



V.92 and V.44 Support for Digital Modems

The V.92 and V.44 Support for Digital Modems feature supports the V.92 Modem on Hold and V.92 Quick Connect portions of the new V.92 modem standard, and the new V.44 LZJH compression standard based on Lempel-Ziv, on the Cisco 3600 and 3700 router platforms.

Feature Specifications for V.92 and V.44 Support for Digital Modems

Feature History

Release	Modification
12.2(11)YT	This feature was introduced.
12.2(15)T	This feature was integrated into Cisco IOS Release 12.2(15)T.

Supported Platforms

Cisco 3620; Cisco 3640; Cisco 3640A; Cisco 3660; Cisco 3725; Cisco 3745

Finding Support Information for Platforms and Cisco IOS Software Images

Use Cisco Feature Navigator to find information about platform support and Cisco IOS software image support. Access Cisco Feature Navigator at <http://www.cisco.com/go/fn>. You must have an account on Cisco.com. If you do not have an account or have forgotten your username or password, click **Cancel** at the login dialog box and follow the instructions that appear.

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Prerequisites for V.92 and V.44 Support for Digital Modems

Client modem vendors must supply their own utilities to enable the V.92 Modem on Hold feature with each client modem.

Restrictions for V.92 Support for Digital Modems

- Cisco modems do not support pulse code modulation (PCM) upstream as defined in the V.92 International Telecommunication Union (ITU) standard. Cisco hardware will, however, interoperate with modems that support PCM upstream.
- There is no standard method for notifying remote or user applications that a modem session has been placed on hold. Extending timeouts or increasing the maximum number of attempts to perform certain operations might be necessary. No e-mail data should be lost because of on-hold times.
- When a modem on hold (MOH) transaction returns to the data-connected state, it retains the same IP network connection. Any other connected application might not be returned to its prior state, depending on the application's data transaction requirements during the MOH active state.
- Configuration of the features described in this document using S-registers is carried out by using modemcaps (modem attention or AT commands). Cisco IOS software does not check these values to guarantee that they are valid. The behavior of invalid values is determined by the module.
- Authorization of MOH is not provided as a standard service by RADIUS. However, RADIUS provides a vendor-specific attribute (VSA) capability that can be used to extend authorization mechanisms. This capability is already used by Cisco routers to provide other custom services.
- Cisco IOS software is packaged as multiple program image types with varying capabilities. Because not all modem interfaces support MOH and because images may be built to support specific modem types, not all software images contain functions to control MOH. In addition, the modems that do support MOH each implement their control functions differently. Therefore, registry functions are used to interface between RADIUS, local authorization, and MOH control for modems.
- Server-initiated MOH is not supported.
- During a suspended modem session, some data might be dropped. The ISP idle timer, which disconnects a dial-in user if no data is exchanged for a period of time, should be reset and suspended while a connection is on hold.

**Note**

Many client modems used in Europe are known to have problems with the MOH feature. The vendors are aware of the issue and are working to correct it. If you are a customer having trouble with the MOH feature in Europe, we suggest that you contact the client modem vendor to verify that the modem complies with the telephony signaling for call waiting, caller ID, and three-way calling in their particular country.

Information About V.92 and V.44 Support for Digital Modems

The following sections provide information about the V.92 and V.44 Support for Digital Modems feature.

- [ITU-T V.92 Modem Standard, page 3](#)
- [V.44 LZJH Compression, page 7](#)

ITU-T V.92 Modem Standard

The ITU-T V.90 modem standard recommendations have been enhanced with V.92, a new standard that meets the need for a digital modem and analog modem pair on the Public Switched Telephone Network (PSTN). V.92 improves the upstream data signaling rate and adds new features that enhance modem usability.

This feature supports the following parts of the V.92 modem standard:

- V.92 Modem on Hold
- V.92 Quick Connect

V.92 is implemented at the modem level as new modem protocols and standards. The new V.92 features co-reside with existing portware features and have no impact on the hardware configuration of either the hex MICA technologies module (HMM) or dual MICA technologies module (DMM), including on memory requirements.

V.92 Modem on Hold

V.92 Modem on Hold allows a dial-in customer to suspend a modem session to answer an incoming voice call or to place an outgoing call while engaged in a modem session.

When the dial-in customer uses V.92 Modem on Hold to suspend an active modem session to engage in an incoming voice call, the Internet service provider (ISP) modem listens to the original modem connection and waits for the dial-in modem to resume the connection. When the voice call ends, the modem signals the telephone system to end the second call and return to the original modem connection, then the modem signals the ISP modem that it is ready to resume the modem call. Both modems renegotiate the connection, and the original exchange of data continues.



