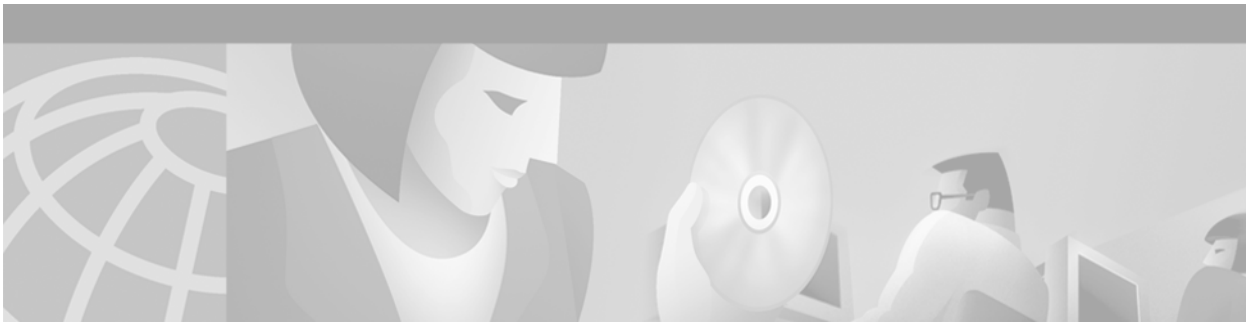

# V.110 Support for Cisco 3600 Series Digital Modems

This feature implements the V.110 protocol on Cisco digital modem network modules (NM-6DM, NM-12DM, NM-18DM, NM-24DM, and NM-30DM) for the Cisco 3600 series of routers, and provides V.110 support for digital modems connected over BRI or PRI interfaces.

This document contains the following sections:



## Feature Overview

V.110 is a real-time method of encapsulating varying data rates and the associated RS-232 signals into a 64-Kbps ISDN B-channel. Using this procedure, asynchronous data rates from 600 bps to 38.4 Kpbs can be transparently rate-adapted over a single 64-Kbps channel.

V.110 is useful for transporting data over GSM-type mobile phones. V.110 over ISDN support is being added to the MARS platform to support digital modems in many countries which use E1 with ISDN.

V.110, as an alternative to V.120, is a method of ISDN rate adaption. It provides DTEs with V-series type interfaces with access to ISDN networks by bit stuffing. Many V.110 devices are used in Europe and Japan.

### Benefits

The V.110 recommendation of the ITU-T rate adapts a low-speed connection to an ISDN B-channel, allowing the remote station or terminal adapter to use the fast call-setup times offered by ISDN. This feature enables Global System for Communications (GSM) wireless connectivity.

## Restrictions

- The BRI interface with V.110 is not supported by the Cisco 3620 router.
- Cisco 3600 series routers require Low Layer Compatability (LLC) information from the Telco switch.

## Related Documents

- *Cisco IOS Dial Services Configuration Guide:Terminal Services* , Release 12.1
- *Cisco IOS Dial Services Command Reference* , Release 12.1

# Supported Platforms

The following platforms are supported:

- Cisco 3620
- Cisco 3640
- Cisco 3660

The following network modules (NM) support V.110:

- NM-6DM
- NM-12DM
- NM-18DM
- NM-24DM
- NM-30DM

# Supported Standards, MIBs, and RFCs

### Standards

ITU-T Recommendation V.110

### MIBs

No new or modified MIBs are supported by this feature.

To obtain lists of MIBs supported by platform and Cisco IOS release and to download MIB modules, go to the Cisco MIB web site on Cisco Connection Online (CCO) at http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml.

### RFCs

No new or modified RFCs are supported by this feature.

# Configuration Tasks

There are no configuration tasks. All commands in this feature are existing **show modem** commands with modified display output.

**Note** Cisco 3600 series routers require Low Layer Compatability (LLC) information from the Telco switch. If you have problems setting up your connection, verify that the Telco switch supports LLC.

# Command Reference

No new commands were added for this feature. However, the output for the following commands was modified to include V.110 information. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command reference publications.

- **show modem**
- **show modem log**
- **show modem configuration**
- **show modem connect-speeds**
- **show modem operational-status**

# show modem

To display a high-level performance report for all modems or a single modem, use the **show modem** EXEC command.

**show modem** [*slot*/*port* | **group** *number*]

## Syntax Description

| | |
|---|---|
| *slot*/*port* | (Optional) Specifies the location of a slot and modem port. Remember to include the forward slash (/) when entering this variable. |
| **group** *number* | (Optional) Specifies a modem group to which a specified modem belongs. The group number range is 1 to 200. |

## Defaults

There are no default behaviors or values for this command.

