CISCO SYSTEMS

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Cisco IOS Release 11.1(474) Release Note and Update to Configuration Guides and Command References for the Cisco AS5200

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This document supplements the Cisco IOS Release 11.1 documentation set with new and changed commands that support the Cisco AS5200. Cisco IOS Release 11.1(474) supports the AS5200. This document discusses the software requirements for the AS5200 and also provides configuration tasks and command reference documentation for the new features available on the AS5200. It is divided into the following sections:

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Use this document in conjunction with the *Release Notes for Cisco IOS Release 11.1* and the Cisco IOS Release 11.1 configuration guide and command reference publications, specifically the *Configuration Fundamentals Configuration Guide*, *Configuration Fundamentals Command*

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Reference, *Access Services Configuration Guide*, *Access Services Command Reference*, and the *Debug Command Reference*. In addition, the *12-Port Modem AT Command Set and Register Summary* publication, part of the AS5200 documentation set, is also referenced in this update.

Release Note

Platform Support

Cisco IOS Release 11.1(474) supports the following platform:

- AS5200

Refer to "Cisco Connection Online (CCO), formerly Cisco Information Online (CIO), is Cisco Systems' primary, real-time support channel. Maintenance customers and partners can self-register on CCO to obtain additional content and services." at the end of this publication for lists of supported interfaces.

Cisco IOS Packaging

The following feature sets are available for the AS5200. Refer to "Feature Sets" at the end of this publication for a complete list of the features provided in these sets.

- IP/Managed Modems
- Desktop/Managed Modems
- Enterprise/RMON/Managed Modems

Boot ROM Requirements

The AS5200 requires boot ROMs of level 11.1(473) or higher.

Memory Requirements

The memory requirements for feature sets available for the AS5200 are shown in Table 1.

Table 1   Release 11.1(474) Memory Requirements

AS5200	Required Code Memory	Required Main Memory	Release 11.1 Runs from
IP/Managed Modems Set	8 MB Flash	8 MB RAM	Flash
Desktop/Managed Modems Set	8 MB Flash	8 MB RAM	Flash
Enterprise/RMON/ Managed Modems Set	8 MB Flash	8 MB RAM	Flash

LAN and WAN Interfaces Supported

Table 2 summarizes the LAN interfaces supported on the AS5200.

Table 3 summarizes the WAN data rates and interfaces supported on the AS5200.

Table 2   LAN Interfaces Supported

Interface	AS5200
Ethernet (AUI)	Yes
Ethernet (10BaseT)	—
Fast Ethernet (100BaseT)	—
4-Mbps Token Ring	—
16-Mbps Token Ring	—
FDDI DAS	—
FDDI SAS	—
FDDI multimode	—
FDDI single-mode	—
ATM Interface (AIP)	—
Channel Interface (CIP)	—
Parallel Channel Adapter (PCA)	—
ESCON Channel Adapter (ECA)	—
Versatile Interface (VIP)	—
Channelized E1/T1	Yes
Synchronous Serial	Yes

Table 3   WAN Data Rates and Interfaces Supported

	AS5200
Data Rate	
48/56/64 kbps	Yes
1.544/2.048 Mbps	Yes
34/45/52 Mbps	—
Interface	
EIA/TIA -232	Yes
X.21	Yes
V.35	Yes
EIA/TIA-449	Yes
EIA-530	Yes
EIA/TIA-613 (HSSI)	—
ISDN BRI	—
ISDN PRI	Yes
E1-G.703/G.704	Yes

Feature Sets

Table 4 lists the feature sets for the AS5200.

Table 4   Cisco AS5200 Software Feature Sets

Feature	Feature Set		
	IP/Managed Modems	Desktop/ Managed Modems	Enterprise/RMON/ Managed Modems
SNMP	Yes	Yes	Yes
RMON[1]	—	—	Yes
Asynchronous support (SLIP)	Yes	Yes	Yes
CSLIP	Yes	Yes	Yes
ARA Protocol	—	Yes	Yes
Frame Relay	Yes	Yes	Yes
SMDS	Yes	Yes	Yes
X.25	Yes	Yes	Yes
ISDN	Yes	Yes	Yes
PPP	Yes	Yes	Yes
CPPP	Yes	Yes	Yes
HDLC	Yes	Yes	Yes
IP	Yes	Yes	Yes
RIP	Yes	Yes	Yes
RIPv2	Yes	Yes	Yes
IGRP	Yes	Yes	Yes
Enhanced IGRP	Yes	Yes	Yes
OSPF	Yes	Yes	Yes
BGP	Yes	Yes	Yes
EGP	Yes	Yes	Yes
PIM	Yes	Yes	Yes
NHRP	Yes	Yes	Yes
ES-IS	—	—	Yes
IS-IS	—	—	Yes
Snapshot routing	Yes	Yes	Yes
NTP	Yes	Yes	Yes
Bridging (transparent and translational)	Yes	Yes	Yes
Multiring	Yes	Yes	Yes
LAN extension host	Yes	Yes	Yes
IPX	—	Yes	Yes
NLSP	—	Yes	Yes
IPXWAN 2.0	—	Yes	Yes
RTMP	—	Yes	Yes
SMRP	—	Yes	Yes
SRTP	—	—	Yes

Feature	Feature Set		
	IP/Managed Modems	Desktop/ Managed Modems	Enterprise/RMON/ Managed Modems
AppleTalk Versions 1 and 2	—	Yes	Yes
AURP	—	Yes	Yes
DECnet IV	—	Yes	Yes
DECnet V	—	—	Yes
Apollo Domain	—	—	Yes
Banyan VINES	—	—	Yes
ISO CLNS	—	—	Yes
XNS	—	—	Yes
Lock-and-Key	Yes	Yes	Yes
MD5 routing authentication	Yes	Yes	Yes
Kerberized login	—	—	Yes
V.120	—	—	Yes
SRB	—	—	Yes
RSRB	—	—	Yes
APPN	—	—	—
FRAS BAN	—	—	Yes
DLSw (RFC 1795)	—	—	Yes
DLSw+	—	—	Yes
SDLC	—	—	Yes
SDLLC	—	—	Yes
STUN	—	—	Yes
TG/COS	—	—	Yes
QLLC	—	—	Yes
Bisync	—	—	Yes
DSPU	—	—	Yes
NetView Native Service Point	—	—	Yes
Protocol translation	—	—	Yes
TN3270	—	—	Yes
LAT	—	—	Yes
SRT bridging	—	—	Yes
XRemote	—	—	Yes
Telnet	Yes	Yes	Yes
PAD	Yes	Yes	Yes
AutoInstall	Yes	Yes	Yes
Modem autoconfiguring	—	—	Yes
Router monitoring	Yes	Yes	Yes

Feature	Feature Set		
	IP/Managed Modems	Desktop/ Managed Modems	Enterprise/RMON/ Managed Modems
DHCP	Yes	Yes	Yes
NASI	—	—	—
NetBEUI over PPP	—	—	—
RADIUS	Yes	Yes	Yes
Modem Management	Yes	Yes	Yes

1. All feature sets include RMON alarm and events groups. Full, nine-group RMON support is included in the feature sets indicated.

Update to Configuration Guides

The documentation in the sections below supplements the *Configuration Fundamentals Configuration Guide* and the *Access Services Configuration Guide*. Pointers to chapter titles and sections are shown in *italic* typeface.

Add the "Enable Digital and Analog Users to Access Network Resources" section and the "Configure Integrated Modems" section to the "Configuring Terminal Lines and Modem Support" chapter of the Access Services Configuration Guide.

Enable Digital and Analog Users to Access Network Resources

The Cisco AS5200 supports the needs of the following users:

- Small office or home users who use analog modems to dial in from disparate locations. These incoming analog calls enter the T1 PRI interface, connect to an integrated AS5200 modem, and access network resources.

- Telecommuters and central offices who are increasingly using ISDN Basic Rate Interface (BRI), ISDN Primary Rate Interface (PRI), and ISDN digital modems to access enterprise networks. These incoming digital data connections and calls enter the T1 PRI interface and directly connect to network resources.

Figure 1 shows how the AS5200 services these types of users.

Figure 1   Cisco AS5200 Topology
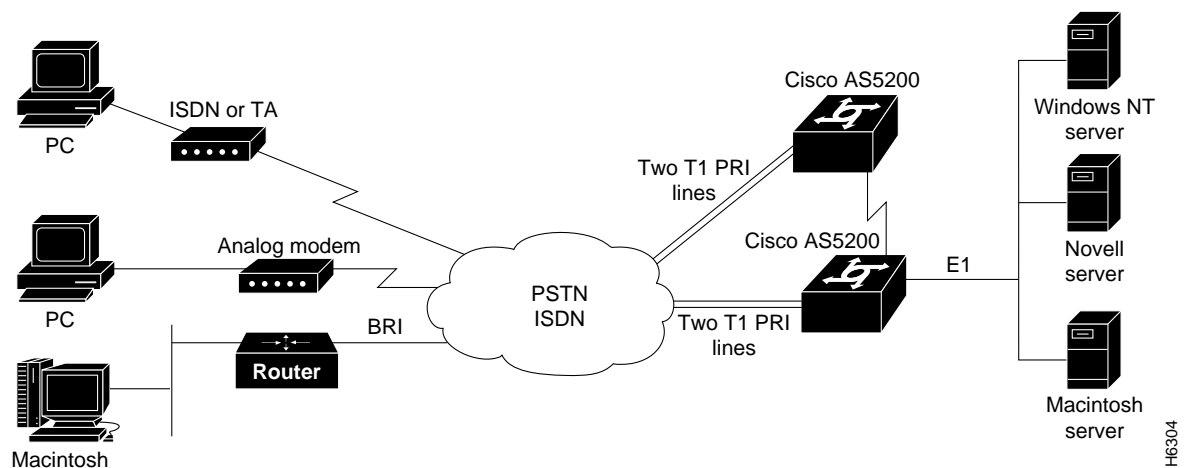
Configure Integrated Modems

You can configure asynchronous services with the Cisco AS5200 using the Cisco IOS software. To access, monitor, test, and manage integrated modems, perform the tasks in the following sections:

- Understand and Locate Integrated Modems

- Monitor Modems and Enable Modem Events

- Troubleshoot and Manage Modems

- Send AT Commands to Manageable Modems

- Poll Manageable Modems

- Download Modem Firmware

Understand and Locate Integrated Modems

The Cisco AS5200 contains integrated V.34 modems that are *manageable* (also known as *select*) or *nonmanageable* (also known as *reliable*). Each manageable modem has one out-of-band port, which is used for polling modem statistics and creating a directly connected session for transmitting attention (AT) commands. Nonmanageable modems do not have out-of-band ports. As you use this document, note which commands apply to manageable versus nonmanageable modems.

Incoming ISDN and analog calls access the AS5200 through the dual T1 PRI interfaces. Unlike digital calls, incoming analog calls are first terminated and then converted to digital data at the modem card.

Each TTY line is directly mapped to an integrated AS5200 modem as shown in Table 5. The TTY lines 1 through 24 directly connect to modems 1/0 through 1/23, which are installed in the first chassis slot. The TTY lines 25 through 48 directly connect to modems 2/0 through 2/23, which are installed in the second chassis slot.

Table 5   TTY Lines Associated to Integrated AS5200 Modems

TTY Line	Slot/ Modem Port Number	TTY Line	Slot/ Modem Port Number
1	1/0	25	2/0
2	1/1	26	2/1
3	1/2	27	2/2
4	1/3	28	2/3
5	1/4	29	2/4
6	1/5	30	2/5
7	1/6	31	2/6
8	1/7	32	2/7
9	1/8	33	2/8
10	1/9	34	2/9
11	1/10	35	2/10
12	1/11	36	2/11
13	1/12	37	2/12
14	1/13	38	2/13
15	1/14	39	2/14
16	1/15	40	2/15
17	1/16	41	2/16
18	1/17	42	2/17
19	1/18	43	2/18
20	1/19	44	2/19
21	1/20	45	2/20
22	1/21	46	2/21
23	1/22	47	2/22

TTY Line	Slot/ Modem Port Number	TTY Line	Slot/ Modem Port Number
24	1/23	48	2/23

Note   Table 5 reflects the modem mapping for a Cisco AS5200 using 48 integrated modems. If the first chassis slot in the access server is not occupied by a modem card, the TTY lines 1 to 24 connect to modems 2/0 through 2/23.

The following example shows TTY line 3 directly connected to modem 1/2, which is the third modem port in the first chassis slot:

```
AS5200# show modem 1/2
Mdm Typ  Status   Tx/Rx       G  Duration TX  RX  RTS  CTS  DSR  DCD  DTR
1/2 VFC  Bad*     19200/19200 0  00:17:11  x   x   x    x    x    x    x

Modem 1/2, AS5200 Manageable Modem, TTY3
Firmware (Boot) Rev: 1.0.23(1.0.5)
Modem config: Incoming and Outgoing
Protocol: Normal, Compression: None
Management config: status and AT session polling
TX signals: -17 dBm, RX signals: -33 dBm

    0 incoming completes, 0 incoming failures,
    0 outgoing completes, 0 outgoing failures,
    0 failed dial attempts, 0 ring no answers, 0 busied outs
    0 no dial tones, 0 dial timeouts, 0 watchdog timeouts
    0 no carriers, 0 link failures, 1 resets
    0 protocol timeouts, 0 protocol errors, 0 lost events


                    2400-       2400-14400    14400+
# of connections      0             0            0

Mdm Typ  Status   Tx/Rx       G  Duration TX  RX  RTS  CTS  DSR  DCD  DTR
```

Monitor Modems and Enable Modem Events

You can view various modem statistics and configure modem events using the Cisco IOS software with the Cisco AS5200.

Show Modem Performance

To show modem performance statistics, perform the following tasks in EXEC mode:

Task	Command
Show various performance statistics for a modem or group of modems.	**show modem** [*slot/modem-port* | **group** *number*]
Show the call switching module status for a modem or group of modems.	**show modem csm** [*slot/modem-port* | **group** *number*]
Show the event log status for a modem or group of modems.	**show modem log** [*slot/modem-port* | **group** *number*][1]
Display the cumulative system statistics for all modems installed in the access server.	**show modem summary**[1]
Display all directly connected AT sessions active on the access server.	**show modem at-mode**[1]

1. This command does not apply to nonmanageable modems.

To create an asynchronous interface and use it as a group interface associated with a group of modems, refer to the "Configuring Interfaces" chapter in the *Configuration Fundamentals Configuration Guide*.