Note

This feature is designed for use on telephone lines that are configured for the call-waiting service; call-waiting signals trigger the suspension of the modem session. If call-waiting service is not present on the subscriber's line, callers receive a busy signal, and the modem session is not interrupted.

Use of the V.92 Modem on Hold feature for Cisco MICA portware can be controlled globally using AT commands (modemcaps) or can be controlled on a per-caller basis using the RADIUS distributed client/server system. (You are not required to have a RADIUS server to use the V.92 Modem on Hold feature.)

V.92 Modem on Hold AT Commands and S-Registers

V.92 Modem on Hold is disabled by default and is controlled with standard AT commands and S-registers. V.92 is enabled and disabled with the S29 S-register (S29 = 12), and MOH is controlled with the S62 S-register (S62 must be set to enable MOH). AT commands download the configuration to the modem at the end of every call. The **ATSn=v** and **ATSn?** AT commands are used to configure the V.92 Modem on Hold feature on Cisco MICA platforms. [Table 1](#) lists additional S-register parameters used to enable and disable the feature.

Table 1 V.92 Modem on Hold S-Registers

Name	Register	Index	Default	Description
MOH Timeout	S62	63	0 MOH Disabled	0: MOH Disabled 1: 10 seconds 2: 20 seconds 3: 30 seconds 4: 40 seconds 5: 1 minute 6: 2 minutes 7: 3 minutes 8: 4 minutes 9: 6 minutes 10: 8 minutes 11: 12 minutes 12: 16 minutes 13: No limit

To disable V.92 Modem on Hold, you can use a modemcap (for example, `s62=0s63=3s21=15s29=12`) or set the S29 register to any number other than 12. You can also use the RADIUS VSA to disable MOH if the feature was initially enabled by the default value (modemcap).

**Note**

If the feature is enabled using `S29=12` and V.92 Modem on Hold is disabled using `S62=0`, statistics for the number of times a dial-in customer requests an on-hold function are tracked in the MOH link information parameters. However, completely disabling the feature by setting S29 to a value other than 12 disables the reporting of all MOH statistics.

For detailed information about the AT commands and S-registers used to control V.92 on Cisco MICA platforms, refer to the [AT Command Set and Register Summary for MICA 6-Port Modules](#).

RADIUS Authorization

Per-user control of V.92 Modem on Hold can be configured for caller authorization using a RADIUS server. RADIUS servers use the VSA capability to configure MOH for individual users. The current attribute=value protocol syntax has been extended with the new Modem on Hold attribute. You can enter an unsigned integer in the range from 0 through 65,535 that represents the maximum number of seconds that a modem may remain on hold, and which can extend from 10 seconds to an unlimited number of minutes.

**Note**

Although the integer attribute values can be specified as any value in a contiguous range, V.92 specifications limit configuration to a limited set of values. Attribute values are rounded down to the next permitted value when they are used to configure a modem.

Alternatively, you can enter the **inf** keyword, which allows the modem to remain on hold indefinitely.

If the V.92 Modem on Hold configuration is not present, or if it is not syntactically correct, the modem uses its default configuration for MOH. The default operation can be modified by using a modemcap string. Following authentication of a dial-in user, an additional control command is sent to the modem if the dial-in user does not have a default MOH configuration.

**Note**

Code space requirements for RADIUS support is less than 2 KBs. There are no additional data space requirements.

V.92 Modem on Hold running on systems using RADIUS authorization increases the length of RADIUS response packets by approximately 20 bytes. RADIUS databases increase in size by approximately the same amount for each dial-in user with a nondefault MOH attribute value.

With RADIUS, authentication and authorization occur as part of the same process. When a caller connects to the access server, the caller enters a user ID and password in response to prompts from the access server. This information is formatted as a RADIUS request packet and is sent to the appropriate RADIUS server. If the user ID is valid and the password matches, the RADIUS server responds with a packet containing authorization data for the connection. This authorization data contains the MOH configuration if it is present in the RADIUS database.

The access server interprets the response from the RADIUS server and performs any actions associated with the authorization data. For V.92 Modem on Hold, a command is sent from the Cisco IOS host to the Cisco MICA channel to set the MOH parameters. No confirmation from the channel is required.

When the client modem requests a V.92 Modem on Hold operation, the modem switches to an on-hold state, which prevents further data from being queued to the connection. When the Cisco IOS software receives the request to go on hold, any transmit packets queued to local Cisco IOS queues (packets not already posted to the queues shared between the Cisco IOS software and the modem) are discarded. This mechanism reduces the possibility that stale data will be transmitted to the modem when the connection is reactivated. It also reduces the number of buffer resources that are unavailable while a modem is on hold.