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 11.2 | This command was introduced. |
| 12.1(5)T | This command was modified to show the output display indicating V.110 support on Cisco 3600 series platforms. |

## Examples

```
Router# show modem

  Codes:
  * - Modem has an active call
  R - Modem is being Reset
  D - Download in progress
  B - Modem is marked bad and cannot be used for taking calls
  b - Modem is either busied out or shut-down

        Avg Hold     Inc calls     Out calls    Busied   Failed    No      Succ
  Mdm     Time      Succ   Fail   Succ   Fail    Out      Dial   Answer   Pct.
* 0/0   00:21:01     132      0      0      0       0        0       0    100%
* 0/1      2d01h      1      0      0      0       0        0       0    100%
  0/2   00:00:34     130      0      0      0       0        0       0    100%
* 0/3   00:21:53     126      1      0      0       0        0       0     99%
* 0/4      2d01h      1      0      0      0       0        0       0    100%
  0/5   00:00:33     131      0      0      0       0        0       0    100%
* 0/6   00:21:12     131      0      0      0       0        0       0    100%
  0/7   00:00:34     131      0      0      0       0        0       0    100%
b 0/8   00:00:00       0      0      0      0       0        0       0      0%
b 0/9   00:00:00       0      0      0      0       0        0       0      0%
!.
!.
!.
b 0/29  00:00:00       0      0      0      0       0        0       0      0%
Total:  00:18:25     783      1      0      0       0        0       0     99%
```

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

```
Router# show modem
                Inc calls     Out calls     Busied   Failed  No       Succ
  Mdm  Usage    Succ   Fail   Succ   Fail   Out      Dial    Answer   Pct.
* 1/0    17%      74      3      0      0      0         0       0     96%
* 1/1    15%      80      4      0      0      0         1       1     95%
* 1/2    15%      82      0      0      0      0         0       0    100%
  1/3    21%      62      1      0      0      0         0       0     98%
  1/4    21%      49      5      0      0      0         0       0     90%
* 1/5    18%      65      3      0      0      0         0       0     95%
* 1/6    19%      58      2      0      0      0         0       0     96%
* 1/7    17%      67      5      0      0      0         1       1     93%
* 1/8    20%      68      3      0      0      0         0       0     95%
  1/9    16%      67      2      0      0      0         0       0     97%
  1/10   18%      56      2      0      0      0         1       1     96%
* 1/11   15%      76      3      0      0      0         0       0     96%
* 1/12   16%      62      1      0      0      0         0       0     98%
  1/13   17%      51      4      0      0      0         0       0     92%
  1/14   16%      51      5      0      0      0         0       0     91%
  1/15   17%      65      0      0      0      0         0       0    100%
  1/16   15%      73      3      0      0      0         0       0     96%
  1/17   17%      67      2      0      0      0         0       0     97%
  1/18   17%      61      2      0      0      0         0       0     96%
* 1/19   17%      74      2      0      0      0         0       0     97%
  1/20   16%      65      1      0      0      0         0       0     98%
* 1/21   16%      58      3      0      0      0         0       0     95%
* 1/22   18%      56      4      0      0      0         0       0     93%
* 1/23   20%      60      4      0      0      0         0       0     93%
```

Table 1 describes the fields shown in the previous displays of the **show modem** command.

***Table 1 show modem Field Descriptions***

| Field | Description |
|---|---|
| Mdm | Slot and modem port number. Also, the following modem states can appear to the left of a slot/modem port number:<br>• **b**—Modem was removed from service with the **modem shutdown** command or the **modem busyout** command.<br>• **B**—Modem is suspected to be inoperable or bad. No calls can be made with this modem. The letter B can also mean that a modem firmware download failed for the specified modem. In this case, try unmarking the modem as bad with the **no modem bad** command and upgrading the modem firmware.<br>• **d**—The RAM-based DSP code, which supports K56flex, is not configured. The modem will revert to transmitting at 33.6 kbps.<br>• **D**—Modem is currently downloading firmware.<br>• **p**—Firmware download is pending, typically because one or more modems is active.<br>• **R**—Modem is held and isolated in a suspended state by the **modem hold-reset** command.<br>• **T**—Modem is conducting a back-to-back test with another modem.<br>• ***—Modem is connected or dialing. |
| Usage | Percentage of the total system uptime that all modems are in use. |

| Field | Description |
|---|---|
| Inc calls | Number of incoming calls that successfully and unsuccessfully connected to a modem. |
| Out calls | Number of outgoing calls that successfully and unsuccessfully dialed out from an available 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 2/10. A dash (-) indicates a field that is not available on basic modems. An x indicates a field that is available and active on manageable modems. See Table 2 for a description of the fields displayed by the **show modem** command.

```
Router> show modem 2/10
Mdm  Typ     Status     Tx/Rx     G  Duration  TX  RX  RTS  CTS  DSR  DCD  DTR
2/10 V34     Idle    33600/33600  1  00:00:00           x    x    x         x

Modem 2/10, Microcom MNP10 V34 Modem (Select), Async35, TTY35
Firmware (Boot) Rev: 2.1(9) (1.0(5))
Modem config: Incoming and Outgoing
Protocol: reliable/MNP, Compression: V42bis
Management port config: Status polling and AT session
Management port status: Status polling and AT session
TX signals: 0 dBm, RX signals: 0 dBm

  Last clearing of "show modem" counters never
    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 recover oob
    0 protocol timeouts, 0 protocol errors, 0 lost events

Connection Speeds         75      300      600     1200     2400     4800
# of connections          0        0        0        0        0        0
Connection Speeds       7200     9600    12000    14400    16800    19200
# of connections          0        0        0        0        0        0
Connection Speeds      21600    24000    26400    28800    31200    33600
# of connections          0        0        0        0        0        1
```

The following is an output example for a basic V.34 modem module:

**Note** Unavailable fields are marked with dashes (-).

```
Router# 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

Connection Speeds         75      300      600     1200     2400     4800
# of connections           0        0        0        0        0        0
Connection Speeds       7200     9600    12000    14400    16800    19200
# of connections           0        0        0        0        0        0
Connection Speeds      21600    24000    26400    28800    31200    33600
# of connections           0        0        0        0        0        0
```