Enable Incoming and Outgoing Voice Calls

To enable incoming ISDN voice calls to access the AS5200 call switch module and integrated modems, perform the following task in interface configuration mode:

Task	Command
Enable ISDN voice calls to dial into and dial out of the AS5200.	**isdn incoming-voice modem**[1]

1. Without configuring this command, the voice calls cannot be routed to the internal modems.

Incoming ISDN digital calls are unaffected by this command.

See the "AS5200 Configuration Examples" section for the "ISDN Voice Calls Example" and the "Allocating Channels for Channelized T1."

Set Modem Recovery Time

To set the maximum amount of time the call switching module waits for a local modem to respond to a request before it is considered locked in a suspended state, perform the following task in global configuration mode:

Task	Command
Set maximum time local modems will wait for a response. The default is 5 minutes.	**modem recovery-time** *minutes*

This command does not apply to nonmanageable modems.

After the call switching module resets a suspended modem, the module recovers to a default call switching module state.

Set Modem Event Buffer

To configure the size of the history event queue buffer for manageable modems in the access server, perform the following task in global configuration mode:

Task	Command
Define the number of modem events that each modem is able to store. The default is 100 events for each modem.	**modem buffer-size** *number*

This command does not apply to nonmanageable modems.

Use the **show modem log** command to view modem events.

Troubleshoot and Manage Modems

This section describes how to troubleshoot the integrated modems and remove them from dial-up connection services.

Perform a Modem Startup Test

To perform diagnostic testing on all the installed modems during the system's initial power-up or rebooting process, perform the following task in global configuration mode:

Task	Command
Perform diagnostic testing for all modems.	**modem startup-test**

The results of the modem startup test are displayed in the *Status* column of the **show modem** command's output. Modems that pass the diagnostic test are marked as *Idle*, *Busy*, *Downloading*, and *Reset*. Modems that fail the diagnostic test are marked as *Bad**. These modems cannot be used for call connections. Depending on how many modems are installed, this diagnostic test may take from 5 to 15 minutes to complete.

Perform additional testing on an inoperative modem by executing the **test modem back-to-back** command. The **no modem startup-test** command disables startup testing.

See the "AS5200 Configuration Examples" section for the "Modem Startup Test Example."

Test Two Modems Back-to-Back

Perform additional testing on a modem suspected of being inoperable by conducting a series of internal back-to-back connections and data transfers between two modems. All modem test connections occur inside the access server. For example, if mobile users cannot dial into modem 2/5, which is the sixth modem port on the modem board in the second chassis slot, attempt a back-to-back test with modem 2/5 and a known functioning modem such as modem 2/6.

Use the following command in EXEC mode to perform internal back-to-back modem tests between two modems:

Task	Command
Perform internal back-to-back modem tests between two modems.	**test modem back-to-back** *first-slot/modem-number second-slot/modem-number*

You might need to enable this command on several different combinations of modems to determine which one is not functioning properly. A pair of operable modems successfully connect and complete transmitting data in both directions. An operable modem and an inoperable modem do not successfully connect with each other.

See the "AS5200 Configuration Examples" section for the "Back-to-Back Modem Test Example."

Remove Inoperable Modems from Service

To remove modems from service and indicate them as suspected or proven to be inoperable, perform the following task in line configuration mode:

Task	Command
Specify a modem as inoperable.	**modem bad**

If you mark a *single* modem as inoperable using this command, it appears as *Bad*—without the asterisk (*)—in the *Status* column of the **show modem** command's output for that particular modem. A modem marked inoperable by the **modem startup-test** command appears as *Bad** in the **show modem** command output for that particular modem. Use the **no modem bad** command to unmark a modem as *Bad** or *Bad* and restore it for dial-up connection services.

See the "AS5200 Configuration Examples" section for the "Inoperable Modem Example."

Hold and Reset a Modem

To reset and isolate the modem hardware for extensive troubleshooting, perform the following task in line configuration mode:

Task	Command
Reset and isolate the modem hardware.	**modem hold-reset**

Use this command if you are experiencing extreme modem behavior (for example, if the modem is uncontrollably dialing into the network). This command prevents the modem from establishing software relationships such as those created by the **test back-to-back modem** command and the **modem startup-test** command. The modem is unusable while the **modem hold-reset** command is configured.

This command is also used to reset a modem that is frozen in a suspended state. Disable the suspended modem with the **modem hold-reset** command, and then restart hardware initialization with the **no modem hold-reset** command.

A modem decommissioned by the **modem hold-reset** command does not accept modem firmware upgrades using the **copy modem** command.

See the "AS5200 Configuration Examples" section for the "Hold and Reset Modem Example."

Disable a Modem from Dial-Up Services

To disable modems from dialing or answering calls, perform one of the following tasks in line configuration mode:

Task	Command
Gracefully disable a modem from dial-up services.	**modem busyout**
Abruptly shut down a modem from dial-up services.	**modem shutdown**

The **modem busyout** command is not executed until the active modem is idle. No active connections are interrupted when you use this command. In contrast, the **modem shutdown** command immediately terminates all active connections on the specified modem. The resulting modem status for both these commands is the same.

Enable the **no** form of these commands to restore a modem for dial-up services.

You can still configure the following commands on a disabled modem:

- **test modem back-to-back**
- **clear modem**
- **modem bad**
- **copy modem**

See the "AS5200 Configuration Examples" section for the "Disable Modem Examples."

Debug a Modem

To debug a modem or group of modems, perform the following tasks in EXEC mode:

Task	Command
Debug a modem's out-of-band port, which is used to poll modem events.	**debug modem oob** [*slot/modem-port*	**group** *group-number*]
Debug a call switching module, which is used to connect calls.	**debug modem csm** [*slot/modem-port*	**group** *group-number*]
Debug the call trace, which determines why calls are terminated. Use this keyword only with manageable modems. Upload the call trace on **normal**, **abnormal**, or **all** call terminations.	**debug modem trace** [**normal**	**abnormal**	**all**] [*slot/modem-port*	**group** *group-number*]

Use the **debug modem** command to do the following:

- Debug the out-of-band port, which is used for polling modem events
- Debug the call switching module, which is used to connect calls
- Debug the uploaded modem call trace to the syslog server, which determines why calls are terminated

To create an asynchronous interface and use it as a group interface associated with a group of modems, refer to the "Configuring Interfaces" chapter in the *Configuration Fundamentals Configuration Guide*.

See the "AS5200 Configuration Examples" section for the "Debug Modem Example."

Send AT Commands to Manageable Modems

Each AS5200 manageable modem has one out-of-band port, which is used to poll modem statistics and transmit AT commands. The Cisco IOS software uses a directly connected session to transfer information to an out-of-band port. To transfer AT commands, you must permit a directly connected session on a modem, open a directly connected session and send AT commands to a modem, and clear a directly connected session from a modem.

Note   This section does not apply to nonmanageable modems, which do not have out-of-band ports.

Permit a Directly Connected Session

To permit a manageable modem to accept a directly connected session, which is enabled by default on all modems, perform the following task in line configuration mode:

Task	Command
Permit a modem to accept a directly connected session.	**modem at-mode-permit**

The **no modem at-mode-permit** command disables a modem from accepting a direct connection, which is useful for ensuring modem security.

See the "AS5200 Configuration Examples" section for the "Directly Connected Session Example."

Open a Directly Connected Session and Transmit AT Commands

To open a directly connected session and enable AT command mode, which is needed to transmit to a manageable modem, perform the following command in EXEC mode:

Task	Command
Open a directly connected session and enter AT command mode.	**modem at-mode** *slot/modem-port*

Once you enable this command, you can transmit AT commands directly from your terminal session. Most incoming or outgoing calls on the modem are not interrupted when you open a directly connected session and transmit AT commands. However, some AT commands interrupt a call—for example, the **ATH** AT command, which hangs up a call.

Open and close one directly connected session at a time. Multiple open directly connect sessions slow down modem performance.

Refer to the *12-Port Modem AT Command Set and Register Summary* publication (part of the AS5200 documentation set) for a complete list of AT commands that you can transmit.

See the "AS5200 Configuration Examples" section for the "Transmit AT Command Example."

Clear a Directly Connected Session

You can clear or terminate an active directly connected session in two ways:

— Press **Ctrl-C** after transmitting all AT commands as instructed by the system when you enter AT command mode.

— Enter a second Telnet session and enable the **clear modem at-mode** *slot/modem-port* command in EXEC configuration mode. This method is used for closing a directly connected session that may have been mistakenly left open by the first Telnet session.

See the "AS5200 Configuration Examples" section for the "Clear Session from a Second Telnet Session Example."

Poll Manageable Modems

Each manageable modem has one out-of-band port, which is used for polling modem statistics.

Note   This section does not apply to nonmanageable modems, which do not have out-of-band ports.

Set Time Interval between Polls

To set the time interval between the polls that are sent to the local modems for reporting modem status and statistics, perform the following task in global configuration mode:

Task	Command
Specify the number of seconds between polls. The default is 12 seconds.The configuration range is 2 to 120 seconds.	**modem poll time** *seconds*

See the "AS5200 Configuration Examples" section for the "Time Interval Example."

Poll for Modem Statistics

To poll for a modem's status and statistics through its out-of-band port, perform the following task in line configuration mode:

Task	Command
Poll for a modem's status and statistics.	**modem status-poll**

The **no modem status-poll** command disables status polling through the out-of-band port for a specified modem.

See the "AS5200 Configuration Examples" section for the "Modem Polling Example."

Set Polling Attempts

To set the maximum number of polling attempts used to retrieve a local modem's status or statistics, perform the following task in global configuration mode:

Task	Command
Set maximum number of polling attempts. The default is three polling attempts. The configuration range is from 0 to 10 attempts.	**modem poll retry** *number*

If the number of attempts to retrieve modem status or statistics exceeds the *number* you define, the out-of-band port is removed from operation. In this case, you must reset the modem hardware using the **clear modem** command.

See the "AS5200 Configuration Examples" section for the "Polling Attempts Example."

Download Modem Firmware

To download firmware to modems in the access server, perform one of the following tasks in EXEC mode:

Task	Command
Copy modem firmware from Flash memory to a modem.	**copy flash modem**
Copy modem firmware from a TFTP server to a modem.	**copy tftp modem**
Copy modem firmware remotely from a network server to a modem.	**copy rcp modem**

After you enter a command, you are prompted for the download destination, the remote host name, and the path leading to the source modem firmware as requested by the system software.

If a modem that you wish to upgrade is busy with a call when the **copy modem** command is enabled, the upgrade for that modem yields until the active call is dropped. All other idle modems in the upgrade range proceed with the downloading operation.

See the "AS5200 Configuration Examples" section for the "Download Firmware Examples."

Add the "Display an AS5200 Time Division Multiplexer" section to the "Configuring Interfaces" chapter of the Configuration Fundamentals Configuration Guide*.*

Display an AS5200 Time Division Multiplexer

The time division multiplexer (TDM) bus receives incoming digital data and digitized analog calls and redirects them to the PRI board and integrated modems. This section describes how to view a snapshot of the incoming TDM data and the internal TDM connections.

Display TDM Memory

Each TDM bus device in the Cisco AS5200 contains two types of memory: *connection memory* and *data memory*. The TDM data memory holds the inbound and outbound frames. Each frame has 32 channels to be processed. The TDM connection memory determines the internal hardware connections for each channel held in data memory.

Display TDM Connection Memory

To display a snapshot of the TDM bus connection memory's output, perform the following task in EXEC mode:

Task	Command
Display connection memory for the TDM.	**show tdm connections** [**motherboard**	**slot** *number*][1]

1. If you do not specify a keyword, all TDM connection information in the Cisco AS5200 is displayed.

Each TDM device has eight inputs and eight outputs. Each input and output is a serial stream of frames that has 32 channels (also known as *timeslots*) of data. The channel destinations held in connection memory are displayed in hexadecimal numbers. The five least significant bits represent the source channel. The three most significant bits represent the source stream (also known as the *source frame*). Up to eight streams and 32 possible channels per stream can be switched by each TDM device.

When an inbound modem call is received, the call switching module notifies the TDM driver to connect the inbound channel to a given modem. The call switching module is responsible for managing which modem gets chosen from the modem pool.

The **show tdm connections** command shows the connection memory for all TDM connections in the access server if you do not limit the display to the motherboard or a slot.

See the "AS5200 Configuration Examples" section for the "TDM Connection Memory Example."

Display TDM Data Memory

To display a snapshot of the TDM bus data memory, which receives and processes incoming frames and channels from the network, perform the following task in EXEC mode:

Task	Command
Display a snapshot of the TDM data memory.	**show tdm data** [**motherboard**	**slot** *number*][1]

1. If you do not specify a keyword, all TDM data information in the Cisco AS5200 is displayed.

See the "AS5200 Configuration Examples" section for the "TDM Data Memory Example."

Debug TDM

To display TDM bus connection information each time a connection is made, such as between the PRI card and a modem card, perform the following task in EXEC mode:

Task	Command
Display source and destination connection information. One TDM device exists on the PRI board, on the motherboard, and on each modem board.	**debug tdm**

Expect up to 256 TDM connections to be displayed on your terminal when this command is enabled.

Add the "Configure Channelized T1 on the Cisco AS5200" section to the "Configuring Terminal Lines and Modem Support" chapter of the Access Services Configuration Guide.

Configure Channelized T1 on the Cisco AS5200

The Cisco AS5200 Universal Access Server is an ISDN-capable access server that can make and receive ISDN and analog calls from remote clients needing access to network resources. The Cisco AS5200 has two T1 controllers, which can be configured individually.

On a Cisco AS5200, you can allocate the 24 available channels for channelized T1 in the following four ways:

1 All 24 channels can be configured to support ISDN PRI.

2 If you are not running PRI ISDN, all channels can be configured to support channel-associated signaling (also known as *robbed-bit signaling*), which enables an AS5200 modem to receive and make analog calls.

3 All 24 channels can be configured in a single channel group.

4 Mix and match channels supporting ISDN PRI, robbed bit signalling, and channel grouping across the same T1 line.

For example, on the same channelized T1 you can configure the **pri-group timeslots 1-10** command, **channel-group 11 timeslots 11-16** command, and **cas-group 17 timeslots 17-23** command. This is a rare configuration, because it requires you to align the correct range of timeslots on both ends of the connection.