**Note**

When a RADIUS server is used, placement of commas is important. The asterisk in the modem-on-hold attribute indicates that the attribute is optional. If a modem does not support V.92 Modem on Hold, then the call might continue anyway. If the asterisk is replaced by an equal sign (=), the attribute is required, and modems that do not support MOH terminate the calls following authentication. The value of the attribute is the number of seconds allowed for the on-hold state. This value is rounded down by the Cisco IOS software to one of the permissible values. The number can be replaced with the **inf** command, which allows unlimited on-hold time. Case is significant for both attribute names and values.

**Note**

If your router is configured for RADIUS, the RADIUS server must be accessible to the router. The server must also be capable of responding to authentication requests with VSA attributes.

V.92 Quick Connect

V.92 Quick Connect speeds up the client-to-server startup negotiation, reducing the overall connect time by up to 30 percent. The client modem retains line condition information and characteristics of the connection to the ISP, which reduces connect time by avoiding some of the initial signal handshaking.

V.92 Quick Connect AT Commands and S-Registers

V.92 Quick Connect is enabled by default and is controlled with standard AT commands and S-registers. S29 is used to enable V.92 sequence detection and S63 is used to enable V.92 Quick Connect, both of which are enabled by default. The S63 S-register controls the feature through the ANSpcm signal. You can choose the power level of the ANSpcm signal, which defaults to -12 dBm (the transmit power level for the United States). The **ATSn=v** and **ATSn?** AT commands are used to configure V.92 Quick Connect on Cisco MICA platforms.

To disable V.92 Quick Connect or to set a different ANSpcm value, you can use a modemcap (for example, v92_v44:MSC=s62=8s63=0s21=15s29=12), or you can set the S29 register to any number other than 12. [Table 2](#) lists the S-registers used to enable and disable the V.92 Quick Connect feature.

Table 2 Quick Connect (QC) Config S-Registers

Name	Register	Index	Default	Description
V.92 QC Config	S63	64	0x3 QC Enabled ANSpcm Level -12 dBm	Bit 0: QC Enable 0: Disabled 1: Enabled Bits 1–2 ANSpcm Level 00: -9 dBm 01: -12 dBm 10: -15 dBm 11: -18 dBm

**Note**

If the V.92 Modem on Hold feature is enabled using S29=12, and QC is disabled using S63=0, then the QC Exchange Link Information Parameter is updated to show if QC was requested. However, completely disabling the feature by setting S29 to a value other than 12 disables the reporting of QC requests.

For detailed information about the AT commands and S-registers that are used to configure the V.92 Quick Connect feature on Cisco MICA platforms, refer to the [AT Command Set and Register Summary for MICA 6-Port Modules](#).

V.44 LZJH Compression

V.44 LZJH is a new compression standard based on Lempel-Ziv that uses a new string-matching algorithm that increases upload and download speeds to make Internet access and Web browsing faster. The V.44 call success rate (CSR) is similar to V.42bis with significant compression improvement for most file types, including HTML files. V.44 applies more millions of instructions per second than V.42bis toward the same application data stream and yields better compression rates in almost any data stream in which V.42bis shows positive results.

V.44 supports automatic switching between compressed and transparent modes on supported platforms. Automatic switching allows overall performance gain without loss in throughput for file streams that are not compressible.

V.44 is globally controlled through dialed number identification service (DNIS), calling line identification (CLID), and resource pool manager server (RPMS) virtual groups, and performance improvement is determined by the LZJH algorithms.

To support V.44 LZJH compression, the control switch module (CSM) has been modified. MIBs that show the status of V.42bis have been extended to show V.44 configuration status. New disconnect reasons help manage V.44 session status and debugging.

V.44 AT Commands and S-Registers

V.44 compressor/decompressor optimizes throughput and the CSR using the standard AT command interface. New AT commands are provided so that V.44 can be enabled or disabled at the modem level. Modemcaps (dial in) or chat scripts (dial out) are required to enable or disable V.44 globally on the access server.

The AT command interface supports new S-registers for tuning V.44 negotiation parameters and lets you monitor V.44 configuration and session status. The **ATSn=v** AT command is used to configure V.44, and the **ATSn?**, **AT%R**, and **AT\S** commands are used for obtaining V.44 status. These commands modify the operation of S21 to enable and disable the algorithm.

Table 3 shows the S21 register values, and Table 4 shows additional S-register values used with the V.44 feature. V.44 is enabled by default.