The following display shows output information for the **show modem** *slot*/*port* command for V.110 modem cards:

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

Modem 0/1, V.110 Terminal Adaptor (Unmanaged), Async2, TTY2
Firmware (Boot) Rev: Unmanaged (Unmanaged)
Modem config: Incoming and Outgoing
Management config: Unmanaged

  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
    - no dial tones, - dial timeouts, 0 watchdog timeouts
    - no carriers, - link failures, 0 resets, - recover oob
    - protocol timeouts, - protocol errors, - lost events

Connection Speeds         75      300      600     1200     2400     4800
# of connections           -        -        -        -        -        -
Connection Speeds       7200     9600    12000    14400    16800    19200
# of connections           -        -        -        -        -        -
Connection Speeds      21600    24000    26400    28800    31200    32000
# of connections           -        -        -        -        -        -
Connection Speeds      33600    34000    36000    38000    40000    42000
# of connections           -        -        -        -        -        -
Connection Speeds      44000    46000    48000    50000    52000    54000
# of connections           -        -        -        -        -        -
Connection Speeds      56000
# of connections           -
```

The type of display output generated from the **show modem** *slot*/*port* command depends on the version of Cisco IOS software running on the router or access server. For example, the following example shows an example output for a 56K modem card, which carries digital modems that transmit at 56 kbps.

**Note** 56K modems do not modulate or demodulate data. A pure digital-to-digital connection is made.

See Table 2 for a description of the fields displayed by this modem card.

```
Router# show modem 0/0
Mdm  Typ     Status      Tx/Rx     G  Duration  TX  RX  RTS  CTS  DSR  DCD  DTR
0/0          Idle         0/0      0  00:00:00           x    x    x         x

Modem 0/0, Microcom MNP10 K56 Modem (Select), TTY1
Firmware (Boot) Rev: 3.1(16) (3.0(4))
DSP Controller (SPX) Rev: 1.1(0) (1.1(0))
Modem config: Incoming and Outgoing
Protocol: Normal, Compression: None
Management port config: Status polling and AT session
Management port status: Status polling and AT session
TX signals: 0 dBm, RX signals: 0 dBm

  Last clearing of "show modem" counters never
    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 recover oob
    0 protocol timeouts, 0 protocol errors, 0 lost events

Transmit Speed Counters:

Connection Speeds         75      300      600     1200     2400     4800
# of connections           0        0        0        0        0        0
Connection Speeds       7200     9600    12000    14400    16800    19200
# of connections           0        0        0        0        0        0
Connection Speeds      21600    24000    26400    28800    31200    32000
# of connections           0        0        0        0        0        0
Connection Speeds      33600    34000    36000    38000    40000    42000
# of connections           0        0        0        0        0        0
Connection Speeds      44000    46000    48000    50000    52000    54000
# of connections           0        0        0        0        0        0
Connection Speeds      56000
# of connections           0

Receive Speed Counters:

Connection Speeds         75      300      600     1200     2400     4800
# of connections           0        0        0        0        0        0
Connection Speeds       7200     9600    12000    14400    16800    19200
# of connections           0        0        0        0        0        0
Connection Speeds      21600    24000    26400    28800    31200    32000
# of connections           0        0        0        0        0        0
Connection Speeds      33600    34000    36000    38000    40000    42000
# of connections           0        0        0        0        0        0
Connection Speeds      44000    46000    48000    50000    52000    54000
# of connections           0        0        0        0        0        0
Connection Speeds      56000
# of connections           0
```

Table 2 describes the fields in the previous four displays, which were created using the **show modem** *slot*/*port* command. This table applies to all modem module types.

*Table 2 show modem slot/port Field Descriptions*

| Field | Description |
|---|---|
| Mdm | Slot and modem number. |
| Typ | Modulation type, which can be any of the following values: Bel103, Bel212, V110, V21, V22, V22bis, V23, V32, V32bis, VFC, V34, V17, V27, V33 and K56Flx |
| Status | Current status of the modem. Possible values include:<br>**Conn**—Modem is connected to a remote host.<br>**B**—Inoperable state, which is configured by the **modem bad** command.<br>**B***—Inoperable state, which is configured by the **modem startup-test** command during initial power-up testing.<br>**b**—Modem is busied out. This can be manually configured by the **modem busyout** line configuration command.<br>**Reset**—Modem is in reset mode.<br>**D/L**—Modem is downloading firmware.<br>**Bad FW**—Downloaded modem firmware is not operational.<br>**Busy**—Modem is out of service and not available for calls.<br>**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 that 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 (-).<br>• **TX**—Transmit Data. The DTE device transmits data to the DCE device.<br>• **RX**—Receive Data. The DCE device receives data from the DTE device.<br>• **RTS**—Request To Send. The DTE device signals to the DCE device that the DTE device accepts data into its buffers.<br>• **CTS**—Clear To Send. The DCE device signals to the DTE device that the DCE device accepts data into its buffers.<br>• **DSR**—Data Set Ready. The modem is ready to start communication.<br>• **DCD**—Data Carrier Detect. The DCE device indicates to the DTE device that a call is present and established with a remote modem. Dropping the DCD function terminates the session.<br>• **DTR**—Data Terminal Ready. The DTE device indicates to the DCE device that it accepts calls. |
| Firmware | Installed modem firmware. |

| Field | Description |
|---|---|
| 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/MNP4, and reliable/LAPM (Link Access Procedure for Modems). |
| Compression | Compression algorithm running on the modem, such as None, V42bis, and MNP5. |
| Management config | Indicates if the modem is configured for out-of-band feature polling. |
| TX signals | Transmit signal levels. For modulations that do not support signal-to-noise calculations, the ratio is 0. |
| RX signals | Transmit signal levels. |
| Last clearing of "show modem" counters | Last time the modem counters were cleared using the **clear modem counters** command. A summary of modem events also appears:<br>• Incoming completes and failures—Total number of incoming connection requests that the modem answered and successfully or unsuccessfully connected with the remote DCE device.<br>• Outgoing completes and failures—Total number of outgoing connection requests that the modem dialed and successfully or unsuccessfully connected with the remote DCE device.<br>• Failed dial attempts—Number of times the modem attempted to dial out but the call failed to leave the modem.<br>• Ring no answers—Number of times the integrated modem detected ringing but did not answer the incoming call.<br>• 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).<br>• No dial tones—Number of times the dial-out attempt failed because the modem failed to detect a dial tone.<br>• Dial timeouts—Number of times the modem has timed out while attempting to dial.<br>• Watchdog timeouts—Number of times the modem internal watchdog timer has expired.<br>• No carriers—Number of times the modem disconnected because no carrier was present.<br>• Link failures—Number of times the modem has detected a link failure.<br>• Resets—Number of times the modem has been reset.<br>• recover oob—Number of times the out-of-band feature has been cleared and reinitialized.<br>• Protocol timeouts and errors—Number of times the modem protocol failed to make a call connection.<br>• Lost events—Number of incomplete modem events performed by the modem. |
| Transmit Speed Counters | List of connection speeds that were sent by the modem. |

| Field | Description |
|---|---|
| Receive Speed Counters | List of connection speeds that were received by the modem. |
| Connection Speeds # of connections | A complete summary of possible connection speeds and the actual number of connections that occurred at those speeds. Depending on which modem port module and version of software you are running, possible connection speeds range from 75 to 56,000 bps. The number of successful connections is displayed directly beneath the connection speed identifier. For example, the following output shows that three connections were made at 56 kbps.<br>`Connection Speeds 56000 # of connections 3` |

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

```
Router# 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
```

## Related Commands

| Command | Description |
|---|---|
| **show modem version** | Displays version information about the modem firmware, controller, DSP code (for 56-kbps modems only), and boot code. |

# show modem log

To display the modem history event status performed on a manageable modem or group of modems, use the **show modem log** EXEC command.

**show modem log** [*slot*/*port* | **group** *number*]

## Syntax Description

| | |
|---|---|
| *slot*/*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. The group number range is from 1 to 200. |

## Defaults

There are no default behaviors or values for this command.

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 11.2 | This command was introduced. |
| 12.1(5)T | This command was modified to show display output for Cisco 3600 series digital modems that support V.110. |

## Examples

The following example shows a portion of the output display when using the **show modem log** command. Since no specific modem or range of modems is designated, the data from all modems is shown. The V.110 information is highlighted in this example.

```
Router# show modem log
Modem 0/0 Mica: Event Log contains 100 Events:
1d21h MICA-Cfg issued S-Reg configuration change:
    configuration index = 59, value = 0x3
1d21h CSM: Incoming call from 9195555301 to Unknown
1d21h CSM: event-ISDN_CALL New State-IC_MODEM_RESERVED
    CSM: status-1 dchan-3/2 bchan-0
...
1d21h CSM: event-MODEM_CONNECTED New State-CONNECTED_STATE
1d21h MICA-Qry Static Link Information:
    Connect Protocol - V.110, Compression - None, Connected Standard - V110
    Tx/Rx Symbol Rate - 0/0, Tx/Rx Carrier Freq - 0/0
    Tx/Rx Trellis Coding - /, Frequency offset - 0Hz
    Round trip delay - 0ms, Tx/Rx bit rate - 2400/2400
    RBS pattern - 0x0, digital pad - , compensation - 0
1d21h MICA-Cmd Set Framing Mode to PPP.
...
1d21h MICA-Qry Final Link Information:
    Call Time - 00:00:34, Disconnect Reason (0x8001) - SOFTWARE_RESET command
    0 retrains and/or speed shifts, 0 ec retransmissions
    9454 chars tx, 6577 chars rx, 0 chars rx bad
```