To configure the T1 controllers in the Cisco AS5200, perform the tasks in the following sections:

- Configure the T1 Controllers to Make and Receive Calls
- Configure the ISDN D-Channel Serial Interfaces

Configure the T1 Controllers to Make and Receive Calls

Set parameters for a T1 controller to make and receive calls. To do so, perform the following steps beginning in global configuration mode:

Task		Command
Step 1	Enable the T1 0 controller, and enter controller configuration mode.	**controller t1 0**
Step 2	If the channelized T1 line connects to a smart jack instead of a CSU, set pulse equalization (use parameter values specified by your telco).	**cablelength long** *dbgain-value dbloss-value*
Step 3	Set the framing to match your telco's offering, which in most cases is *esf*.	**framing esf**
Step 4	Set the line code type to match your telco's offering, which in most cases is *b8zs*	**linecode b8zs**
Step 5	Configure one T1 line to serve as the primary or most stable clock source line.	**clock source line primary** [1]

Task	Command
Step 6 Configure channels on this T1 controller for ISDN PRI.	**pri-group timeslots 1-24**
or	
If you are not running ISDN, configure channels to accept voice calls.	**cas-group 1 timeslots 1-24**
or	
If you are not running ISDN, configure channels for synchronous serial communications.	**channel-group 1 timeslots 1-24**
This step creates interfaces that you can configure.	
Step 7 Set the facilities data link exchange standard for the CSU, as specified by your service provider.	**fdl** {**att** | **ansi**}

1. Configure the other T1 line as the secondary clock source.

Repeat Steps 1 through 7 to configure T1 controller 1, making sure in Step 5 to select T1 controller 1's line as the secondary clock source. You do not have to configure the timeslots in the same way on the two T1 controllers. You can configure the timeslots on this second controller as needed, no matter how you configured the timeslots in T1 controller 0.

Configure the ISDN D-Channel Serial Interfaces

Once you create the interfaces,two corresponding D channel serial interfaces are automatically created. Serial interface 0:23 is the D channel for T1 controller 0, and serial interface 1:23 is the D channel for T1 controller 1. You must configure each serial interface to receive and make calls.

To configure an ISDN D-Channel serial interface, perform the following steps beginning in global configuration mode:

Task	Command
Step 1 Specify the D channel of the first PRI line.	**interface serial 0:23**
Step 2 Configure all incoming voice calls to go to the Cisco AS5200's integrated modems.	**isdn incoming-voice modem** [1, 2]
Step 3 Assign this interface to a dialer interface. The dialer interface's protocol characteristics apply to each interface assigned to it.	**dialer rotary-group** *number* [3]

1. Because some telcos charge more for ISDN data calls, you might want to configure the isdn incoming-voice isdn command to process ISDN calls as voice calls, which provides you with data service at a voice billing rate.
2. Native ISDN calls are directed like a protocol.
3. The address you will assign to the dialer interface is used for the hunt group provided by the phone comany.

Repeat Steps 1 through 3 for serial interface 1:23, which is the D channel on the second T1 controller.

Add the "Configure RMON for the AS5200" section to the "Managing the System" chapter in the Configuration Fundamentals Configuration Guide.

Configure RMON for the AS5200

To set a Remote Monitoring (RMON) alarm or event, perform one of the following tasks in global configuration mode:

Task	Command
Set an alarm on a MIB object.	**rmon alarm** *number variable interval* {**delta** | **absolute**} **rising-threshold** *value* [*event-number*] **falling-threshold** *value* [*event-number*] [**owner** *string*]
Add or remove an event in the RMON event table.	**rmon event** *number* [**log**] [**trap** *community*] [**description** *string*] [**owner** *string*]

You can set an alarm on any MIB object in the access server. To disable an alarm, you must enable the **no** form of this command on each alarm you configure. You cannot disable all the alarms you configure at once. Refer to RFC 1757 to learn more about alarms and events and how they interact with each other.

See the "AS5200 Configuration Examples" section for the "RMON Alarm and Event Examples."

Add the "AS5200 Configuration Examples" section to the "Configuring Terminal Lines and Modem Support" chapter of the Access Services Configuration Guide.

AS5200 Configuration Examples

The following section provides example AS5200 configurations, including a sample startup configuration:

- Sample Startup Configuration for the Cisco AS5200
- Allocating Channels for Channelized T1
- Back-to-Back Modem Test Example
- Clear Session from a Second Telnet Session Example
- Clock Source Example
- Debug Modem Example
- Directly Connected Session Example
- Disable Modem Examples
- Download Firmware Examples
- Inoperable Modem Example
- ISDN Voice Calls Example
- Hold and Reset Modem Example
- Modem Polling Example
- Modem Startup Test Example
- Polling Attempts Example
- Pulse Equalization Example
- RMON Alarm and Event Examples

- Time Interval Example

- Clock Source Example

- TDM Connection Memory Example

- TDM Data Memory Example

- Transmit AT Command Example

- Facilities Data-Link Example

Sample Startup Configuration for the Cisco AS5200

This section includes a complete start up configuration for the Cisco AS5200. This configuration includes a comprehensive setup for dialing in to IP, IPX, and AppleTalk networks.

Configuring Security

The following configuration establishes a base security and local database:

```
aaa new-model
aaa authentication login default local
aaa authentication login console none
aaa authentication ppp default if-needed local
username jojackso password 7 kjfow34899347xkccx
username wmays password 7 dfl;fd45065rgkv;lhnk
username bruth password 7 kldte40095565rgh89r9834
username hwilliam password 7 tyiewzl04540o3498c
!
```

Setting the ISDN Switch Type

The following global configuration command sets the ISDN switch type:

```
isdn switch-type primary-5ess
```

Configuring IP Dialin

The following commands configure the appropriate interfaces for IP dialin:

```
controller T1 0
 framing esf
 linecode b8zs
 clock source line primary
 pri-group timeslots 1-24
!
controller T1 1
 framing esf
 linecode b8zs
 clock source line secondary
 pri-group timeslots 1-24
!
interface Serial0:23
 isdn incoming-voice modem
 dialer rotary-group 1
!
interface Serial1:23
 isdn incoming-voice modem
 dialer rotary-group 1
!
interface Loopback0
```

```
 ip address 172.16.254.254 255.255.255.0
!
interface Ethernet0
 ip address 172.16.1.1 255.255.255.0
!
interface Group-Async1
 ip unnumbered Loopback0
 ip tcp header-compression passive
 encapsulation ppp
 async mode interactive
 peer default ip address pool default
 dialer-group 1
 dialer idle-timeout 3600
 ppp authentication pap chap default
 group-range 1 48
!
interface Dialer1
 ip unnumbered Loopback0
 encapsulation ppp
 peer default ip address pool default
 ip local pool default 172.16.254.1 172.16.254.48
 dialer in-band
 dialer-group 1
 dialer idle-timeout 3600
 ppp multilink
 ppp authentication chap pap default
```

Configuring Modem Lines

The following example configures modem lines 1 to 48:

```
line 1 48
 autoselect during-login
 autoselect pppmodem InOut
 modem autoconfigure type microcom_hdms
 transport input all
 stopbits 1
 rxspeed 57600
 txspeed 57600
 flowcontrol hardware
 login local
```

Assigning a Routing Protocol

The following commands configure enhanced IGRP:

```
router eigrp 202
 network 172.16.0.0
```

Configuring a Dialin Pool, Domain Name, DNS Server, and NBNS Server

The following commands configure a range of IP addresses in an IP address pool, a domain name, and name servers:

```
ip domain-name cisco.com
ip name-server 172.16.99.99
!
async-bootp dns-server 172.16.10.100 172.16.39.67
async-bootp nbns-server 172.16.200.200 172.16.201.200
```

Enabling IPX Dialin

The following commands enable IPX dialin:

```
dialer-list 1 protocol ip permit
ipx routing 0060.3ef1.6f74

interface Loopback0
 ipx network FEFEFE

interface Ethernet 0
 ipx network 123ABCD encapsulation SAP

interface Group-Async1
 group-range 1 48
 ipx ppp-client Loopback0

interface Dialer1
 ipx unnumbered loopback 0
 dialer map ipx FEFEFE.0000.0c00.1234 name stock
 dialer map ipx FEFEFE.0000.0c00.4567 name john
 dialer map ipx FEFEFE.0000.0c00.89AB name cisco
 dialer-list 1 protocol ipx permit
```

Configuring AppleTalk Dialin

The following commands enable users running PPP applications to dial in to an AppleTalk network:

```
appletalk routing
appletalk virtual-net 2 ATCP Zone
appletalk cable-range 1-1 1.120

appletalk zone Ethernet
appletalk client-mode
```

Allocating Channels for Channelized T1

You can configure the 24 channels of a channelized T1 to support ISDN PRI, robbed bit signaling, channel grouping, or a combination of all three.

Allocating all Channels for ISDN PRI

The following example shows you how to configure all 24 channels to support ISDN PRI on a Cisco AS5200:

```
AS5200(config)# controller T1 0
AS5200(config-controller)# pri-group timeslots 1-24
AS5200(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:4, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:5, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:6, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:7, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:8, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:9, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:10, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:11, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:12, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:13, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:14, changed state to down
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:15, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:16, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:17, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:18, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:19, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:20, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:21, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:22, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:23, changed state to up
%LINK-3-UPDOWN: Interface Serial1:23, changed state to up
```

Allocating all Channels for Robbed Bit Signaling

The following example shows you how to configure all 24 channels to support robbed bit signaling on a Cisco AS5200:

```
AS5200(config)# controller T1 0
AS5200(config-controller)# cas-group 1 timeslots 1-24
AS5200(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
```

Allocating all Channels to Server as One Channel Group

The following example shows you how to configure all 24 channels as one channel group on a Cisco AS5200:

```
AS5200(config)# controller T1 0
AS5200(config-controller)# channel-group 1 timeslots 1-24
AS5200(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:1, changed state to down
%LINK-3-UPDOWN: Interface Serial1:1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:1, changed state to up
```

Mixing and Matching Channels

The following example shows you how to configure all 24 channels to support a combination of ISDN PRI, robbed bit signaling, and channel grouping. The range of timeslots that you allocate must match the timeslot allocations that your central office chooses to use. This is a rare configuration due to the complexity of aligning the correct range of timeslots on both ends of the connection.

The following configuration creates serial interfaces 0 to 9, which correspond to ISDN PRI timeslots 1 to 10 (shown as serial 1:0 through serial 1:9). The serial line 1:23 is the D channel, which carries the analog signal bits that dial a modem's phone number and determine if a modem is busy or available. The D channel is automatically created and assigned to timeslot 24.

```
AS5200(config)# controller T1 0
AS5200(config-controller)# pri-group timeslots 1-10
AS5200(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:0, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:1, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:2, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:3, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:4, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:5, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:6, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:7, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:8, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:9, changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:23, changed state to up
%LINK-3-UPDOWN: Interface Serial1:23, changed state to up
```

Channelized T1 data is transmitted over timeslots 11 through 16, which are assigned to serial interface 1 and virtual channel group 11 (shown as serial 1:11) in the next configuration example. However, notice how the earlier attempt to configure channel group 1 is denied because timeslot 1 is used by the previous ISDN PRI group configuration:

```
AS5200(config-controller)# channel-group 1 timeslots 11-16
%Channel-group 1 is already an isdn channel
AS5200(config-controller)# channel-group 11 timeslots 11-16
AS5200(config-controller)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:11, changed state to down
AS5200(config-controller)#
%LINK-3-UPDOWN: Interface Serial1:11, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1:11, changed state to up
```

The channel associated signal E&M is configured on virtual signal group 17 for the remaining 17 to 23 timeslots, which are used for incoming and outgoing analog calls. There is no specific interface, such as the serial interface show in the earlier examples, that corresponds to the timeslot range. Notice how channel number 12 can not be used to configure these timeslots, because it is used in the previously configured channel group range, which is timeslots 11 to 16.

```
AS5200(config-controller)# cas-group 12 timeslots 17-23
The channel has been assigned to pri or channel-group
AS5200(config-controller)# cas-group 17 timeslots 17-23
AS5200(config-controller)#
```

Back-to-Back Modem Test Example

The first part of the following example shows a successful connection between modem 2/1 and modem 2/0, which verifies normal operating conditions between these two modems. However, when modem 2/1 is tested against modem 2/3, the back-to-back modem test fails. Therefore, modem 2/3 is suspected or proven to be inoperable. Modem 2/3 is removed from dial-up services through the use of the **modem bad** command on line 28.

```
AS5200# test modem back-to-back 2/1 2/0
```

```
Repetitions (of 10-byte packets) [1]: 10
AS5200#
%MODEM-5-B2BCONNECT: Modems (2/1) and (2/0) connected in back-to-back test: CONN
ECT9600/REL-MNP
%MODEM-5-B2BMODEMS: Modems (2/0) and (2/1) completed back-to-back test: success/
packets = 20/20
AS5200# test modem back-to-back 2/1 2/3
Repetitions (of 10-byte packets) [1]: 10
AS5200#
%MODEM-5-BADMODEMS: Modems (2/3) and (2/1) failed back-to-back test: NOCARRIER
AS5200# configure terminal
AS5200(config)# line 28
AS5200(config-line)# modem bad
AS5200(config-line)# end
```

Once you enter the **test modem back-to-back** command, you must define the number of packets transmitted between modems at the *Repetitions* prompt. The ideal range of packets to transmit and receive is from 1 to 100. The default is 1 packet. The response message (for example, "success/packets = 2/2") tells you how many packets were successfully sent in *both* directions compared to the total number of packets attempted to be sent in both directions. Because the software reports the packet total in both directions, the reported numbers are *two times* the number you originally specify.