Table 3 V.44 S-Registers (Existing)

Name	Register	Index	Default	New Values
Data Compression	S21	NextPort 0x800b MICA 11	0xf	Bit 2: V.44 Tx Bit 3: V.44 Rx

Table 4 V.44 S-Registers (Redefined)

Name	Register	Index	Default	Description
V.44 Max Tx Codewords	S65	NextPort 0x8042 MICA 66	2048	256–2048
V.44 Max Rx Codewords	S66	NextPort 0x8043 MICA 67	2048	256–2048
V.44 Max Tx String Length	S67	NextPort 0x8044 MICA 68	255	0–255 characters
V.44 Max Rx String Length	S68	NextPort 0x8045 MICA 69	255	0–255 characters
V.44 Max Tx History Size	S69	NextPort 0x8046 MICA 70	10240	256–10240 bytes
V.44 Max Rx History Size	S70	NextPort 0x8047 MICA 71	10240	256–10240 bytes

How to Use the V.92 and V.44 Support for Digital Modems Feature

Cisco IOS software is responsible for controlling the features and displaying the new statistics. There are no tasks associated with configuring this feature. However, you may find the following table listing commands for monitoring digital modems that support the V.92 and V.44 modem standards useful.

- [Monitoring Cisco Modems, page 9](#)

Monitoring Cisco Modems

To monitor Cisco digital modems that support the V.92 and V.44 modem standards, use the following **show** commands in privileged EXEC mode:

Command	Purpose
Router# show modem	Displays a high-level performance report for all the modems or a single modem.
Router# show modem call-stats	Displays the local disconnect reasons for all modems inside an access server or router.
Router# show modem configuration	Displays the current modem configuration for digital Cisco MICA technologies modems.
Router# show modem log	Displays the modem event log with oldest event first.
Router# show modem operational-status	Displays the operational status of the specified ports or the specified port range.

Configuration Examples

None. See the “[Command Reference](#)” section on page 12. The **show modem** and **show modem call-stats** EXEC commands have been modified to display reports about the digital modems that support the V.92 and V.44 modem standards.

Additional References

For additional information related to V.92 and V.44 Support for Digital Modems feature, refer to the following references:

Related Documents

Related Topic	Document Title
Modem commands	Cisco IOS Dial Technologies Command Reference , Release 12.2
Modem configuration and management	Cisco IOS Dial Technologies Configuration Guide , Release 12.2; refer to the part “Modem and Dial Shelf Configuration and Management”
AT Commands and S Registers	AT Command Set and Register Summary for MICA 6-Port Modules

Standards

Standards ¹	Title
ITU-T	V.92 — “Enhancements to Recommendation V.90”
ITU-T	V.44 — “Data Compression Procedures”

1. Not all supported standards are listed.

MIBs

MIBs	MIBs Link
Table 5, Table 6, and Table 7 provide Cisco MIBs for the V.92 Modem on Hold and V.44 MIBs.	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

Table 5 Modem On Hold MIBs (Existing)

MIBs	Attribute	New Values	
CISCO-MODEM-MGMT-MIB	cmDisconnectReason	modemDrMohClrd	87
		modemDrMohTimeout	88

Table 6 V.44 MIBs (Existing)

MIBs	Attribute	New Values	
CISCO-MODEM-MGMT-MIB	cmDisconnectReason	modemDrDcIllegalCodewordStepup	94
		modemDrDcIllegalTokenEmptyNode	95
		modemDrDcIllegalTokenTooLarge	96
		modemDrDcReservedCommand	97
		modemDrDcIllegalCharacterSizeStepup	98
		modemDrDcRxDictionaryFull	99
		modemDrDcRxHistoryFull	100
		modemDrDcRxStringSizeExceeded	101
		modemDrDcNegotiationError	102
		modemDrDcCompressionError	103
CISCO-CALL-TRACKER-MODEM-MIB	CctmDataCompression	v44Tx	6
		v44Rx	7
		v44Both	8

Table 6 V.44 MIBs (Existing)

MIBs	Attribute	New Values	
CISCO-CALL-TRACKER-MODEM-MIB	cctmActiveSupportedDC	v44Rx v44Tx	Bit 3 Bit 4
CISCO-CALL-TRACKER-MODEM-MIB	cctmHistorySupportedDC	v44Rx v44Tx	Bit 3 Bit 4

Table 7 V.44 MIBs (Redefined)

MIBs	Attribute	Value	Old Name	New Name
CISCO-MODEM-MGMT-MIB	cmDisconnectReason	41	modemDrBadV42bisRxdata	modemDrDcGeneralError

To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL:

<http://tools.cisco.com/ITDIT/MIBS/servlet/index>

To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:

<http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>

To access Cisco MIB Locator, you must have an account on Cisco.com. If you have forgotten or lost your account information, send a blank e-mail to cco-locksmith@cisco.com. An automatic check will verify that your e-mail address is registered with Cisco.com. If the check is successful, account details with a new random password will be e-mailed to you.