```
    189 ppp packets tx, 129 ppp packets rx, 14 ppp packets rx bad
    0 ec packets tx, 0 ec packets rx, 0 ec packets rx bad
    0 v110 packets tx, 0 v110 packets rx, 0 v110 packets rx bad, 0 v110 sync loss
1d21h CSM: event-ASYNC_DTR_DOWN New State-IDLE_STATE
1d21h CSM: event-ASYNC_DTR_DOWN New State-IDLE_STATE
...
1d21h MICA-Cfg issued S-Reg configuration change:
    S29 = 8       V.110 modem standard
1d21h MICA-Cfg issued S-Reg configuration change:
    S57 = 3       User rate for V.110 connection is 3 bps
...
```

## Related Commands

| Command | Description |
|---|---|
| **show modem configuration** | Displays the current modem configuration for digital MICA modems loaded inside access servers or routers. |
| **show modem mica** | Displays information about MICA digital modems. |
| **show modem operational-status** | Displays the current modem operational status for MICA digital modems loaded in access servers or routers. |

# show modem configuration

To display the current modem configuration for digital MICA technologies modems loaded inside an access server or router, use the **show modem configuration** EXEC command.

**show modem configuration** [*slot*/*port*]

## Syntax Description

| | |
|---|---|
| *slot*/*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. |

## Defaults

There are no default behaviors or values for this command.

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 11.2P | This command was introduced. |
| 12.1(5)T | This command was modified to show output display for Cisco 3600 series digital modems that support V.110. |

## Examples

The following example shows the display output when using the show modem configuration command. A specific modem, 0/0, has been designated. V.110 information is highlighted in this example.

```
Router# show modem configuration 0/0
  S-Reg   Value   Meaning
 ——-|——|————————————
    S-- = 1       Country Code is Default u-law
    S00 = 0       Auto Answer immediately
    S01 = 0       Reserved
    S02 = 43      escape character is 0x2B or '+'
    S03 = 13      carriage return character is 0xD
    S04 = 10      line feed character is 0xA
    S05 = 8       backspace character is 0x8
    S06 = 2       pause 2 seconds before blind dialing
    S07 = 60      wait up to 60 seconds for carrier after dialing
    S08 = 2       comma adds 2 second dial delay
    S09 = 317     BitMap register value = 0x13D
    S10 = 14      1.4 second delay for hangup after carrier loss
    S11 = 0       In Answer Mode
    S12 = 3       3 Data Bits
    S13 = 3       Space Parity
    S14 = 1       1 Stop Bits
    S15 = 1       V.42 ODP generation enabled
    S16 = 50      5.0 second Error Correction autodetect timeout
    S17 = 100     10.0 second Error Correction negotiation timeout
    S18 = 13      Error Correction fallback char is 0xD
    S19 = 12      Error Correction retransmission limit is 12
    S20 = 256     Error Correction frame length is 256 octets
    S21 = 3       V42bis or MNP Data Compression
```

```
S22 = 0       ARA Error Correction is disabled
S23 = 1       V.42 Error Correction enabled
S24 = 1       MNP Error Correction enabled
S25 = 0       Link Protocol Fallback to Async framing
S26 = 0       Using TDM slice 0
S27 = 0       Calling Tone disabled
S28 = 0       Guard Tone disabled
S29 = 8       V.110 modem standard
S30 = 33600   Maximum connect rate of 33600 bps
S31 = 300     Minimum connect rate of 300 bps
S32 = 2       Bit Errors >= 1:1000 cause recovery
S33 = 500     Fallback/Fallforward Squelch Timer is 500ms
S34 = 2000    Fall Forward Timer is 20.0 seconds
S35 = 50      Fall Back Timer is 0.50 seconds
S36 = 20      Terminate timeout is 20 seconds
S37 = 60      Wait 60 seconds for data mode timeout
S38 = 14      1.4 second lost carrier to hang-up delay
S39 = 7       Transmit level setting of -13dBm
S40 = 4       4 consecutive retrains cause link disconnect
S41 = 5       V.34 maximum symbol rate of 3429 baud
S42 = 0       V.34 minimum symbol rate of 2400 baud
S43 = 2       V.34 carrier frequency is Auto Selection
S44 = 11      V.34 Preemphasis filter selection is Automatic
S45 = 0       Null transmit and receive Signalling Type
S46 = 0       No call progress tone detection
S47 = 2       +++ escape detection enabled for originate mode only
S48 = 1       AT command processor enabled
S49 = 0       no call setup delay
S50 = 60000   Maximum PCM connect rate of 60000 bps
S51 = 28000   Minimum PCM connect rate of 28000 bps
S52 = 1       Digital Pad Compensation is enabled
S53 = 3       V.8bis is enabled
S57 = 2400    User rate for V.110 connection is 2400 bps
configuration index = 59, value = 0x3
```

## Related Commands

| Command | Description |
|---|---|
| **show modem log** | Displays the modem history event status performed on a manageable modem or group of modems. |
| **show modem mica** | Displays information about MICA digital modems. |
| **show modem operational-status** | Displays the current modem operational status for MICA digital modems loaded in access servers or routers. |

# show modem connect-speeds

To display connection speed statistics for all modems running in an access server or router, use the **show modem connect-speeds** EXEC command. There is no **no** form of this command.

**show modem connect-speeds** [*max-speed* [*slot*]]

## Syntax Description

| | |
|---|---|
| *max-speed* | (Optional) Maximum speed you want displayed in the shifting speed window. You can specify from 12,000 to 56,000 bps. |
| *slot* | (Optional) Specifies the slot number, which limits the display output to a particular range of modems in the system. |

## Defaults

The maximum speed displayed is 12,000 bps.

## Command Modes

EXEC

## Command History

| Release | Modification |
|---|---|
| 11.3 | This command was introduced. |
| 12.1(5)T | This command was modified to show display output for Cisco 3600 series digital modems that support V.110. |

## Usage Guidelines

Because most terminal screens are not wide enough to display the entire range of connection speeds at one time (for example, 75 to 56,000 bps), the *max-speed* variable is used. This variable specifies the contents of a shifting baud-rate window, which provides you with a snapshot of modem connection speeds for your system. If you want to see a snapshot of lower baud rates, specify a lower connection speed. If you want to see a snapshot of higher baud rates, specify a higher connection speed.

The Cisco IOS software rounds up the *max-speed* variable to the nearest recognizable baud rate, so you do not need to memorize or enter exact connection speeds. For example, if you enter a maximum baud rate of 22059, the system software automatically rounds the value up to 24000.

To display a complete picture of all connection speeds and counters on the system, you must enter a series of commands. Each time you issue the **show modem connect-speeds** *max-speed* command, only nine baud rate columns can be displayed at the same time.

Table 3 shows a range of commands that you can issue, one at a time, to see a complete picture of the total possible connection speeds on your access server.

*Table 3 Connect Speed Displays for show modem connect-speeds Command*

| Command | Connect Speed Range Displayed |
|---|---|
| **show modem connect-speeds 56000** | 40,000 to 56,000 bps |
| **show modem connect-speeds 38000** | 24,000 to 38,000 bps |

| Command | Connect Speed Range Displayed |
|---|---|
| **show modem connect-speeds 21600** | 2,400 to 21,600 bps |
| **show modem connect-speeds 1200** | 75 to 1200 bps |

**Note** The Cisco IOS software does not accept commas (,) in the connect speed field. For example, enter 28000 not 28,000.

The **show modem connect-speeds** command displays a log of connection speed statistics starting from the last time the access servers or router was power cycled or the **clear modem counters** command was issued. If you want to create a monthly report of the connection speeds achieved by the modems, issue the **clear modem counters** command at the beginning of the month and issue the **show modem connect-speeds** command at the end of the month.

## Examples