Clear Session from a Second Telnet Session Example

The following example shows how to execute the **modem at-mode** command from a Telnet session:

```
AS5200# modem at-mode 1/1
```

The following example shows how to execute the **clear modem at-mode** command from a second Telnet session while the first Telnet session is connected to the modem:

```
AS5200# clear modem at-mode 1/1
clear "modem at-mode" for modem 1/1 [confirm]
AS5200#
```

The following output is displayed in the first Telnet session once the modem is cleared by the second Telnet session:

```
Direct connect session cleared by vty0 (171.69.1.164)
```

Clock Source Example

The following example configures the Cisco AS5200 to use the T0 controller for the primary clocking source and the T1 controller as the secondary clocking source:

```
AS5200(config)# controller t1 0
AS5200(config-if)# clock source line primary
AS5200(config)#
AS5200(config)# controller t1 1
AS5200(config-if)# clock source line secondary
```

Debug Modem Example

The following example is sample output from the **debug modem trace abnormal** command:

```
AS5200# debug modem trace abnormal 1/14

Modem 1/14 Abnormal End of Connection Trace. Caller 123-4567
    Start-up Response: AS5200 Modem, Firmware 1.0
    Control Reply: 0x7C01
```

```
DC session response: brasil firmware 1.0
RS232 event:
DSR=On, DCD=On, RI=Off, TST=Off
changes: RTS=No change, DTR=No change, CTS=No change
changes: DSR=No change, DCD=No change, RI=No change, TST=No change
Modem State event: Connected
Connection event: Speed = 19200, Modulation = VFC
Direction = Originate, Protocol = reliable/LAPM, Compression = V42bis
DTR event: DTR On
Modem Activity event: Data Active
Modem Analog signal event: TX = -10, RX = -24, Signal to noise = -32
End connection event: Duration = 10:34-11:43,
Number of xmit char =      67, Number of rcvd char = 88, Reason: Watchdog Time-out.
```

Directly Connected Session Example

The following example permits modem 1/1 on TTY line 1 to accept a directly connected session using the **modem at-mode-permit** command:

```
configure terminal
line 1
modem at-mode-permit
```

Disable Modem Examples

The following example gracefully disables the modem associated with line 1 from dialing and answering calls. The modem is disabled only after all active calls on the modem are dropped.

```
configure terminal
line 1
modem busyout
```

The following example abruptly shuts down the modem associated with line 2. All active calls on the modem are dropped immediately.

```
configure terminal
line 2
modem shutdown
```

Note You do not specify a *slot/modem-port* number with the **modem busyout** or **modem shutdown** commands. Instead you configure the asynchronous line associated with the modem.

Download Firmware Examples

The following example shows how to copy the modem firmware file called *modem_upgrade* from the TFTP server called *Modem_Server* to modem 2/0, which is installed in the Cisco AS5200:

```
AS5200# copy tftp modem
Modem Firmware Download Modem Numbers? 2/0
Address or name of remote host [UNKNOWN]? Modem_Server
Source file name? dirt/elem/modem_upgrade
Accessing file 'dirt/elem/modem_upgrade on Modem_Server...
Loading dirt/elem/modem_upgrade .from 223.255.254.254 (via Ethernet0): ! [OK]

Loading dirt/elem/modem_upgrade from 223.255.254.254 (via Ethernet0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 237503/278528 bytes]
```

```
AS5200#
%MODEM-5-DL_START: Modem (2/0) started firmware download
%MODEM-5-DL_GOOD: Modem (2/0) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```

Once the modem firmware successfully downloads, a response message reports the new version number of the installed modem firmware—for example Rev1.0.23/85.23/85—as shown the last line of this example.

The next time you use the **copy tftp modem** command, the interactive display shows the name of the previously accessed remote server as the default setting. For example, *Modem_Server* replaces *UNKNOWN* as shown in this example.

You might want to copy the file to one modem first for testing before copying the file to all the modems in the access server.

The following example shows how to download the same modem firmware file from the TFTP server Modem_Server to all the modems in the Cisco AS5200:

```
AS5200# copy tftp modem
Modem Firmware Download Modem Numbers? all
Address or name of remote host [UNKNOWN]? Modem_Server
Source file name? dirt/elem/modem_upgrade
Accessing file 'dirt/elem/modem_upgrade on Modem_Server...
Loading dirt/elem/modem_upgrade .from 223.255.254.254 (via Ethernet0): ! [OK]

Loading dirt/elem/modem_upgrade from 223.255.254.254 (via Ethernet0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 237503/278528 bytes]

AS5200#
%MODEM-5-DL_START: Modem (2/0) started firmware download
%MODEM-5-DL_START: Modem (2/1) started firmware download
%MODEM-5-DL_START: Modem (2/2) started firmware download
%MODEM-5-DL_START: Modem (2/3) started firmware download
%MODEM-5-DL_START: Modem (2/4) started firmware download
%MODEM-5-DL_START: Modem (2/5) started firmware download
%MODEM-5-DL_START: Modem (2/6) started firmware download
%MODEM-5-DL_START: Modem (2/7) started firmware download
%MODEM-5-DL_START: Modem (2/8) started firmware download
%MODEM-5-DL_START: Modem (2/9) started firmware download
%MODEM-5-DL_START: Modem (2/10) started firmware download
%MODEM-5-DL_START: Modem (2/11) started firmware download
%MODEM-5-DL_START: Modem (2/12) started firmware download
%MODEM-5-DL_START: Modem (2/13) started firmware download
%MODEM-5-DL_START: Modem (2/14) started firmware download
%MODEM-5-DL_START: Modem (2/15) started firmware download
%MODEM-5-DL_START: Modem (2/16) started firmware download
%MODEM-5-DL_START: Modem (2/17) started firmware download
%MODEM-5-DL_START: Modem (2/18) started firmware download
%MODEM-5-DL_START: Modem (2/19) started firmware download
%MODEM-5-DL_START: Modem (2/20) started firmware download
%MODEM-5-DL_START: Modem (2/21) started firmware download
%MODEM-5-DL_START: Modem (2/22) started firmware download
%MODEM-5-DL_START: Modem (2/23) started firmware download
%MODEM-5-DL_GOOD: Modem (2/2) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/10) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/4) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/6) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```

```
%MODEM-5-DL_GOOD: Modem (2/7) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/12) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/11) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/13) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/1) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/14) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/19) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/22) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/5) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/8) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/9) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/17) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/0) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/3) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/21) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/16) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/15) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/18) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/20) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/23) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```

Inoperable Modem Example

The first part of the following example shows a successful connection between modem 2/1 and modem 2/0, which verifies normal operating conditions between these two modems. However, when modem 2/1 is tested against modem 2/3, the back-to-back modem test fails. Therefore, modem 2/3 is suspected or proven to be inoperable. Modem 2/3 is removed from dial-up services through the use of the **modem bad** command on line 28 (see Table 5).

```
AS5200# test modem back-to-back 2/1 2/0
Repetitions (of 10-byte packets) [1]: 10
AS5200#
%MODEM-5-B2BCONNECT: Modems (2/1) and (2/0) connected in back-to-back test: CONN
ECT9600/REL-MNP
%MODEM-5-B2BMODEMS: Modems (2/0) and (2/1) completed back-to-back test: success/
packets = 20/20
AS5200# test modem back-to-back 2/1 2/3
Repetitions (of 10-byte packets) [1]: 10
AS5200#
%MODEM-5-BADMODEMS: Modems (2/3) and (2/1) failed back-to-back test: NOCARRIER
AS5200# configure terminal
AS5200(config)# line 28
AS5200(config-line)# modem bad
```

```
AS5200(config-line)# end
```

ISDN Voice Calls Example

The following example configures incoming and outgoing ISDN analog calls at the D channel serial interface:

```
AS5200(config)# interface serial 0:23
AS5200(config-if)# isdn incoming-voice modem
AS5200(config-if)#
```

Hold and Reset Modem Example

The following example disables a suspended modem and resets its hardware initialization:

```
configure terminal
line 4
modem hold-reset
no modem hold-reset
```

Modem Polling Example

The following example enables modem status polling through the out-of-band port connected to line 1:

```
configure terminal
line 1
modem status-poll
```

Modem Startup Test Example

The following example shows how to perform a startup test on the integrated AS5200 modems:

```
configure terminal
modem startup-test
```

Display the results of the modem-startup test after you reboot the system by enabling the **show modem** command as shown in the following example:

```
AS5200# show modem 2/3
   Mdm  Typ  Status   Tx/Rx       G  Duration TX  RX  RTS  CTS  DSR  DCD  DTR
   2/3  VFC  Bad*     19200/19200 0  00:17:11  x   x   x    x    x    x    x

Modem 2/3, AS5200 Manageable Modem, TTY4
Firmware (Boot) Rev: 1.0.23(1.0.5)
Modem config: Incoming and Outgoing
Protocol: Normal, Compression: None
Management config: status and AT session polling
TX signals: -17 dBm, RX signals: -33 dBm
```

Polling Attempts Example

The following example configures the server to attempt to retrieve statistics from a local modem up to five times before discontinuing the polling effort.

```
configure terminal
modem poll retry 5
```

Pulse Equalization Example

The following example increases the receiver gain by 26 decibels and decreases the transmitting pulse by 7.5 decibels:

```
AS5200(config)# controller t1 0
AS5200(config-controller)# cablelength long gain26 -7.5db
```

RMON Alarm and Event Examples

The following example enables the **rmon event** command:

```
rmon event 1 log trap eventtrap description "High ifOutErrors" owner sdurham
```

This example creates RMON event number 1, which is defined as *High ifOutErrors*, and generates a log entry when the event is triggered by an alarm. The user *sdurham* owns the row that is created in the event table by this command. This example also generates a Simple Network Management Protocol (SNMP) trap when the event is triggered.

The following example configures an RMON alarm using the **rmon alarm** command:

```
rmon alarm 10 ifOutErrors.1 20 delta rising-threshold 15 1 falling-threshold 0 owner
jjohnson
```

This example configures RMON alarm number 10. The alarm monitors the MIB variable *ifOutErrors.1* once every 20 seconds until the alarm is disabled, and checks the change in the variable's rise or fall. If the *ifOutErrors.1* value shows a MIB counter increase of 15 or more, such as from 100000 to 100015, the alarm is triggered. The alarm in turn triggers event number 1, which is configured with the **rmon event** command. Possible events include a log entry or a SNMP trap. If the *ifOutErrors.1* value changes by 0, the alarm is reset and can be triggered again.

Time Interval Example

The following example sets the time interval between polls to 10 seconds using the **modem poll time** configuration command:

```
configure terminal
modem poll time 10
```

TDM Connection Memory Example

The following example shows source stream 3 (ST3) channel 2 switched out of stream 6 (ST6) channel 2:

```
AS5200# show tdm connections motherboard
MT8980 motherboard unit 0, Control Register = 0x1F, ODE Register = 0x06
Connection Memory for ST6:
Ch0:  0x62, Ch1:  0x00, Ch2:  0x00, Ch3:  0x00
Ch4:  0x00, Ch5:  0x00, Ch6:  0x00, Ch7:  0x00
Ch8:  0x00, Ch9:  0x00, Ch10: 0x00, Ch11: 0x00
Ch12: 0x00, Ch13: 0x00, Ch14: 0x00, Ch15: 0x00
Ch16: 0x00, Ch17: 0x00, Ch18: 0x00, Ch19: 0x00
Ch20: 0x00, Ch21: 0x00, Ch22: 0x00, Ch23: 0x00
Ch24: 0x00, Ch25: 0x00, Ch26: 0x00, Ch27: 0x00
Ch28: 0x00, Ch29: 0x00, Ch30: 0x00, Ch31: 0x00
```

To interpret the hexadecimal number 0x62 into meaningful information, you must translate it into binary code. These two hexadecimal numbers represent a connection from any stream and a channel on any stream. The number 6 translates into the binary code 0110, which represents the third-source stream. The number 2 translates into the binary code 0010, which represents the second-source channel.

Stream 6 (ST6) channel 0 is the destination for source stream 3 (ST3) channel 2 in this example.

TDM Data Memory Example

The following example shows a snapshot of TDM bus memory where the normal ISDN idle pattern (0x7E) is present on all channels of the TDM device resident on the motherboard:

```
AS5200# show tdm data motherboard
MT8980 motherboard unit 0, Control Register = 0x1F, ODE Register = 0x06
Data Memory for ST0:
Ch0:  0x7E, Ch1:  0x7E, Ch2:  0x7E, Ch3:  0x7E
Ch4:  0x7E, Ch5:  0x7E, Ch6:  0x7E, Ch7:  0x7E
Ch8:  0x7E, Ch9:  0x7E, Ch10: 0x7E, Ch11: 0x7E
Ch12: 0x7E, Ch13: 0x7E, Ch14: 0x7E, Ch15: 0x7E
Ch16: 0x7E, Ch17: 0x7E, Ch18: 0x7E, Ch19: 0x7E
Ch20: 0x7E, Ch21: 0x7E, Ch22: 0x7E, Ch23: 0x7E
Ch24: 0x7E, Ch25: 0x7E, Ch26: 0x7E, Ch27: 0x7E
Ch28: 0x7E, Ch29: 0x7E, Ch30: 0x7E, Ch31: 0x7E
Data Memory for ST1:
Ch0:  0x7E, Ch1:  0x7E, Ch2:  0x7E, Ch3:  0x7E
Ch4:  0x7E, Ch5:  0x7E, Ch6:  0x7E, Ch7:  0x7E
Ch8:  0x7E, Ch9:  0x7E, Ch10: 0x7E, Ch11: 0x7E
Ch12: 0x7E, Ch13: 0x7E, Ch14: 0x7E, Ch15: 0x7E
Ch16: 0x7E, Ch17: 0x7E, Ch18: 0x7E, Ch19: 0x7E
Ch20: 0x7E, Ch21: 0x7E, Ch22: 0x7E, Ch23: 0x7E
Ch24: 0x7E, Ch25: 0x7E, Ch26: 0x7E, Ch27: 0x7E
Ch28: 0x7E, Ch29: 0x7E, Ch30: 0x7E, Ch31: 0x7E
```

Transmit AT Command Example

The following example opens a directly connected session on modem 1/1, enters AT command mode on modem 1/1, and transmits the **ATH** AT command through modem 1/1's out-of-band port:

```
AS5200# modem at-mode 1/1
You are now entering AT command mode on modem (slot 1 / port 1).
Please type CTRL-C to exit AT command mode.
at%v

MNP Class 10 V.34/V.FC Modem Rev 1.0/85

OK
at\s

IDLE          000:00:00
LAST DIAL

NET ADDR:     FFFFFFFFFFFF
MODEM HW: SA 2W United States
4 RTS 5 CTS 6 DSR - CD 20 DTR - RI
MODULATION    IDLE
MODEM BPS     28800  AT%G0
MODEM FLOW    OFF    AT\G0
MODEM MODE    AUT    AT\N3
V.23 OPR.     OFF    AT%F0
AUTO ANS.     ON     ATS0=1
SERIAL BPS    115200 AT%U0
```

```
BPS ADJUST     OFF   AT\J0
SPT BPS ADJ.   0     AT\W0
ANSWER MESSGS  ON    ATQ0
SERIAL FLOW    BHW   AT\Q3
PASS XON/XOFF  OFF   AT\X0
PARITY         8N    AT
```

The manageable modem returns "OK" if the AT command you transmit is successfully enabled.

Facilities Data-Link Example

The following example configures the ANSI T1.403 standard for the T1 controllers:

```
AS5200(config)# controller t1 0
AS5200(config-controller)# fdl ansi
AS5200(config-controller)# exit
AS5200(config)# controller t1 1
AS5200(config-controller)# fdl ansi
```

Update to Command References

Commands in the *Configuration Fundamentals Command Reference* and the *Access Services Command Reference* publications have been added or changed. Use the following new or changed commands to configure the AS5200. Refer to the Cisco IOS Release 11.1 configuration guide and command reference publications for additional commands.

All commands are presented alphabetically in this document, although they are summarized by the chapter to which they belong as follows:

- *Configuration Fundamentals Command Reference, "Interface Commands" chapter:*
  - **cablelength**
  - **cas-group**
  - **clock source**
  - **fdl**
  - **isdn incoming-voice modem**
  - **show tdm connections**
  - **show tdm data**
- *Configuration Fundamentals Command Reference,* "System Management Commands" chapter:
  - **rmon alarm**
  - **rmon event**
- *Access Services Command Reference*, "Terminal Line and Modem Support Commands" chapter:
  - **clear modem**
  - **clear modem at-mode**
  - **clear modem counters**
  - **copy modem**
  - **modem at-mode**
  - **modem at-mode-permit**
  - **modem bad**
  - **modem buffer-size**
  - **modem busyout**
  - **modem hold-reset**
  - **modem poll retry**
  - **modem poll time**
  - **modem recovery-time**
  - **modem shutdown**
  - **modem startup-test**
  - **modem status-poll**
  - **show modem**
  - **test modem back-to-back**

cablelength

To increase the pulse of a signal at the receiver and decrease the pulse from the transmitter using pulse equalization and line build-out for a T1 cable on an AS5200, use the **cablelength** controller configuration command. To return the pulse equalization and line build-out values to their default settings, use the **no** form of this command.

> **cablelength long** {*dbgain-value dbloss-value*}
> **no cablelength long**

Syntax Description

long	Specifies a long cable length for channel service unit (CSU) connections.
dbgain-value	Number of decibels by which the receiver signal is increased. Use the keyword **gain26** or **gain36** to specify this value.
dbloss-value	Number of decibels by which the receiver signal is decreased. Use one of the following keywords to specify this value:

  • **0db**

  • **–7.5db**

  • **–15db**

  • **–22.5db**

Default

Long cable length, receiver gain of 36 dB, and transmitter loss of 0 dB.

Command Mode

Controller configuration

Usage Guidelines

Use this command for configuring the controller T1 interface on the AS5200 access server.

A pulse equalizer regenerates a signal that has been attenuated and filtered by a cable loss. Pulse equalization does not produce a simple gain, but it filters the signal to compensate for complex cable loss. A **gain26** receiver gain compensates for a long cable length equivalent to 26 dB of loss, while a **gain36** compensates for 36 dB of loss.

The lengthening or *building out* of a line is used to control far-end crosstalk. Line build-out attenuates the stronger signal from the customer installation transmitter so that the transmitting and receiving signals have similar amplitudes. A signal difference of less than 7.5 dB is ideal. Line build-out does not produce simple flat loss (also known as *resistive* flat loss). Instead, it simulates a cable loss of 7.5 dB, 15 dB, or 22.5 dB so that the resulting signal is handled properly by the receiving equalizer at the other end.

Example

The following example increases the receiver gain by 26 decibels and decreases the transmitting pulse by 7.5 decibels for a long cable:

```
AS5200(config)# controller t1 0
AS5200(config-controller)# cablelength long gain26 -7.5db
```

cas-group

To configure channelized T1 timeslots with channel associated signaling (also known as *robbed bit signaling*), which enables an AS5200 modem to answer and send an analog call, 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-number* [**timeslots** *range*]
> **no cas-group** *channel-number* [**timeslots** *range*]

Syntax Description

channel-number	Specifies a single channel group number. The channel number can be between 0 and 23.
timeslots *range*	(Optional) Specifies a timeslot range of values from 1 to 24. The default value configures 24 timeslots with the channel associated signal called E&M (Ear and Mouth), which is the default signal type.

Default

Disabled

Command Mode

Controller configuration

Usage Guidelines

Use this command to enable an AS5200 modem to receive and send incoming and outgoing analog calls through each T1 controller that is configured for a channelized T1 line, which has 24 possible channels.

Switched 56 digital calls are not supported under this new feature.

Example

The following example shows you how to configure all 24 channels to support robbed bit signaling on a Cisco AS5200:

```
AS5200(config)# controller T1 0
AS5200(config-controller)# cas-group 1 timeslots 1-24
AS5200(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
```

clear modem

To reset a manageable modem's hardware on an Cisco AS5200, use the **clear modem** EXEC command.

clear modem [*slot/modem-port* | **group** *group-number*]

Syntax Description

slot/modem-port	Slot and modem port number. Remember to include the forward slash (/) when entering this variable.
group *group-number*	Modem group.

Default

Disabled

Command Mode

EXEC

Usage Guidelines

This command resets the specified modem or group of modems, or all the modems in the system. The modem hardware is reset for modems that are idle or busied out for log periods of time.

You can construct a logical modem group using the **interface group-async** command.

Example

The following example resets the hardware for manageable modem 1/1:

```
clear modem 1/1
```

clear modem at-mode

To clear an attention (AT) directly connected session to a manageable modem from a second Telnet session into the AS5200, use the **clear modem at-mode** EXEC command.

> **clear modem at-mode** *slot/modem-port*

Syntax Description

at-mode	An AT directly connected session.
slot/modem-port	Slot and modem port number. Remember to include the forward slash (/) when entering this variable.

Default

Disabled

Command Mode

EXEC

Usage Guidelines

This command applies only to the Cisco AS5200.

An AT directly connected session is usually initiated and closed from the same Telnet session by means of the **modem at-mode** command and **Ctrl-C**. However, you can clear an AT directly connected session that was mistakenly left open, by enabling the **clear modem at-mode** command from a second Telnet session into the access server.

Examples

The following example shows how to execute the **modem at-mode** command from a Telnet session:

```
modem at-mode 1/1
```

The following example shows how to execute the **clear modem at-mode** command from a second Telnet session while the first Telnet session is connected to the modem:

```
AS5200# clear modem at-mode 1/1
clear "modem at-mode" for modem 1/1 [confirm]
AS5200#
```

The following output is displayed in the first Telnet session once the modem is cleared by the second Telnet session:

```
Direct connect session cleared by vty0 (171.69.1.164)
```

Related Command

modem at-mode

clear modem counters

To clear the statistical counters on a manageable modem installed in an Cisco AS5200, use the **clear modem counters** EXEC command.

clear modem counters [*slot/modem-port* | **group** *group-number*]

Syntax Description

slot/modem-port   (Optional) Slot and modem port number. Remember to include the forward slash (*/*) when entering this variable.

group *group-number*   (Optional) Modem group.

Default

Disabled

Command Mode

EXEC

Usage Guidelines

Entering the **clear modem counters** command without specifying an optional keyword or argument resets the modem statistics on each AS5200 modem and the summary statistics displayed in the **show modem summary** command.

You can create a logical modem group using the **interface group-async** command.

Example

The following example shows how clear the statistical counters on manageable modem 1/1:

```
clear modem counters 1/1
```

clock source

To select the clock source for the time division multiplexer (TDM) bus in a Cisco AS5200, 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

line	Clock source on the active line.
primary	Primary TDM clock source.
secondary	Secondary TDM clock source.
internal	Selects the free running clock (also known as internal clock) as the clock source.

Defaults

Primary TDM clock source from the T0 controller

Secondary TDM clock source from the T1 controller

Command Mode

Interface configuration

Usage Guidelines

To use the clocking coming in from a T1 line, configure the **clock source line primary** command on the controller that has the most reliable clocking. 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.

Example

The following example configures the Cisco AS5200 to use the T0 controller as the primary clocking source and the T1 controller as the secondary clocking source:

```
AS5200(config)# controller t1 0
AS5200(config-if)# clock source line primary
AS5200(config-if)# exit
AS5200(config)# controller t1 1
AS5200(config-if)# clock source line secondary
```

copy modem

To download firmware to modems in the Cisco AS5200, use the **copy modem** EXEC command.

copy {**flash** | **tftp** | **rcp**} **modem**

Syntax Description

flash	Copies firmware from Flash memory to the modem.
tftp	Copies firmware from the TFTP server to the modem.
rcp	Downloads a remote copy of the firmware from a network server to the modem.

Default

Disabled

Command Mode

EXEC

Usage Guidelines

After you enable this command, you are asked to provide the download destination (a *slot/modem-port* or **all**), the remote host name, and the path leading to the source modem firmware.

If a modem that you wish to upgrade is busy with a call when the **copy modem** command is enabled, the upgrade for that modem yields until the active call is dropped. All other idle modems in the upgrade range proceed with the downloading operation.

Examples

The following example shows how to copy the modem firmware file called *modem_upgrade* from the TFTP server called *Modem_Server* to modem 2/0, which is installed in the Cisco AS5200:

```
AS5200# copy tftp modem
Modem Firmware Download Modem Numbers? 2/0
Address or name of remote host [UNKNOWN]? Modem_Server
Source file name? dirt/elem/modem_upgrade
Accessing file 'dirt/elem/modem_upgrade on Modem_Server...
Loading dirt/elem/modem_upgrade .from 223.255.254.254 (via Ethernet0): ! [OK]

Loading dirt/elem/modem_upgrade from 223.255.254.254 (via Ethernet0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 237503/278528 bytes]

AS5200#
%MODEM-5-DL_START: Modem (2/0) started firmware download
%MODEM-5-DL_GOOD: Modem (2/0) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```

As shown in this example, you might want to upgrade and test one modem's firmware before upgrading all the modems' firmware on the access server, as shown in the next example.

This example shows how to download the same modem firmware file from the TFTP server to all the modems in the Cisco AS5200:

```
AS5200# copy tftp modem
Modem Firmware Download Modem Numbers? all
Address or name of remote host [UNKNOWN]? Modem_Server
Source file name? dirt/elem/modem_upgrade
Accessing file 'dirt/elem/modem_upgrade on Modem_Server...
Loading dirt/elem/modem_upgrade .from 223.255.254.254 (via Ethernet0): ! [OK]

Loading dirt/elem/modem_upgrade from 223.255.254.254 (via Ethernet0):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 237503/278528 bytes]


AS5200#
%MODEM-5-DL_START: Modem (2/0) started firmware download
%MODEM-5-DL_START: Modem (2/1) started firmware download
%MODEM-5-DL_START: Modem (2/2) started firmware download
%MODEM-5-DL_START: Modem (2/3) started firmware download
%MODEM-5-DL_START: Modem (2/4) started firmware download
%MODEM-5-DL_START: Modem (2/5) started firmware download
%MODEM-5-DL_START: Modem (2/6) started firmware download
%MODEM-5-DL_START: Modem (2/7) started firmware download
%MODEM-5-DL_START: Modem (2/8) started firmware download
%MODEM-5-DL_START: Modem (2/9) started firmware download
%MODEM-5-DL_START: Modem (2/10) started firmware download
%MODEM-5-DL_START: Modem (2/11) started firmware download
%MODEM-5-DL_START: Modem (2/12) started firmware download
%MODEM-5-DL_START: Modem (2/13) started firmware download
%MODEM-5-DL_START: Modem (2/14) started firmware download
%MODEM-5-DL_START: Modem (2/15) started firmware download
%MODEM-5-DL_START: Modem (2/16) started firmware download
%MODEM-5-DL_START: Modem (2/17) started firmware download
%MODEM-5-DL_START: Modem (2/18) started firmware download
%MODEM-5-DL_START: Modem (2/19) started firmware download
%MODEM-5-DL_START: Modem (2/20) started firmware download
%MODEM-5-DL_START: Modem (2/21) started firmware download
%MODEM-5-DL_START: Modem (2/22) started firmware download
%MODEM-5-DL_START: Modem (2/23) started firmware download
%MODEM-5-DL_GOOD: Modem (2/2) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/10) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/4) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/6) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/7) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/12) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/11) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/13) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/1) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/14) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/19) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/22) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/5) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/8) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```

```
%MODEM-5-DL_GOOD: Modem (2/9) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/17) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/0) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/3) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/21) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/16) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/15) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/18) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/20) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
%MODEM-5-DL_GOOD: Modem (2/23) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
```

The following example shows how to copy the modem firmware file called STAR.M from Flash memory to the integrated modem 1/2:

```
AS5200# copy flash modem
Modem Numbers (<slot>/<port> | group <number> | all)? 1/2

System flash directory:
File   Length    Name/status
  1    3539820   as5200-i-m.allcookies
  2    239203    STAR.M
  3    23072     BOOT.105 [3802288 bytes used, 4586320 available, 8388608 total]
Source file name? STAR.M
AS5200#
%MODEM-5-DL_START: Modem (1/2) started firmware download
%MODEM-5-DL_GOOD: Modem (1/2) completed firmware download:
MNPClass10V.34/V.FCModemRev1.0.23/85.23/85
AS5200#
```

fdl

To set the facilities data link exchange standard for the CSU on the AS5200's T1 controllers, enter the **fdl** controller configuration command. The **no** form of this command disables this facilities data-link support.

> **fdl** {**att** | **ansi**}
> **no fdl** {**att** | **ansi**}

Syntax Description

att   Selects AT&T technical reference 54016 for extended superframe facilities data link exchange support.

ansi   Selects ANSI T1.403 for extended superframe facilities data link exchange support.

Default

Disabled

Command Mode

Controller configuration

Usage Guidelines

You must configure this command on both T1 controllers if you want to support the CSU function on each T1 line. However, you must use the same facilities data link exchange standard as your service provider. You can have a different standard configured on each T1 controller.

Example

The following example configures the ANSI T1.403 standard for both T1 controllers:

```
AS5200(config)# controller t1 0
AS5200(config-controller)# fdl ansi
AS5200(config-controller)# exit
AS5200(config)# controller t1 1
AS5200(config-controller)# fdl ansi
```

isdn incoming-voice modem

To enable incoming ISDN voice calls to access the Cisco AS5200 call switch module and integrated modems, use the **isdn incoming-voice modem** interface configuration command. The **no** form of this command stops all incoming ISDN voice calls from routing to the modems.

isdn incoming-voice modem
no isdn incoming-voice modem

Default

Disabled

Command Mode

Interface configuration

Usage Guidelines

Incoming ISDN digital calls are unaffected by this command. ISDN digital calls directly connect to network resources even when the **no isdn incoming-voice modem** command is configured.

Example

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