Qualified users can establish an account on Cisco.com by following the directions found at this URL:

<http://www.cisco.com/register>

RFCs

RFCs	Title
None	—

Technical Assistance

Description	Link
Technical Assistance Center (TAC) home page, containing 30,000 pages of searchable technical content, including links to products, technologies, solutions, technical tips, tools, and lots more. Registered Cisco.com users can log in from this page to access even more content.	http://www.cisco.com/public/support/tac/home.shtml

Command Reference

This section documents modified commands. All other commands used with this feature are documented in the Cisco IOS Release 12.2 command reference publications.

- [show modem](#)
- [show modem call-stats](#)

show modem

To display a high-level performance report for all the modems or a single modem inside Cisco access servers, use the **show modem** command in EXEC mode.

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

Syntax Description		
<i>slot/port</i>	(Optional) Location of a slot and modem port. Remember to include the forward slash (/) when entering this variable.	
group number	(Optional) Modem group to which a specified modem belongs. The group number range is 1 to 200.	

Command Modes EXEC

Command History	Release	Modification
	11.2	This command was introduced.
	1 2.1(5)T	This command was enhanced to display information about modems on the Cisco 3600 series routers that support the V.110 standard.
	12.2(11)YT	This command was enhanced to display information about digital modems on the Cisco 3600 and 3700 series routers that support the V.92 and V.44 standards.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.

Examples

The following is sample output from the **show modem** command for two V.34 modem cards inserted in a Cisco 3600 router:

Router# **show modem**

Mdm	Usage	Inc calls		Out calls		Busied Out	Failed Dial	No Answer	Succ Pct.
		Succ	Fail	Succ	Fail				
* 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%

show modem

```
* 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%
```

The following is sample output from the **show modem** command for two V.110 modem cards inserted in a Cisco 3600 router:

Router# **show modem**

Mdm	Usage	Inc calls		Out calls		Busied Out	Failed Dial	No Answer	Succ Pct.
		Succ	Fail	Succ	Fail				
0/0	0%	-	-	-	-	0	0	0	-
0/1	0%	-	-	-	-	0	0	0	-
0/2	0%	-	-	-	-	0	0	0	-
0/3	0%	-	-	-	-	0	0	0	-
0/4	0%	-	-	-	-	0	0	0	-
0/5	0%	-	-	-	-	0	0	0	-
0/6	0%	-	-	-	-	0	0	0	-
0/7	0%	-	-	-	-	0	0	0	-
0/8	0%	-	-	-	-	0	0	0	-
0/9	0%	-	-	-	-	0	0	0	-
0/10	0%	-	-	-	-	0	0	0	-
0/11	0%	-	-	-	-	0	0	0	-
1/0	0%	-	-	-	-	0	0	0	-
1/1	0%	-	-	-	-	0	0	0	-
1/2	0%	-	-	-	-	0	0	0	-
1/3	0%	-	-	-	-	0	0	0	-
1/4	0%	-	-	-	-	0	0	0	-
1/5	0%	-	-	-	-	0	0	0	-
1/6	0%	-	-	-	-	0	0	0	-
1/7	0%	-	-	-	-	0	0	0	-
1/8	0%	-	-	-	-	0	0	0	-
1/9	0%	-	-	-	-	0	0	0	-
1/10	0%	-	-	-	-	0	0	0	-
1/11	0%	-	-	-	-	0	0	0	-

The following is sample output from the **show modem** command for a Cisco 3600 series router:

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
```

Mdm	Avg Hold Time	Inc calls		Out calls		Busied Out	Failed Dial	No Answer	Succ Pct.
		Succ	Fail	Succ	Fail				
* 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%

Table 8 describes the significant fields shown in the previous displays of the **show modem** command.

Table 8 *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: b—Modem was removed from service with the modem shutdown command or the modem busyout command. 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 again. d—The RAM-based DSP code, which supports K56flex, is not configured. The modem will revert to transmitting at 33.6 kbps. D—Modem is currently downloading firmware. p—Firmware download is pending. Typically because one or more modems is active. R—Modem is held and isolated in a suspended state by the modem hold-reset command. T—Modem is conducting a back-to-back test with another modem. *—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 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, which exists on a V.34 modem card in a Cisco 3600 router. 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 9 for a description of the fields displayed by the **show modem** command with slot and port designators.