```
Router# show modem connect-speeds

  Codes:
  * - Modem has an active call
  R - Modem is being Reset
  D - Download in progress
  B - Modem is marked bad and cannot be used for taking calls
  b - Modem is either busied out or shut-down

  Transmit connect speeds

   Mdm       75    300    600   1200   2400   4800   7200   9600  12000 TotCnt
* 0/0        0      0      0     36     35     61      0      0      0    132
* 0/1        0      0      0      1      0      0      0      0      0      1
  0/2        0      0      0     48     45     37      0      0      0    130
* 0/3        0      0      0     86     36      4      0      0      0    126
* 0/4        0      0      0      0      0      1      0      0      0      1
  0/5        0      0      0     20     33     78      0      0      0    131
* 0/6        0      0      0     25     57     49      0      0      0    131
  0/7        0      0      0     47     48     36      0      0      0    131
b 0/8        0      0      0      0      0      0      0      0      0      0
!.
!.
!.
b 0/29       0      0      0      0      0      0      0      0      0      0
 Tot         0      0      0    263    254    266      0      0      0    783
 Tot %       0      0      0     33     32     33      0      0      0

  Receive connect speeds

   Mdm       75    300    600   1200   2400   4800   7200   9600  12000 TotCnt
* 0/0        0      0      0     36     35     61      0      0      0    132
* 0/1        0      0      0      1      0      0      0      0      0      1
  0/2        0      0      0     48     45     37      0      0      0    130
* 0/3        0      0      0     86     36      4      0      0      0    126
* 0/4        0      0      0      0      0      1      0      0      0      1
  0/5        0      0      0     20     33     78      0      0      0    131
* 0/6        0      0      0     25     57     49      0      0      0    131
  0/7        0      0      0     47     48     36      0      0      0    131
b 0/8        0      0      0      0      0      0      0      0      0      0
!.
!.
!.
b 0/29       0      0      0      0      0      0      0      0      0      0
```

```
 Tot        0      0      0    263    254    266      0      0      0    783
 Tot %      0      0      0     33     32     33      0      0      0

Router# show modem connect-speeds ?
  <12000-64000>  Max baud connect speed to display to
  |              Output modifiers
  <cr>

Router# show modem connect-speeds 12000 ?
  <0-3>  Slot number
  |      Output modifiers
  <cr>

Router# show modem connect-speeds 12000 2

  Codes:
  * - Modem has an active call
  R - Modem is being Reset
  D - Download in progress
  B - Modem is marked bad and cannot be used for taking calls
  b - Modem is either busied out or shut-down

  Transmit connect speeds

  Mdm      75    300    600   1200   2400   4800   7200   9600  12000 TotCnt
 Tot        0      0      0    263    254    266      0      0      0    783
 Tot %      0      0      0     33     32     33      0      0      0

  Receive connect speeds

  Mdm      75    300    600   1200   2400   4800   7200   9600  12000 TotCnt
 Tot        0      0      0    263    254    266      0      0      0    783
 Tot %      0      0      0     33     32     33      0      0      0
```

The following example shows connection speed statistics up to 28,000 bps:

```
Router# show modem connect-speeds 28800

  transmit connect speeds

  Mdm    9600  12000  14400  16800  19200  21600  24000  26400  28800 TotCnt
* 1/0       0      0      0      0      3      4      6     37     23     74
* 1/1       0      0      3      1      0      4      9     41     20     80
* 1/2       0      0      2      0      1      3     10     37     26     82
  1/3       1      0      0      0      0      3     15     35      7     62
  1/4       0      0      0      0      4      2      8     20     13     49
* 1/5       0      0      4      0      1      0      4     38     17     65
* 1/6       0      0      2      1      0      1      9     32     11     57
* 1/7       1      0      2      0      0      5     10     31     18     67
* 1/8       0      0      0      1      1      1     10     42     11     68
  1/9       0      0      2      1      2      4      4     30     23     67
  1/10      0      0      0      0      0      2      5     26     22     56
* 1/11      0      0      0      0      3      1     16     38     17     76
* 1/12      0      0      0      0      0      3      7     40     12     62
  1/13      0      0      0      1      2      3     11     20     14     51
  1/14      0      0      2      0      0      2      7     26     12     51
  1/15      0      0      1      1      1      2      6     29     25     65
  1/16      2      0      2      0      1      5     10     37     15     73
  1/17      0      0      0      0      0      2     10     33     22     67
  1/18      0      0      2      2      0      2     12     17     25     61
* 1/19      2      0      3      0      1      2      9     35     20     74
  1/20      0      0      2      2      2      2      8     28     21     65
* 1/21      0      1      2      0      1      2      5     23     21     58
```

```
* 1/22       0       0       1       0       1       1       5      27      21      56
* 1/23       0       0       2       0       0       4       8      30      15      60
 Tot         6       1      32      10      24      60     204     752     431    1546
 Tot %       0       0       2       0       1       3      13      48      27

  receive connect speeds

  Mdm     9600  12000  14400  16800  19200  21600  24000  26400  28800 TotCnt
* 1/0        0      0      1      0      1      2      9     35     25     74
* 1/1        0      0      3      0      1      3     10     42     18     80
* 1/2        0      0      2      0      1      4      8     40     26     82
  1/3        1      0      0      0      0      1     10     36     14     62
  1/4        0      0      1      0      2      2      8     22      8     49
* 1/5        0      1      4      0      0      0      9     32     17     65
* 1/6        0      0      2      0      0      0      7     33     14     57
* 1/7        0      0      2      1      1      0      6     39     18     67
* 1/8        0      0      0      0      1      0     11     43     12     68
  1/9        1      0      3      0      0      0      8     33     22     67
  1/10       0      0      0      0      1      1      6     31     17     56
* 1/11       0      0      0      1      1      1     14     43     16     76
* 1/12       0      0      0      0      0      0      5     43     12     62
  1/13       0      0      0      0      0      2     10     26     13     51
  1/14       0      0      2      1      0      0      5     27     14     51
  1/15       0      0      1      0      1      2      3     36     22     65
  1/16       1      0      3      1      2      0      8     37     20     73
  1/17       0      0      0      0      0      0      8     36     22     67
  1/18       0      1      1      0      0      2      4     30     20     61
* 1/19       0      0      3      2      1      1      6     42     18     74
  1/20       0      1      2      1      2      1      2     37     18     65
* 1/21       0      0      3      3      1      2      2     28     18     58
* 1/22       0      0      1      0      1      0      5     32     16     56
* 1/23       0      0      2      0      0      1      8     35     13     60
 Tot         3      3     36     10     17     25    172    838    413   1546
 Tot %       0      0      2      0      1      1     11     54     26
```

The following example shows connection speed statistics up to 56,000 bps:

```
Router# show modem connect-speeds 56000

  transmit connect speeds

  Mdm   40000  42000  44000  46000  48000  50000  52000  54000  56000 TotCnt
  1/0       0      0      0      0      0      0      0      0      0       0
  1/1       0      0      0      0      0      0      0      0      0       0
  1/2       0      0      0      0      0      0      0      0      0       0
!.
!.
!.
  1/23      0      0      0      0      0      0      0      0      0       0
 Tot        0      0      0      0      0      0      0      0      0       0
 Tot %      0      0      0      0      0      0      0      0      0

  receive connect speeds

  Mdm   40000  42000  44000  46000  48000  50000  52000  54000  56000 TotCnt
  1/0       0      0      0      0      0      0      0      0      0       0
  1/1       0      0      0      0      0      0      0      0      0       0
  1/2       0      0      0      0      0      0      0      0      0       0
!.
!.
!.
```

```
1/23       0       0       0       0       0       0       0       0       0       0
 Tot         0       0       0       0       0       0       0       0       0       0
 Tot %       0       0       0       0       0       0       0       0       0       0
```

Table 4 describes of the fields shown in the previous display examples.

*Table 4 show modem connect-speeds Field Descriptions*

| Field | Description |
|---|---|
| transmit connect speeds | Connection speeds for calls initiated by the system. |
| Mdm slot/port | Specified slot and port number assigned to the modem. |
| speed counters | The transmit and receive speed counters are 75, 300, 600, 1200, 2400, 4800, 7200, 9600, 12000, 14400, 16800, 19200, 21600, 24000, 26400, 28800, 31200, 33600, 32000, 34000, 36000, 38000, 40000, 42000, 44000, 46000, 48000, 50000, 52000, 54000, and 56000 bps. |
| TotCnt | For the specified modem, the sum of the number of times a connection was initiated or received at one of the specified connection rates (75 to 56,000 bps). |
| Tot | For all modems loaded in the system, the total number of times a call was initiated or received at the specified speed. |
| Tot % | Percentage of the total number of calls that were initiated or received at the specified speed. |
| receive connect speeds | Connection speeds for incoming calls. |

# show modem operational-status

To display performance statistics for individual modems, use the **show modem operational-status** user EXEC and privileged EXEC command.

### Cisco AS2600, Cisco AS3600 series, Cisco AS5200, and Cisco AS5300 series access servers

**show modem operational-status** [*slot/port*]

### Cisco AS5800 series access servers

**show modem operational-status** [*shelf/slot/port*]

## Syntax Description

| | |
|---|---|
| *shelf/slot/port* | (Optional) Specifies the location of the shelf (Cisco AS5800 access server only) and slot and modem port. If these numbers are not specified, statistics for all connected modems are displayed. (Remember to include the forward slash (/) when entering these variables.) |

## Defaults

There are no default behaviors or values for this command.

## Command Modes

User EXEC and privileged EXEC

## Command History

| Release | Modification |
|---|---|
| 11.2(10)P | This command was introduced. |
| 12.1(5)T | This command was modified to include information for Cisco 3600 series routers. |

## Usage Guidelines

The **show modem operational-status** command is supported only on systems with internal MICA technologies or Microcom analog (NM-AM) modems, but not in systems with internal Microcom digital modems. To display performance statistics for access servers, use the following command sequence:

```
Router# modem at-mode s/p AT@E1
```

Sample output and explanations of the **AT@E1** modem command are provided in the document *AT Command Set and Register Summary for Analog Modem Network Modules* , found in the Analog Modem Firmware index of the Cisco 3600 Series Router documentation on CCO.

## Examples

```
Router# show modem operational-status 0/0
Modem (0/0) Operational Status:
 Parameter #0  Disconnect Reason Info:  (0x0)
       Type (=0 ):  <unknown>
      Class (=0 ):  Other
     Reason (=0 ):  no disconnect has yet occurred
 Parameter #1  Connect Protocol:  ISDN Mode
 Parameter #2  Compression:  None
 Parameter #3  EC Retransmission Count:  0
 Parameter #4  Self Test Error Count:  0
 Parameter #5  Call Timer:  179077 secs
 Parameter #6  Total Retrains:  0
 Parameter #7  Sq Value:  7
 Parameter #8  Connected Standard:  ISDN
 Parameter #9  TX,RX Bit Rate:  2400, 2400
 Parameter #11 TX,RX Symbol Rate:  0, 0
 Parameter #13 TX,RX Carrier Frequency:  0, 0
 Parameter #15 TX,RX Trellis Coding:  (n/a), (n/a)
 Parameter #16 TX,RX Preemphasis Index:  0, 0
 Parameter #17 TX,RX Constellation Shaping:  (n/a), (n/a)
 Parameter #18 TX,RX Nonlinear Encoding:  (n/a), (n/a)
 Parameter #19 TX,RX Precoding:  (n/a), (n/a)
 Parameter #20 TX,RX Xmit Level Reduction:  0, 0 dBm
 Parameter #21 Signal Noise Ratio:  0 dB
 Parameter #22 Receive Level:  0 dBm
 Parameter #23 Frequency Offset:  0 Hz
 Parameter #24 Phase Jitter Frequency:  0 Hz
 Parameter #25 Phase Jitter Level:  0 degrees
 Parameter #26 Far End Echo Level:  0 dBm
 Parameter #27 Phase Roll:  0 degrees
 Parameter #28 Round Trip Delay:  0 msecs
 Parameter #30 Characters transmitted, received:  39483250, 41069212
 Parameter #32 General Portware Information:  0
 Parameter #33 PPP/SLIP packets transmitted, received:  774185, 774894
 Parameter #35 PPP/SLIP packets received (BAD/ABORTED):  0
 Parameter #36 EC packets transmitted, received OK:  0, 0
 Parameter #38 EC packets (Received BAD/ABORTED):  0
 Parameter #39 Robbed Bit Signalling (RBS) pattern:  0
 Parameter #40 Digital Pad:  (n/a),  Digital Pad Compensation: None
 Parameter #41 V110/PIAFS frames received bad:  0
 Parameter #42 V110/PIAFS frames received good:  0
 Parameter #43 V110/PIAFS frames transmitted:  0
 Parameter #44 V110/PIAFS sync lost:  0
Line Shape:
.....................................................................*
.....................................................................*
.....................................................................*
.....................................................................*
.....................................................................*
.....................................................................*
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```

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**Related Commands**

| Command | Description |
|---|---|
| **show modem configuration** | Displays the current modem configuration for digital MICA modems loaded inside access servers or routers. |
| **show modem log** | Displays the modem history event status performed on a manageable modem or group of modems. |

# Glossary

**E1**—European equivalent of T1, 32 channels of 64 Khz, 1 for framing, 1 for signalling.

**GSM**—Global System for Communications

**ISDN**—Integrated Services Digital Network

**LLC**—Link Layer Control

**MICA**—Modem ISDN Channel Aggregation

**PRI**—Primary Rate Interface

**Q.931**—ISDN user-network interface Layer 3 specification for basic call control.

**T1**—North American channelized TDM with 24 channels of 64 Khz each, plus an 8 Khz frame.

**TA**—Terminal adapter.

**TDM**—Time-division multiplexing.

**V.110**—ITU-T standard for support by ISDN of Data Terminal Equipment (DTE) with V-series type interfaces.

**Note** For a list of other internetworking terms, see the Internetworking Terms and Acronyms document available on the Documentation CD-ROM and Cisco Connection Online (CCO) at the following URL: http://www.cisco.com/univercd/cc/td/doc/cisintwk/ita/index.htm.