639: Mica Modem(1/3): Rcvd Digit detected(5)
*Apr 7 12:39:44.763: Mica Modem(1/3): Rcvd Digit detected(5)
*Apr 7 12:39:44.883: Mica Modem(1/3): Rcvd Digit detected(5)
*Apr 7 12:39:44.943: Mica Modem(1/3): Rcvd Digit detected(6)
*Apr 7 12:39:45.063: Mica Modem(1/3): Rcvd Digit detected(6)
*Apr 7 12:39:45.183: Mica Modem(1/3): Rcvd Digit detected(6)
*Apr 7 12:39:45.243: Mica Modem(1/3): Rcvd Digit detected(B)
*Apr 7 12:39:45.243: CSM_PROC_IC2_COLLECT_ADDR_INFO: CSM_EVENT_DNIS_COLLECTED
(DNIS=111222333444555666, ANI=) at slot 1, port 3
*Apr 7 12:39:45.363: Mica Modem(1/0): Rcvd Digits Generated
*Apr 7 12:39:45.891: neat msg at slot 0: (0/0): Tx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:45.907: neat msg at slot 0: (1/0): Rx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:46.115: neat msg at slot 0: (0/0): Tx LOOP_OPEN (ABCD=0101)
*Apr 7 12:39:46.131: neat msg at slot 0: (1/0): Rx LOOP_OPEN (ABCD=0101)
*Apr 7 12:39:46.175: CSM_RX_CAS_EVENT_FROM_NEAT:(A001): EVENT_START_TX_TONE at
slot 1 and port 0
*Apr 7 12:39:46.175: CSM_PROC_OC4_DIALING: CSM_EVENT_DSX0_START_TX_TONE at slot 1,
port 0
*Apr 7 12:39:46.175: Mica Modem(1/0): Generate digits:called_party_num= len=3
*Apr 7 12:39:46.267: Mica Modem(1/3): Rcvd Digit detected(#)
*Apr 7 12:39:46.387: Mica Modem(1/3): Rcvd Digit detected(A)
*Apr 7 12:39:46.447: Mica Modem(1/3): Rcvd Digit detected(B)
*Apr 7 12:39:46.447: CSM_PROC_IC2_COLLECT_ADDR_INFO: CSM_EVENT_ADDR_INFO_COLLECTED
(DNIS=111222333444555666, ANI=) at slot 1, port 3
*Apr 7 12:39:46.507: Mica Modem(1/0): Rcvd Digits Generated
*Apr 7 12:39:46.507: CSM_PROC_OC4_DIALING: CSM_EVENT_ADDR_INFO_COLLECTED at slot 1,
port 0
*Apr 7 12:39:47.127: CSM_RX_CAS_EVENT_FROM_NEAT:(0004): EVENT_CHANNEL_CONNECTED at
slot 1 and port 3
*Apr 7 12:39:47.127: CSM_PROC_IC4_WAIT_FOR_CARRIER: CSM_EVENT_DSX0_CONNECTED at
slot 1, port 3
*Apr 7 12:39:47.127: Mica Modem(1/3): Link Initiate
```

```
*Apr 7 12:39:47.131: neat msg at slot 0: (0/0): Tx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:47.147: neat msg at slot 0: (1/0): Rx LOOP_CLOSURE (ABCD=1101)
*Apr 7 12:39:47.191: CSM_RX_CAS_EVENT_FROM_NEAT:(A001): EVENT_CHANNEL_CONNECTED at
slot 1 and port 0
*Apr 7 12:39:47.191: CSM_PROC_OC5_WAIT_FOR_CARRIER: CSM_EVENT_DSX0_CONNECTED at
slot 1, port 0
*Apr 7 12:39:47.191: Mica Modem(1/0): Link Initiate
*Apr 7 12:39:47.227: Mica Modem(1/3): State Transition to Connect
*Apr 7 12:39:47.287: Mica Modem(1/0): State Transition to Connect
*Apr 7 12:39:49.103: Mica Modem(1/0): State Transition to Link
*Apr 7 12:39:52.103: Mica Modem(1/3): State Transition to Link
*Apr 7 12:40:00.927: Mica Modem(1/3): State Transition to Trainup