```
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
```

show modem

```

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 sample output for a basic V.34 modem module. Notice that 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, C3600 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 is sample output from 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 shows example output for a 56K modem card, which carries digital modems that transmit at 56 kbps. (In truth, 56K modems do not modulate or demodulate data. A pure digital-to-digital connection is made.) See [Table 9](#) 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

```

The following is sample output from the **show modem slot/port** command for digital modems on a Cisco 3600 series router that support the V.92 and V.44 modem standards:

```

Router# show modem 3/0
Mdm Typ Status Tx/Rx G Duration TX RX RTS CTS DSR DCD DTR
3/0 V90/92 Idle 46666/31200 1 00:01:30 - - x

```

```

Modem 3/0 [line 97], Async97, TTY97
MICA-6DM Firmware: CP ver 2910 - 7/13/2001, SP ver 2910 - 7/13/2001.
Modem config: Incoming and Outgoing
Protocol: LAPM, Compression: V44

```

```

Last clearing of "show modem" counters: never
  1 incoming completes, 1 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
  0 TDM errors, 0 speed shifts (up/dn - 0/0), 0 retrains (hi/lo - 0/0)
  0 MOH

```

```

Modulation type      V90/92
# of connections     1

```

```

Protocol type        LAPM
# of connections     1

```

Transmit Speed Counters:

```

Connection Speeds    46667
# of connections     1

```

Receive Speed Counters:

```

Connection Speeds    31200
# of connections     1

```

Table 9 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 9 *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, V21, V22, V22bis, V23, V32, V32bis, VFC, V34, V17, V27, V33, K56Flx, and V90/92.

Table 9 *show modem slot/port Field Descriptions (continued)*

Field	Description
Status	<p>Current status of the modem. Possible values include:</p> <ul style="list-style-type: none"> • Conn—Modem is connected to a remote host. • B—Inoperable state, which is configured by the modem bad command. • B*—Inoperable state, which is configured by the modem startup-test command during initial power-up testing. • b—Modem is busied out. This can be manually configured by the modem busyout line configuration command. • 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	<p>The following modem functions are displayed on manageable modems. A field that is available and turned on is marked with an <i>x</i>. An unavailable field is marked with a dash (-).</p> <p>TX—Transmit Data. The DTE device transmits data to the DCE device.</p> <p>RX—Receive Data. The DCE device receives data from the DTE device.</p> <p>RTS—Request To Send. The DTE device signals to the DCE device that the DTE device accepts data into its buffers.</p> <p>CTS—Clear To Send. The DCE device signals to the DTE device that the DCE device accepts data into its buffers.</p> <p>DSR—Data Set Ready. The modem is ready to start communication.</p> <p>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.</p> <p>DTR—Data Terminal Ready. The DTE device indicates to the DCE device that it accepts calls.</p>
Firmware	Installed modem firmware.
Modem config	Current modem configuration, which includes the fields Incoming, Outgoing, Incoming and Outgoing, Unknown, Protocol, and Compression.
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, V.44, and MNP5.

Table 9 show modem slot/port Field Descriptions (continued)

Field	Description
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	<p>Last time the modem's counters were cleared using the clear modem counters command. A summary of modem events also appears.</p> <ul style="list-style-type: none"> • Incoming completes and failures—Total number of incoming connection requests that the modem answered and successfully or unsuccessfully connected with the remote DCE device. • Outgoing completes and failures—Total number of outgoing connection requests that the modem dialed and successfully or unsuccessfully connected with the remote DCE device. • 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. • recover oob—Number of times the out-of-band feature has been cleared and re-initialized. • Protocol timeouts and errors—Number of times the modem protocol failed to make a call connection. • Lost events—Number of incomplete modem events performed by the modem. • MOH—Indicates V.92 Modem on Hold, which allows suspending a modem session to answer an incoming voice call or to place an outgoing call while engaged in a modem session.
Modulation Type:	Modulation type, which can be any of the following values: Bel103, Bel212, V21, V22, V22bis, V23, V32, V32bis, VFC, V34, V17, V27, V33, K56Flx, and V90/92.

Table 9 *show modem slot/port Field Descriptions (continued)*

Field	Description
Protocol Type:	Protocol the modem is running such as Normal, Direct, reliable/MNP4, and reliable/LAPM (Link Access Procedure for Modems).
Transmit Speed Counters:	List of connection speeds that were sent by the modem.
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 are displayed directly beneath the connection speed identifier. For example, the following output shows that three connections were made at 56 kbps. 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. The report is self explanatory.