```
AS5200(config)# interface serial 0:23
AS5200(config-if)# isdn incoming-voice modem
AS5200(config-if)#
```

modem at-mode

To open a directly connected session and enter AT command mode on an Cisco AS5200, which is used for sending AT commands to a manageable modem, use the **modem at-mode** EXEC command.

> **modem at-mode** *slot/modem-port*

Syntax Description

slot/modem-port	Slot and modem port number. Remember to include the forward slash (/) when entering this variable.

Default

Disabled

Command Mode

EXEC

Usage Guidelines

Manageable modems return "OK" if the AT command you transmit is successfully enabled. Press **Ctrl-C** after transmitting an AT command to close the directly connected session.

Note This command does not apply to nonmanageable modems.

Example

The following example opens a directly connected session on modem 1/1, enters AT command mode on modem 1/1, and transmits the **ATH** AT command through modem 1/1's out-of-band port:

```
AS5200# modem at-mode 1/1
You are now entering AT command mode on modem (slot 1 / port 1).
Please type CTRL-C to exit AT command mode.
at%v

MNP Class 10 V.34/V.FC Modem Rev 1.0/85

OK
at\s

IDLE            000:00:00
LAST DIAL

NET ADDR:       FFFFFFFFFFFF
MODEM HW: SA 2W United States
4 RTS 5 CTS 6 DSR - CD 20 DTR - RI
MODULATION      IDLE
MODEM BPS       28800  AT%G0
MODEM FLOW      OFF    AT\G0
MODEM MODE      AUT    AT\N3
V.23 OPR.       OFF    AT%F0
AUTO ANS.       ON     ATS0=1
SERIAL BPS      115200 AT%U0
```

```
BPS ADJUST      OFF    AT\J0
SPT BPS ADJ.    0      AT\W0
ANSWER MESSGS   ON     ATQ0
SERIAL FLOW     BHW    AT\Q3
PASS XON/XOFF   OFF    AT\X0
PARITY          8N     AT
```

Related Command
clear modem at-mode

modem at-mode-permit

To permit a manageable modem installed in the Cisco AS5200 to accept a directly connected session, which is required to send AT commands, use the **modem at-mode-permit** line configuration command. The **no** form of this command disables permission for modems to accept a direct connection.

> **modem at-mode-permit**
> **no modem at-mode-permit**

Syntax Description

This command has no keywords or arguments.

Default

Enabled

Command Mode

Line configuration

Usage Guidelines

After you enter this command, enter the **modem at-mode** command to enable a directly connected session on the modem. From AT command mode, you can enter AT commands directly from your terminal session.

Refer to the *12-Port Modem AT Command Set and Register Summary* publication (part of the AS5200 documentation set) for a complete list and description of AT commands.

The **no modem at-mode-permit** command disables a modem from accepting a direct connection, which is useful for ensuring modem security.

Note   This command does not apply to nonmanageable modems.

Example

The following example permits the modem connected to TTY line 1 to accept a directly connected session:

```
line 1
modem at-mode-permit
```

Related Commands

clear modem at-mode
modem at-mode

modem bad

To remove a modem, which is installed on a Cisco AS5200, from service and indicate it as suspected or proven to be inoperable, use the **modem bad** line configuration command. The **no** form of this command restores a modem to service.

> **modem bad**
> **no modem bad**

Syntax Description

This command has no keywords or arguments.

Default

Disabled

Command Mode

Line configuration

Usage Guidelines

If you mark a modem as inoperable, it appears as *Bad*—without the asterisk (*)—in the *Status* column of the **show modem** command output. A modem marked inoperable by the **modem startup-test** command appears as *Bad** in the **show modem** command output. Use the **no modem bad** command to unmark a modem as *Bad** or *Bad* and restore it for dial-up connection services.

Example

The first part of the following example shows a successful connection between modem 2/1 and modem 2/0, which verifies normal operating conditions between these two modems. However, when modem 2/1 is tested against modem 2/3, the back-to-back modem test fails. Therefore, modem 2/3 is suspected or proven to be inoperable. Modem 2/3 is removed from dial-up services through the use of the **modem bad** command on line 28 (see Table 5).

```
AS5200# test modem back-to-back 2/1 2/0
Repetitions (of 10-byte packets) [1]: 10
AS5200#
%MODEM-5-B2BCONNECT: Modems (2/1) and (2/0) connected in back-to-back test: CONN
ECT9600/REL-MNP
%MODEM-5-B2BMODEMS: Modems (2/0) and (2/1) completed back-to-back test: success/
packets = 20/20
AS5200# test modem back-to-back 2/1 2/3
Repetitions (of 10-byte packets) [1]: 10
AS5200#
%MODEM-5-BADMODEMS: Modems (2/3) and (2/1) failed back-to-back test: NOCARRIER
AS5200# configure terminal
AS5200(config)# line 28
AS5200(config-line)# modem bad
AS5200(config-line)# end
```

Related Commands

modem startup-test
show modem
test modem back-to-back

modem buffer-size

To configure the size of the history event queue buffer for manageable modems installed in a Cisco AS5200, use the **modem buffer-size** command.

modem buffer-size *number*

Syntax Description

number	Defined number of modem events that each manageable modem is able to store.

Default

100 modem events

Command Mode

Global configuration

Usage Guidelines

A large buffer size uses significant amounts of processing memory. If the processing memory is running low, reduce the modem buffer size.

To view modem events, use the **show modem log** command.

Note   This command does not apply to nonmanageable modems.

Example

The following example enables each modem in the access server to store 150 modem events:

```
modem buffer-size 150
```

Related Command

show modem log

modem busyout

To gracefully disable a modem, which is installed in a Cisco AS5200, from dialing or answering calls, use the **modem busyout** line configuration command. The **no** form of this command reenables a modem.

modem busyout
no modem busyout

Syntax Description

This command has no keywords or arguments.

Default

Disabled

Command Mode

Line configuration

Usage Guidelines

The disabling action is not executed until the active modem returns to an idle state. No active connections are interrupted when you use this command.

Example

The following example disables the modem associated with line 1 from dialing and answering calls. You do not specify a *slot/modem-port* number with this command:

```
line 1
modem busyout
```

Related Command

modem shutdown

modem hold-reset

To reset and isolate integrated modems for extensive troubleshooting, which are installed in a Cisco AS5200, use the **modem hold-reset** line configuration command. The **no** form of this command restarts a modem.

modem hold-reset
no modem hold-reset

Syntax Description

This command has no keywords or arguments.

Default

Disabled

Command Mode

Line configuration

Usage Guidelines

This command is also used to reset a modem that is frozen in a suspended state. Disable the suspended modem with the **modem hold-reset** command, and then restart initialization with the **no modem hold-reset** command.

Example

The following example disables a suspended modem and resets its initialization:

```
configure terminal
line 4
modem hold-reset
no modem hold-reset
```

modem poll retry

To set the maximum number of polling attempts used to retrieve performance statistics from a manageable modem installed on a Cisco AS5200, use the **modem poll retry** global configuration command.

> **modem poll retry** *number*

Syntax Description

number	Maximum number of polling attempts. The configuration range is from 0 to 10 attempts.

Default

Three polling attempts

Command Mode

Global configuration

Usage Guidelines

Higher settings cause the software to keep polling one modem for status and to avoid polling other modems, which decreases the amount of statistics that are gathered.

Note This command does not apply to nonmanageable modems.

Example

The following example configures the server to attempt to retrieve statistics from a local modem up to five times before discontinuing the polling effort:

```
modem poll retry 5
```

Related Commands

clear modem
modem poll time
modem status-poll

modem poll time

To set the time interval between modem polls, which report modem statistics on a Cisco AS5200, use the **modem poll time** global configuration command. To restore the default setting of the poll time, use the **no** form of this command.

> **modem poll time** *seconds*
> **no modem poll time** *seconds*

Syntax Description

seconds	Number of seconds between polls. The configuration range is 2 to 120 seconds.

Default

Twelve seconds elapse between each modem poll.

Command Mode

Global configuration

Usage Guidelines

This command does not apply to nonmanageable modems.

Example

The following example sets the time interval between polls to 10 seconds:

```
modem poll time 10
```

Related Commands

modem poll retry
modem status-poll

modem recovery-time

To set the maximum amount of time the call switching module waits for a local modem to respond to a request before it is considered locked in a suspended state, use the **modem recovery-time** global configuration command. The **no** form of this command sets a 5-minute response time, which is the default setting.

> **modem recovery-time** *minutes*
> **no modem recovery-time**

Syntax Description

minutes	Maximum amount of time local modems wait for a response.

Default

5 minutes

Command Mode

Global configuration

Usage Guidelines

This command applies only to the Cisco AS5200.

Note   This command does not apply to nonmanageable modems.

After the call switching module resets a suspended modem, it recovers to a default call switching module state.

Example

The following example configures the call switching module to wait for 8 minutes:

```
modem recovery-time 8
```

modem shutdown

To abruptly shut down an active or idle modem installed on an Cisco AS5200, use the **modem shutdown** line configuration command. The **no** form of this command takes the modem out of a shutdown state and places it back in service.

> **modem shutdown**
> **no modem shutdown**

Syntax Description

This command has no keywords or arguments.

Default

Disabled

Command Mode

Line configuration

Usage Guidelines

Enable the **no modem shutdown** command to restore a shutdown modem for service.

Example

The following example abruptly shuts down the modem associated with line 2. All active calls on the modem are dropped immediately.

```
configure terminal
line 2
modem shutdown
```

Related Command

modem busyout

modem startup-test

To perform diagnostic testing on each modem during the Cisco AS5200's initial power-up or rebooting process, use the **modem startup-test** global configuration command. The **no** form of this command disables startup testing.

modem startup-test
no modem startup-test

Syntax Description

This command has no keywords or arguments.

Default

Enabled

Command Mode

Global configuration

Example

The following example shows how to perform a startup test on the integrated AS5200 modems:

```
configure terminal
modem startup-test
```

Display the results of the modem startup test after you reboot the system by enabling the **show modem** command.

Related Commands

show modem
test modem back-to-back

modem status-poll

To poll for modem statistics through an out-of-band port in a Cisco AS5200, use the **modem status-poll** line configuration command. The **no** form of this command disables status polling through the out-of-band port for a specified modem.

> **modem status-poll**
> **no modem status-poll**

Syntax Description

This command has no keywords or arguments.

Default

Enabled

Command Mode

Line configuration

Usage Guidelines

This command applies only to manageable modems that have out-of-band ports.

Note   This command does not apply to nonmanageable modems.

Example

The following example enables modem status polling through the out-of-band port through TTY line 1:

```
configure terminal
line 1
modem status-poll
```

Related Commands

modem poll retry
modem poll time

rmon alarm

To set an alarm on any MIB object in the Cisco AS5200, use the **rmon alarm** configuration command. Use the **no** form of this command to disable the alarm.

rmon alarm *number variable interval* {**delta** | **absolute**} **rising-threshold** *value* [*event-number*] **falling-threshold** *value* [*event-number*] [**owner** *string*]
no rmon alarm *number*

Syntax Description

number	Alarm number, which is identical to the *alarmIndex* in the alarmTable in the Remote Network Monitoring (RMON) MIB.
variable	MIB object to monitor, which translates into the *alarmVariable* used in the alarmTable of the RMON MIB.
interval	Time in seconds the alarm monitors the MIB variable, which is identical to the *alarmValue* used in the alarm table of the RMON MIB.
delta	Tests the change between MIB variables, which affects the *alarmSampleType* in the alarmTable of the RMON MIB.
absolute	Tests each MIB variable directly, which affects the *alarmSampleType* in the alarmTable of the RMON MIB.
rising-threshold *value*	Value at which the alarm is triggered.
event-number	(Optional) Event number to trigger when the rising or falling threshold exceeds its limit. This value is identical to the alarmRisiongEventIndex or the alarmFallingEventIndex in the alarm Table of the RMON MIB.
falling-threshold *value*	Value at which the alarm is reset.
owner *string*	(Optional) Specifies an owner for the alarm, which is identical to the alarm owner in the alarmTable of the RMON MIB.

Default

No alarms configured

Command Mode

Global configuration

Usage Guidelines

To disable the RMON alarms, you must use the **no** form of the command on each configured alarm. For example, enter **no rmon alarm 1**, where the 1 identifies which alarm is to be removed.

See RFC 1757 for more information about the RMON alarm group.

Example

The following example configures an RMON alarm using the **rmon alarm** command:

```
rmon alarm 10 ifOutErrors.1 20 delta rising-threshold 15 1 falling-threshold 0 owner
jjohnson
```

This example configures RMON alarm number 10. The alarm monitors the MIB variable
ifOutErrors.1 once every 20 seconds until the alarm is disabled, and checks the change in the
variable's rise or fall. If the *ifOutErrors.1* value shows a MIB counter increase of 15 or more, such
as from 100000 to 100015, the alarm is triggered. The alarm in turn triggers event number 1, which
is configured with the **rmon event** command. Possible events include a log entry or a SNMP trap. If
the *ifOutErrors.1* value changes by 0, the alarm is reset and can be triggered again.

Related Commands

rmon event
show rmon

rmon event

To add or remove an event in the RMON event table that is associated with an RMON event number, use the **rmon event** global configuration command. Use the **no** form of this command to disable RMON on the interface.

> **rmon event** *number* [**log**] [**trap** *community*] [**description** *string*] [**owner** *string*]
> **no rmon event** *number*

Syntax Description

number	Assigned event number, which is identical to the *eventIndex* in the eventTable in the RMON MIB.
log	(Optional) Generates an RMON log entry when the event is triggered and sets the *eventType* in the RMON MIB to *log* or *log-and-trap*.
trap *community*	(Optional) SNMP community string used for this trap. Configures the setting of the *eventType* in the RMON MIB for this row as either *snmp-trap* or *log-and-trap*. This value is identical to the *eventCommunityValue* in the eventTable in the RMON MIB.
description *string*	(Optional) Specifies a description of the event, which is identical to the event description in the eventTable of the RMON MIB.
owner *string*	(Optional) Owner of this event, which is identical to the *eventDescription* in the eventTable of the RMON MIB.

Default

No events configured

Command Mode

Global configuration

Usage Guidelines

This command applies only to the Cisco AS5200.

Example

The following example enables the **rmon event** command:

```
rmon event 1 log trap eventtrap description "High ifOutErrors" owner sdurham
```

This example configuration creates RMON event number 1, which is defined as High *ifOutErrors*, and generates a log entry when the event is triggered by an alarm. The user *sdurham* owns the row that is created in the event table by this command. This configuration also generates a Simple Network Management Protocol (SNMP) trap when the event is triggered.

See RFC 1757 for more information about the RMON MIB.

show modem

To show modem performance statistics on an Cisco AS5200, enable the **show modem** EXEC command.

> **show modem** [**csm** | **log**] [*slot/modem-port* | **group** *number*] [**summary** | **at-mode**]

Syntax Description

csm	(Optional) Shows the internal status of the call switching module.
log	(Optional) Shows the modem history event status performed on a manageable modem or group of modems.
slot/modem-port	(Optional) Specifies the location of a slot and modem port. If this number is not specified, statistics for all connected modems are displayed. Remember to include the forward slash (/) when entering this variable.
group *number*	(Optional) Specifies the location of a specific group of modems. If this number is not specified, statistics for all modems in the access server are displayed.
summary	(Optional) Displays a cumulative statistics report for all manageable modems dialing into and out of the network.
at-mode	(Optional) Displays all AT sessions connected to manageable modems.

Command Mode

EXEC

Usage Guidelines

The keywords **log**, **summary**, and **at-mode** apply only to manageable modems.

The number of events that you can record and view with the **show modem log** command is defined using the **modem buffer-size** command. The events stored in the buffer wrap around the event queue. You cannot clear the modem event queue.

Use the **clear modem counters** command to reset modem counters and clear the modem summary report of modem statistics.

Sample Displays

The following display shows output information for the **show modem** command:

```
AS5200# show modem
                  Inc calls     Out calls    Busied    Failed   No         Succ
     Mdm   Usage   Succ   Fail   Succ   Fail   Out       Dial     Answer     Pct.
     1/0    0%      0      0      0      0      0         0        0          0%
     1/1    0%      0      0      0      0      0         0        0          0%
     1/2    0%      0      0      0      0      0         0        0          0%
     1/3    0%      0      0      0      0      0         0        0          0%
```

Table 6 describes the fields in the previous display

Table 6   Show Modem Field Descriptions

Field	Description
Mdm	Slot and modem port number. The following modem states can appear to the left of a slot/modem port number:
	b—Modem was removed from service with the **modem shutdown** command or the **modem busyout** command.
	R—Modem is held and isolated in a suspended state by the **modem hold-reset** command.
	B—Modem is *Bad**, *Bad*, or the downloaded firmware has failed.
	D—Modem is currently downloading firmware.
	T—Modem is conducting a back-to-back modem test.
	*—Modem is connected or dialing.
Usage	Percentage of the total system uptime that all modems are in use.
Inc calls	Number of incoming calls that successfully and unsuccessfully connected to an available AS5200 integrated modem.
Out calls	Number of outgoing calls that successfully and unsuccessfully dialed out from an available AS5200 integrated modem.
Busied Out	Number of modems that have been manually removed from service.
Failed Dial	Number of modems that attempted to dial into the network but failed to make a connection.
No Answer	Number of modems that detected an incoming ring but failed to answer the call.
Succ Pct.	Successful connection percentage of total available modems.

The following example shows the statistics and current configurations for the manageable modem 1/1. A dash (-) indicates a field that is not available on nonmanageable modems. An *x* indicates a field that is available and active on manageable modems.

```
AS5200# show modem 1/1
   Mdm  Typ  Status    Tx/Rx       G  Duration  TX  RX  RTS  CTS  DSR  DCD  DTR
   1/1  V34  Idle      1200/1200   0  01:39:59  x   x   x    x    x    x    x

Modem 1/1, AS5200 Manageable Modem
Firmware (Boot) Rev: 1.0.1 (0.0.2)
Modem config: Incoming and Outgoing
Protocol: Normal, Compression: None
Management config: status and AT session polling
TX signals: -17 dBm, RX signals: -33 dBm
Last clearing of "show modem" counters 00:11:34
    0 incoming completes, 0 incoming failures,
    0 outgoing completes, 0 outgoing failures,
    0 failed dial attempts, 0 ring no answers, 0 busied outs
    0 no dial tones, 0 dial timeouts, 0 watchdog timeouts
    0 no carriers, 0 link failures, 0 resets
    0 protocol timeouts, 0 protocol errors, 0 lost events


                    2400-       2400-14400      14400+
# of connections       0               0           0
```

Table 7 describes the fields in the previous display.

Table 7   Show Modem Slot/Modem Field Descriptions

Field	Description
Mdm	Slot and modem number.
Typ	Modulation type.
Status	Current status of the modem. Possible values include
	Conn—Modem is connected to a remote host.
	Bad—Inoperable state, which is configured by the **modem bad** command.
	Bad*—Inoperable state, which is configured by the **modem startup-test** command during initial power-up testing.
	Reset—Modem is in reset mode.
	D/L—Modem is downloading firmware.
	Bad FW—Downloaded modem firmware is not operational.
	Busy—Modem is out of service and not available for calls.
	Idle—Modem is ready for incoming and outgoing calls.
Tx/Rx	Transmission and receiving speed for the most recently connected call.
G	Modem group number assigned to the modem. The group number 0 means the modem is not part of any group.
Duration	Time duration of the current call or the last call.
Modem functions	The following modem functions are displayed on manageable modems. A field that is available and turned on is marked with an *x*. An unavailable field is marked with a dash (-).
	TX—Transmit Data. The DTE transmits data to the DCE.
	RX—Receive Data. The DCE receives data from the DTE.
	RTS—Request To Send. The DTE signals to the DCE that the DTE accepts data into its buffers.
	CTS—Clear To Send. The DCE signals to the DTE that the DCE accepts data into its buffers.
	DSR—Data Set Ready. The modem is ready to start communication.
	DCD—Data Carrier Detect. The DCE indicates to the DTE that a call is present and established with a remote modem. Dropping the DCD function terminates the session.
	DTR—Data Terminal Ready. The DTE indicates to the DCE that it accepts calls.
Firmware	Installed modem firmware.
Modem config	Current modem configuration, which includes the fields Incoming, Outgoing, Incoming and Outgoing, and Unknown.
Protocol	Protocol the modem is running such as Normal, Direct, reliable/MNP, and reliable/LAPM (Link Access Procedure for Modems).
Compression	Compression algorithm running on the modem, such as None, V42bis, and MNP class 5.
Management config	Indicates if the modem is configured for out-of-band port polling.
TX signals	Analog signal levels that the modem transmits for signal-to-noise ratio.
RX signals	Analog signal levels that the modem receives for signal-to-noise ratio.

Field	Description
Last clearing of "show modem" counters	Last time the modem's counters were cleared using the **clear modem counters** command. A summary of modem events also appears.
	• Incoming completes and failures—Total number of incoming connection requests that the modem answered and successfully or unsuccessfully connected with the remote DCE.
	• Outgoing completes and failures—Total number of outgoing connection requests that the modem dialed and successfully or unsuccessfully connected with the remote DCE.
	• Failed dial attempts—Number of times the modem attempted to dial out but the call failed to leave the modem.
	• Ring no answers—Number of times the integrated modem detected ringing but did not answer the incoming call.
	• Busied outs—Number of times the integrated modem was intentionally taken out of service (for example, the **modem busyout** command was enabled on the modem).
	• No dial tones—Number of times the dial-out attempt failed because the modem failed to detect a dial tone.
	• Dial timeouts—Number of times the modem has timed out while attempting to dial.
	• Watchdog timeouts—Number of times the modem internal watchdog timer has expired.
	• No carriers—Number of times the modem disconnected because no carrier was present.
	• Link failures—Number of times the modem has detected a link failure.
	• Resets—Number of times the modem has been reset.
	• Protocol timeouts and errors—Number times the modem protocol failed to make a call connection.
	• Lost events—Number of incomplete modem events performed by the modem.
# of connections	Speed summary of the number of calls that have connected since the system has been up. Speed categories are 2400 bps, 2400–14400 bps, and 14400+ bps.

The following example displays example output for a nonmanageable modem. Notice that unavailable fields are marked with dashes (-):

```
AS5200# show modem 1/1
  Mdm  Typ  Status   Tx/Rx       G  Duration  TX  RX  RTS  CTS  DSR  DCD  DTR
  1/1   -   Idle    19200/19200  0  00:01:05  -   -   -    -    -    -    -

Modem 1/1, AS5200 Non-Manageable Modem
Firmware (Boot) Rev: Unknown
Modem config: Unknown
Management config: Not Manageable Modem

Last clearing of "show modem" counters never
- incoming completes, - incoming failures
- outgoing completes, - outgoing failures,
0 failed dial attempts, 0 ring no answers, 0 busied outs
0 no dial tones, 0 dial timeouts, 0 watchdog timeouts
- no carriers, - link failures, 0 resets
- protocol timeouts, - protocol errors, - lost events

                      2400-       2400-14400     14400+
# of connections        -             -             -
```

The following example displays the call switching module information for modem 1/2:

```
AS5200# show modem csm 1/2
MODEM_INFO: slot 1, port 2, unit 130, modem_mask=0x0004, modem_port_offset=0
tty_hwidb=0x00000000, modem_tty=0x004370A8, mgmt_tty=0x004370A8, modem_pool=0x0041D99C
csm_status(0): CSM_STATUS_UNLOCKED
csm_state(0x00000000)=CSM_OC_STATE, csm_event_proc=0x0005B448
invalid_event_count=0, wdt_timeout_count=0
wdt_timestamp_started is not activated
wait_for_dialing:False, wait_for_bchan:False
pri_chnl=TDM_ISDN_STREAM(s0, c0), modem_chnl=TDM_ISDN_STREAM(s0, c0)
dchan_idb_start_index=0, dchan_idb_index=0, call_id=0x0000, bchan_num=0
csm_event=CSM_EVENT_NONE, cause=0x0000, phone_num=
ring_indicator=0, oh_state=0, oh_int_enable=0, modem_reset=0
ring_no_answer=0, ic_failure=0, ic_complete=0
dial_failure=0, oc_failure=0, oc_complete=0
oc_busy=0, oc_no_dial_tone=0, oc_dial_timeout=0
remote_link_disc=0, busyout=0, modem_reset=0
call_duration_started=00:00:00, call_duration_ended=00:00:00,
total_call_duration=00:00:00
The calling party phone number = 4082968388
The called party phone number = 4085267406
```

Table 8 describes the most useful fields in the previous display.

Table 8   Show Modem Call Switching Module Field Descriptions

Field	Description
MODEM_INFO	Displays internal data structure information.
csm_status	Displays the status of the call switching module. Possible displays include unlocked, active call, busyout req, shutdown, bad modem, modem hold, back-to-back, file downloading, and reset.
csm_state	Displays the current state of the call switching module. Possible states include idle and connected. Incoming calls are marked *IC* and outgoing calls are marked *OC*.
Modem counters	Counters for different modem events.
The calling party phone number The called party phone number	Phone numbers for the dialing integrated modem and the remote modem.

The following example shows the event log status for a manageable modem and identifies the time elapsed since each modem event was performed (for example, 01:02:41 means the modem event occurred 1 hour, 2 minutes, and 41 seconds ago):

```
AS5200# show modem log 1/1
Modem 1/1 Events Log:
  00:02:41: Startup Response: Brasil Modem
            Modem (boot) firmware = 1.0.23 (1.0.5)
  00:02:41: Control Reply: 0xFE01
  00:02:41: RS232 event:
            RTS=On, DTR=Off, CTS=On
            DSR=On, DCD=On, RI=Off, TST=Off
            changes: RTS=No change, DTR=Changed, CTS=Changed
            changes: DSR=Changed, DCD=Changed, RI=No change, TST=No change
  00:02:41: Modem Activity event: Data Active
  00:02:41: RS232 event:
            RTS=On, DTR=Off, CTS=On
            DSR=On, DCD=On, RI=Off, TST=Off
```

```
                changes: RTS=No change, DTR=No change, CTS=No change
                changes: DSR=No change, DCD=No change, RI=No change, TST=No change
    00:02:42: Modem State event: Idle
    00:02:42: End connection event: Retransmits for MNP block (TX/RX) = 0/0
                Duration = 0:00:00, Number of TX/RX char = 0/0
                Local Disc Reason = Unknown, Remote Disc Reason = Unknown
    00:02:29: DTR event: DTR On
    00:02:29: RS232 event:
                RTS=On, DTR=On, CTS=On
                DSR=On, DCD=On, RI=Off, TST=Off
                changes: RTS=No change, DTR=Changed, CTS=No change
                changes: DSR=No change, DCD=No change, RI=No change, TST=No change
    00:02:34: ISDN outgoing called number: 16664200
    00:02:34: Modem State event: Dialing/Answering
    00:02:22: Modem State event: Waiting for Carrier
    00:01:58: Modem State event: Connected
    00:01:58: Connection event: TX/RX Speed = 26400/26400, Modulation = V34
                Direction = Originate, Protocol = reliable/MNP, Compression = V42bis
    00:01:58: Modem Analog signal event: TX = -13, RX = -14, Signal to noise = -40
    00:01:58: RS232 event:
                RTS=On, DTR=On, CTS=On
                DSR=On, DCD=Off, RI=Off, TST=Off
                changes: RTS=No change, DTR=No change, CTS=No change
                changes: DSR=No change, DCD=Changed, RI=No change, TST=No change
    00:00:57: Modem State event: Disconnecting
    00:00:57: Modem Activity event: Data Active
    00:00:57: End connection event: Retransmits for MNP block (TX/RX) = 0/0
                Duration = 0:00:59, Number of TX/RX char = 30/2061
                Local Disc Reason = Remote Link Disc, Remote Disc Reason = DTR Drop
    00:00:57: Modem State event: Idle
```

The following example shows the cumulative system statistics for all manageable modems on the access server:

```
AS5200# show modem summary
            Incoming calls       Outgoing calls      Busied   Failed   No    Succ
    Usage  Succ   Fail  Avail   Succ   Fail  Avail   Out      Dial     Ans   Pct.
    5%     2      0     12      0      0     0       0        0        0     100%
```

Table 9 describes the fields in the previous display.

Table 9   Show Modem Summary Field Descriptions

Fields	Descriptions
Incoming and Outgoing calls	Calls dialing into and out of the modem. • Usage—Percentage of the total system uptime that all the modems are in use. • Succ—Total calls successfully connected. • Fail—Total calls that did not successfully connect. • Avail—Total modems available for use in the system.
Busied Out	Total number of times the modems were taken out of service with the **modem busy** command or the **modem shutdown** command.
Failed Dial	Total number of attempts the modems did not hang up or there was no dial tone.
No Ans	Total number of times call ringing was detected, but the calls were not answered by a modem.
Succ Pct.	Successful connection percentage of total available modems.

The following example shows the sample display for modem group 1, which is composed of
modem 1/0 through modem 1/23:

```
AS5200# show modem group 1
                Incoming calls      Outgoing calls    Busied   Failed  No    Succ
 Grp  Usage  Succ   Fail  Avail   Succ   Fail  Avail  Out      Dial    Ans   Pct.
 1    0%     0      0     24      0      0     24     0        0       0     0%

 Modem Group 1: 1/0, 1/1, 1/2, 1/3, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/11, 1/12, 1/13,
 1/14, 1/15, 1/16, 1/17, 1/18, 1/19, 1/20, 1/21, 1/22, 1/23
```

The following example shows all the directly connected sessions currently using the internal
out-of-band ports on the integrated manageable modems:

```
AS5200# show modem at-mode
Active AT-MODE management sessions:
Modem    User's Terminal
1/1 0 cty 0
```

show tdm connections

To display a snapshot of the time division multiplexer (TDM) bus connection memory in an Cisco AS5200, use the **show tdm connections** EXEC command.

> **show tdm connections** [**motherboard** | **slot** *number*]

Syntax Description

motherboard   (Optional) Motherboard in the Cisco AS5200.

slot *number*   (Optional) Slot number.

Command Mode

EXEC

Usage Guidelines

The **show tdm connections** command shows the connection memory for all TDM bus connections in the access server if you do not limit the display to the motherboard or a slot.

Sample Display

The following example shows source stream 3 (ST3) channel 2 switched out of stream 6 (ST6) channel 2:

```
AS5200# show tdm connections motherboard
MT8980 motherboard unit 0, Control Register = 0x1F, ODE Register = 0x06
Connection Memory for ST6:
Ch0:  0x62, Ch1:  0x00, Ch2:  0x00, Ch3:  0x00
Ch4:  0x00, Ch5:  0x00, Ch6:  0x00, Ch7:  0x00
Ch8:  0x00, Ch9:  0x00, Ch10: 0x00, Ch11: 0x00
Ch12: 0x00, Ch13: 0x00, Ch14: 0x00, Ch15: 0x00
Ch16: 0x00, Ch17: 0x00, Ch18: 0x00, Ch19: 0x00
Ch20: 0x00, Ch21: 0x00, Ch22: 0x00, Ch23: 0x00
Ch24: 0x00, Ch25: 0x00, Ch26: 0x00, Ch27: 0x00
Ch28: 0x00, Ch29: 0x00, Ch30: 0x00, Ch31: 0x00
```

To interpret the hexadecimal number 0x62 into meaningful information, you must translate it into binary code. These two hexadecimal numbers represent a connection from any stream and a channel on any stream. The number 6 translates into the binary code 0110, which represents the third-source stream. The number 2 translates into the binary code 0010, which represents the second-source channel.

Stream 6 (ST6) channel 0 is the destination for source stream 3 (ST3) channel 2 in this example.

show tdm data

To display a snapshot of the time division multiplexer (TDM) bus data memory in an Cisco AS5200, use the **show tdm connections** EXEC command.

show tdm data [**motherboard** | **slot** *number*]

Syntax Description

motherboard	(Optional) Motherboard in the Cisco AS5200.
slot *number*	(Optional) Slot number.

Command Mode

EXEC

Usage Guidelines

The data memory for all TDM bus connections in the access server is displayed if you do not specify a motherboard or slot.

Sample Display

The following example shows a snapshot of TDM memory where the normal ISDN idle pattern (0x7E) is present on all channels of the TDM device resident on the motherboard:

```
AS5200# show tdm data motherboard
MT8980 motherboard unit 0, Control Register = 0x1F, ODE Register = 0x06
Data Memory for ST0:
Ch0:  0x7E, Ch1:  0x7E, Ch2:  0x7E, Ch3:  0x7E
Ch4:  0x7E, Ch5:  0x7E, Ch6:  0x7E, Ch7:  0x7E
Ch8:  0x7E, Ch9:  0x7E, Ch10: 0x7E, Ch11: 0x7E
Ch12: 0x7E, Ch13: 0x7E, Ch14: 0x7E, Ch15: 0x7E
Ch16: 0x7E, Ch17: 0x7E, Ch18: 0x7E, Ch19: 0x7E
Ch20: 0x7E, Ch21: 0x7E, Ch22: 0x7E, Ch23: 0x7E
Ch24: 0x7E, Ch25: 0x7E, Ch26: 0x7E, Ch27: 0x7E
Ch28: 0x7E, Ch29: 0x7E, Ch30: 0x7E, Ch31: 0x7E
Data Memory for ST1:
Ch0:  0x7E, Ch1:  0x7E, Ch2:  0x7E, Ch3:  0x7E
Ch4:  0x7E, Ch5:  0x7E, Ch6:  0x7E, Ch7:  0x7E
Ch8:  0x7E, Ch9:  0x7E, Ch10: 0x7E, Ch11: 0x7E
Ch12: 0x7E, Ch13: 0x7E, Ch14: 0x7E, Ch15: 0x7E
Ch16: 0x7E, Ch17: 0x7E, Ch18: 0x7E, Ch19: 0x7E
Ch20: 0x7E, Ch21: 0x7E, Ch22: 0x7E, Ch23: 0x7E
Ch24: 0x7E, Ch25: 0x7E, Ch26: 0x7E, Ch27: 0x7E
Ch28: 0x7E, Ch29: 0x7E, Ch30: 0x7E, Ch31: 0x7E
```

test modem back-to-back

To diagnose a modem that may not be functioning properly in an Cisco AS5200, use the **test modem back-to-back** EXEC command.

test modem back-to-back {*first-slot/modem-number*} {*second-slot/modem-number*}

Syntax Description

first-slot/modem-number	Slot and modem number of the first test modem. Remember to include the forward slash (/) when entering this variable.
second-slot/modem-number	Slot and modem number of the second test modem. Remember to include the forward slash (/) when entering this variable.

Default

Disabled

Command Mode

EXEC

Usage Guidelines

Use this command to perform back-to-back testing of two modems. You might need to enable this command on several different combinations of modems to determine which one is not functioning properly.

Example

The following example shows how to perform a back-to-back modem test between modem 2/0 and modem 2/1 and removes modem 2/1, which is associated with TTY line 26, from all dial-in and dial-out services:

```
AS5200# test modem back-to-back 2/0 2/1
back2back 2/0 2/1
Repetitions (of 10-byte packets) [1]:
AS5200#
%MODEM-5-B2BCONNECT: Modems (2/0) and (2/1) connected in back-to-back test:
CONNECT9600/REL-MNPM
%MODEM-5-B2BMODEMS: Modems (2/0) and (2/1) completed back-to-back test: success/packets
= 2/2
```

Related Command

modem bad

Update to Debug Command Reference

Add the following commands to the *Cisco IOS Release 11.1 Debug Command Reference*:

- **debug modem csm**
- **debug modem oob**
- **debug modem trace**
- **debug tdm**

debug modem csm

To debug an AS5200 modem's call switching module, use the **debug modem csm** EXEC command. Use the **no** form of this command to disable debug output.

> **debug modem csm** [*slot/modem-port* | **group** *group-number*]
> **no debug modem csm** [*slot/modem-port* | **group** *group-number*]

Syntax Description

slot/modem-port   (Optional) Slot and modem port number. Remember to include the forward slash (*/*) when entering this variable.

group *group-number*   (Optional) Modem group.

Command Mode

EXEC

Usage Guidelines

Use the **debug modem csm** command to troubleshoot call switching problems. Once you enable this command, the whole sequence of switching of incoming calls and outgoing calls can be traced on the screen.

Sample Displays

The following example shows call switching module (csm) trace output when the **debug modem csm** is configured and an incoming call enters the modem:

```
AS5200(config)# service timestamps debug uptime
AS5200(config)# end
AS5200# debug modem csm

Modem Management Call Switching Module debugging is on
AS5200#
00:04:09:  ccpri_ratetoteup bear rate is 10
00:04:09: CSM_MODEM_ALLOCATE: slot 1 and port 0 is allocated.
00:04:09: MODEM_REPORT(0001): DEV_INCALL at slot 1 and port 0
00:04:09: CSM_PROC_IDLE: CSM_EVENT_ISDN_CALL at slot 1, port 0
00:04:11: CSM_RING_INDICATION_PROC: RI is on
00:04:13: CSM_RING_INDICATION_PROC: RI is off
00:04:15: CSM_PROC_IC1_RING: CSM_EVENT_MODEM_OFFHOOK at slot 1, port 0
```

The following example shows csm trace output when the **debug modem csm** command is configured and an outgoing call is dialed from modem 1/2 into the network:

```
atdt16665202
00:11:21: CSM_PROC_IDLE: CSM_EVENT_MODEM_OFFHOOK at slot 1, port 2
00:11:21: T1_MAIL_FROM_NEAT: DC_READY_RSP: mid = 1, slot = 0, unit = 0
00:11:21: CSM_PROC_OC1_REQUEST_DIGIT: CSM_EVENT_DIGIT_COLLECT_READY at slot 1, port 2
00:11:24: T1_MAIL_FROM_NEAT: DC_FIRST_DIGIT_RSP: mid = 1, slot = 0, unit = 0
00:11:24: CSM_PROC_OC2_COLLECT_1ST_DIGIT: CSM_EVENT_GET_1ST_DIGIT at slot 1, port 2
00:11:27: T1_MAIL_FROM_NEAT: DC_ALL_DIGIT_RSP: mid = 1, slot = 0, unit = 0
00:11:27: CSM_PROC_OC3_COLLECT_ALL_DIGIT: CSM_EVENT_GET_ALL_DIGITS (16665202) at slot 1,
port 2
00:11:27:  ccpri_ratetoteup bear rate is 10
00:11:27: MODEM_REPORT(A000): DEV_CALL_PROC at slot 1 and port 2
00:11:27: CSM_PROC_OC4_DIALING: CSM_EVENT_ISDN_BCHAN_ASSIGNED at slot 1, port 2
```

debug modem oob

To debug an AS5200 modem's out-of-band port, use the **debug modem oob** EXEC command. Use the **no** form of this command to disable debug output.

debug modem oob [*slot/modem-port* | **group** *group-number*]
no debug modem oob [*slot/modem-port* | **group** *group-number*]

Syntax Description

slot/modem-port	(Optional) Slot and modem port number. Remember to include the forward slash (*/*) when entering this variable.
group *group-number*	(Optional) Modem group.

Command Mode

EXEC

Usage Guidelines

Entering the **debug modem oob** command without specifying a slot and modem number debugs all out-of-band ports in the AS5200, which produces an excessive amount of output information.

The message types and sequence numbers that appear in the command's output are initiated by the modem oob protocol and used by software developers for debugging purposes.

Sample Display

The following example debugs the out-of-band port on modem 2/0, which creates modem startup messages between the network management software and the modem:

```
AS5200# debug modem oob 2/0
MODEM(2/0): One message sent --Message type:3, Sequence number:0
MODEM(2/0): Modem DC session data reply
MODEM(2/0): One mes%sage sent --Message type:83, Sequence number:1
MODEM(2/0): DC session event =
MODEM(2/0): One message sent --Message type:82, Sequence number:2
MODEM(2/0): No status changes since last polled
MODEM(2/0): One message sent --Message type:3, Sequence number:3
MODEM(2/0): Modem DC session data reply
MODEM(2/0): One message sent --Message type:83, Sequence number:4
```

debug modem trace

To debug an AS5200 modem's call trace, use the **debug modem trace** EXEC command. Use the **no** form of this command to disable debug output.

> **debug modem trace** [**normal** | **abnormal** | **all**] [*slot/modem-port* | **group** *group-number*]
> **no debug modem trace** [**normal** | **abnormal** | **all**] [*slot/modem-port* | **group** *group-number*]

Syntax Description

normal	(Optional) Uploads the call trace to the syslog server on normal call termination (for example, a local user hangup or a remote user hangup).
abnormal	(Optional) Uploads the call trace to the syslog server on abnormal call termination (for example, any call termination other than normal termination, such as a lost carrier or a watchdog timeout).
all	(Optional) Uploads the call trace on all normal and abnormal call termination.
slot/modem-port	(Optional) Slot and modem port number. Remember to include the forward slash (/) when entering this variable.
group *group-number*	(Optional) Modem group.

Command Mode

EXEC

Usage Guidelines

The **debug modem trace** command applies only to manageable modems, which are modems that support modem polling and sending AT commands.

Sample Display

The following example is sample output from the **debug modem trace abnormal** command:

```
AS5200# debug modem trace abnormal 1/14

Modem 1/14 Abnormal End of Connection Trace. Caller 123-4567
    Start-up Response: AS5200 Modem, Firmware 1.0
    Control Reply: 0x7C01
    DC session response: brasil firmware 1.0
    RS232 event:
    DSR=On, DCD=On, RI=Off, TST=Off
    changes: RTS=No change, DTR=No change, CTS=No change
    changes: DSR=No change, DCD=No change, RI=No change, TST=No change
    Modem State event: Connected
    Connection event: Speed = 19200, Modulation = VFC
    Direction = Originate, Protocol = reliable/LAPM, Compression = V42bis
    DTR event: DTR On
    Modem Activity event: Data Active
    Modem Analog signal event: TX = -10, RX = -24, Signal to noise = -32
    End connection event: Duration = 10:34-11:43,
    Number of xmit char =        67, Number of rcvd char = 88, Reason: Watchdog Time-out.
```

debug tdm

To display time division multiplexer (TDM) bus connection information each time a connection is made on the Cisco AS5200, use the **debug tdm** EXEC command. Use the **no** form of this command to disable debug output.

debug tdm
no debug tdm

Syntax Description

This command has no arguments or keywords.

Command Mode

EXEC

Usage Guidelines

If you are losing channel data between the dual T1 Primary Rate Interfaces (PRI) and any termination points, such as an Ethernet or modem point, enable the **debug tdm** command.

This command displays the TDM bus connection information for each TDM device installed in the access server. One TDM device exists on the PRI board, on the motherboard, and on each modem board. Expect up to 256 TDM connections to be displayed on your terminal when this command is enabled.

Example

The following example enables the **debug tdm** command:

```
debug tdm
dialtone connection requested.
TDM(reg: 0x2138100): Close connection to STo7, channel 1
TDM(reg: 0x2138100): Connect STi3, channel 1 to STo7, channel 1
```

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CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously—a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, Internet e-mail, and fax download options, and is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: `http://www.cisco.com`.

- Telnet: `cco.cisco.com`.

- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and baud rates up to 14.4 kbps.

For a copy of CCO's Frequently Asked Questions (FAQ), contact `cco-help@cisco.com`. For additional information, contact `cco-team@cisco.com`.

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