*Apr 7 12:40:00.991: Mica Modem(1/0): State Transition to Trainup
*Apr 7 12:40:02.615: Mica Modem(1/0): State Transition to EC Negotiating
*Apr 7 12:40:02.615: Mica Modem(1/3): State Transition to EC Negotiating
CONNECT 31200 /V.42/V.42bis
5800>
*Apr 7 12:40:05.983: Mica Modem(1/0): State Transition to Steady State
*Apr 7 12:40:05.983: Mica Modem(1/3): State Transition to Steady State+++
OK
ath
*Apr 7 12:40:09.167: Mica Modem(1/0): State Transition to Steady State Escape
*Apr 7 12:40:10.795: Mica Modem(1/0): State Transition to Terminating
*Apr 7 12:40:10.795: Mica Modem(1/3): State Transition to Terminating
*Apr 7 12:40:11.755: Mica Modem(1/3): State Transition to Idle
*Apr 7 12:40:11.755: Mica Modem(1/3): Went onhook
*Apr 7 12:40:11.755: CSM_PROC_IC5_OC6_CONNECTED: CSM_EVENT_MODEM_ONHOOK at slot 1,
port 3
*Apr 7 12:40:11.755: VDEV_DEALLOCATE: slot 1 and port 3 is deallocated
*Apr 7 12:40:11.759: neat msg at slot 0: (0/0): Tx LOOP_OPEN (ABCD=0101)
*Apr
OK
7 12:40:11.767: neat msg at slot 0: (1/0): Rx LOOP_OPEN (ABCD=0101)
*Apr 7 12:40:12.087: neat msg at slot 0: (1/0): Tx LOOP_OPEN (ABCD=0101)
*Apr 7 12:40:12.091: neat msg at slot 0: (0/0): Rx LOOP_OPEN (ABCD=0101)
*Apr 7 12:40:12.111: CSM_RX_CAS_EVENT_FROM_NEAT:(A001): EVENT_CALL_IDLE at slot 1
and port 0
*Apr 7 12:40:12.111: CSM_PROC_IC5_OC6_CONNECTED: CSM_EVENT_DSX0_DISCONNECTED at
slot 1, port 0
*Apr 7 12:40:12.111: Mica Modem(1/0): Link Terminate(0x6)
*Apr 7 12:40:12.779: Mica Modem(1/3): State Transition to Terminating
*Apr 7 12:40:12.839: Mica Modem(1/3): State Transition to Idle
*Apr 7 12:40:13.495: Mica Modem(1/0): State Transition to Idle
*Apr 7 12:40:13.495: Mica Modem(1/0): Went onhook
```

```
*Apr 7 12:40:13.495: CSM_PROC_IC6_OC8_DISCONNECTING: CSM_EVENT_MODEM_ONHOOK at slot
1, port 0
*Apr 7 12:40:13.495: VDEV_DEALLOCATE: slot 1 and port 0 is deallocated
5800#disc
Closing connection to 1.19.36.7 [confirm]
5800#
*Apr 7 12:40:18.783: Mica Modem(1/0): State Transition to Terminating
*Apr 7 12:40:18.843: Mica Modem(1/0): State Transition to Idle
5800#
```

Related Command

cas-group

What to Do Next

For information on how to configure access servers, refer to the chapters, “Overview of Lines, Interfaces, and Controllers on Cisco Routers” and “Configuring Channelized E1 and Channelized T1,” in the *Dial Solutions Configuration Guide* for Cisco IOS Release 11.3.

Refer to the following publications for additional software configuration information:

- *Cisco AS5800 Universal Access Server Software Installation and Configuration Guide*
- *Release Notes for the Cisco AS5800 Access Server for Cisco IOS Release 11.3 T*