```
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 and DSP code (for 56-kbps modems only), and boot code.

show modem call-stats

To display the local disconnect reasons for all modems inside an access server or router, use the **show modem call-stats** command in EXEC mode.

show modem call-stats [*slot*]

Syntax Description	<i>slot</i>	(Optional) Slot number, which limits the display output to a particular range of modems in the system.
---------------------------	-------------	--

Command Modes	EXEC
----------------------	------

Command History	Release	Modification
	11.3	This command was introduced.
	12.2(11)YT	This command was enhanced to display information about digital modems on the Cisco 3600 and 3700 series routers that support the V.92 and V.44 standards.
	12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.

Usage Guidelines Use this command to find out why a modem ended its connection or why a modem is not operating at peak performance.

Local disconnect reasons for a particular modem are listed across the top of the screen display. For example, see `lostCarr`, `dtrDrop`, `rmtLink`, `wdogTimr`, `compress`, `retrain`, `inacTout`, and `linkFail` in the following output:

```
Router# show modem call-stats

dial-in/dial-out call statistics

      lostCarr  dtrDrop  rmtLink  wdogTimr  compress  retrain  inacTout  linkFail
Mdm
* 0/0
* 0/1
```

In the body of the screen display, the number of times an error occurred on a specific modem is displayed (see the # column). The % column shows the total running percent that a modem was logged for the specified disconnect reason with respect to the entire modem pool. For example, out of all the times that the `lostCarr` error occurred on all the modems in the system, the `lostCarr` error occurred 2 percent of the time on modem 0/0.

```
Router# show modem call-stats

dial-in/dial-out call statistics

      lostCarr  dtrDrop  rmtLink  wdogTimr  compress  retrain  inacTout  linkFail
Mdm   #   %    #   %    #   %    #   %    #   %    #   %    #   %
* 0/0   6   2    2   3    1   0    0   0    0   0    0   0    0   0
* 0/1   5   2    2   3    2   1    0   0    0   0    0   0    0   0
```

Bad or malfunctioning modems are detected by an unusually high number of disconnect counters for a particular disconnect reason. For example, if modem 1/0 had an astronomically high number of compression errors compared to the remaining modems in system, modem 1/0 would probably be bad or inoperable.

To reset the counters displayed by the **show modem call-stats** command, use the **clear modem counters** command.

**Note**

Remote disconnect reasons are not described by this command.

Examples

The following example shows call statistics for the **show modem call-stats** command. Because of the screen size limitation of most terminal screen displays, all the possible disconnect reasons cannot be displayed at the same time. Only the top eight most frequently experienced disconnect reasons are displayed.

```
Router# show modem call-stats
```

```
dial-in/dial-out call statistics
```

lostCarr	dtrDrop	rmtLink	wdogTimr	compress	retrain	inacTout	linkFail									
Mdm	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
* 0/0	6	2	2	3	1	0	0	0	0	0	0	0	0	0	0	0
* 0/1	5	2	2	3	2	1	0	0	0	0	0	0	0	0	0	0
0/2	5	2	2	3	4	3	0	0	0	0	0	0	0	0	0	0
* 0/3	5	2	2	3	2	1	0	0	0	0	0	0	0	0	0	0
* 0/4	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/5	5	2	2	3	2	1	0	0	0	0	0	0	0	0	0	0
* 0/6	4	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0
* 0/7	4	1	2	3	4	3	0	0	0	0	0	0	0	0	0	0
* 0/8	6	2	1	1	3	2	0	0	0	0	0	0	0	0	0	0
* 0/9	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/10	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 0/11	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
0/12	5	2	2	3	2	1	0	0	0	0	0	0	0	0	0	0
* 0/13	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/14	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/15	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/16	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/17	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 0/18	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 0/19	5	2	1	1	3	2	0	0	0	0	0	0	0	0	0	0
* 0/20	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/21	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 0/22	5	2	1	1	11	10	0	0	0	0	0	0	0	0	0	0
* 0/23	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 2/0	4	1	2	3	2	1	0	0	0	0	0	0	0	0	0	0
* 2/1	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 2/2	5	2	2	3	0	0	0	0	0	0	0	0	0	0	0	0
* 2/3	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 2/4	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 2/5	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 2/6	4	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 2/7	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 2/8	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 2/9	4	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 2/10	5	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0
* 2/11	5	2	1	1	5	4	0	0	0	0	0	0	0	0	0	0
* 2/12	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0
* 2/13	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0
* 2/14	5	2	1	1	2	1	0	0	0	0	0	0	0	0	0	0

show modem call-stats

```

* 2/15  4  1  1  1  3  2  0  0  0  0  0  0  0  0  0  0
* 2/16  4  1  1  1  3  2  0  0  0  0  0  0  0  0  0  0
* 2/17  5  2  2  3  9  8  0  0  0  0  0  0  0  0  0  0
* 2/18  4  1  1  1  1  0  0  0  0  0  0  0  0  0  0  0
* 2/19  3  1  1  1  2  1  0  0  0  0  0  0  0  0  0  0
* 2/20  7  3  1  1  8  7  0  0  0  0  0  0  0  0  0  0
* 2/21  5  2  1  1  1  0  0  0  0  0  0  0  0  0  0  0
* 2/22  4  1  1  1  2  1  0  0  0  0  0  0  0  0  0  0
* 2/23  5  2  1  1  2  1  0  0  0  0  0  0  0  0  0  0
Total  233      59      110      0      0      0      0

```

dial-out call statistics

```

noCarr noDitone      busy      abort dialStrg autoLgon dialTout rmtHgup
Mdm    #    %      #    %      #    %      #    %      #    %      #    %      #    %
* 0/0  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/1  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
  0/2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/3  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/4  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/5  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/6  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/7  5  5  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/8  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/9  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/10 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/11 5  5  0  0  0  0  0  0  0  0  0  0  0  0  0  0
  0/12 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/13 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/14 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/15 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/16 2  2  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/17 4  4  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/18 5  5  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/19 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/20 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/21 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/22 5  5  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 0/23 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/0  2  2  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/1  3  3  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/2  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/3  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/4  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/5  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/6  1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/7  4  4  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/8  7  8  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/9  4  1  1  1  2  1  0  0  0  0  0  0  0  0  0  0
* 2/10 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/11 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/12 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/13 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/14 4  4  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/15 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/16 1  1  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/17 5  5  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/18 5  5  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/19 3  3  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/20 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/21 4  4  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/22 2  2  0  0  0  0  0  0  0  0  0  0  0  0  0  0
* 2/23 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
Total  84      0      0      0      0      0      0

```

The following is sample output from the **show modem call-stats** command for digital modems on a Cisco 3600 series router that supports the V.92 modem standard (see the “mohTrmnt” column for data about the V.92 Modem on Hold function):

Router# **show modem call-stats**

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

dial-in/dial-out call statistics

Mdm	mohTrmnt		wdogTimr		compress		retrain		inacTout		linkFail		moduFail		mnpProto	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
3/0	1	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
* 3/1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1		0		0		0		0		0		0		0	

dial-out call statistics

Mdm	noCarr		noDitone		busy		abort		dialStrg		autoLgon		dialTout		rmtHgup	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
3/0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
* 3/1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3/11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0		0		0		0		0		0		0		0	

Table 10 describes the significant fields shown in the display.

Table 10 *show modem call-stats Field Descriptions*

Field	Description
dial-in/dial-out call statistics	This category of disconnect reasons can happen only in dial-in or dial-out scenarios.
mohTrmnt	The number of times that a modem is disconnected because MOH terminates. MOH will terminate for two reasons: <ul style="list-style-type: none"> • MOH clear down by the modem (MICA_DR_MOH_CLEAR_DOWN) • MOH time out (MICA_DR_MOH_TIMEOUT)
wdogTimr	Watchdog timeout. An obscure firmware problem occurred. This is a rare disconnect reason.
compress	Compression. An error was detected during decompression, which caused the internal decompression dictionary to overflow. This could be caused by a modem dialing in that is using a slightly different compression algorithm.
retrain	Retrain failure. A connection was lost and not re-established after three attempts.
inacTout	Inactivity timeout. The time specified in the AT/T command has expired. No modem data transfers were detected during that period.
linkFail	Link failure. The protocol level link failed while using MNP-10 or LAPM in reliable mode.
moduFail	Modulation error. An error was detected at the DSP chip level, which caused a disconnect.
mnpProto	MNP10 protocol error. An uncorrectable error occurred during a MNP-10 connection.
lapmProt	LAPM protocol error. An uncorrectable error occurred during a LAPM connection.
lostCarr	Lost carrier. The modem firmware detected a carrier drop during a connection. The cause for the carrier drop could be the loss of signal from the remote modem or the result of an error detection.
dtrDrop	DTR drop. The modem disconnected because the DTR signal from the host became inactive.
userHgup	User hang up. The modem disconnected because a command such as ATH was detected.
rmtlink	Remote link disconnect. If an MNP-10 reliable link is established, the remote modem sends the disconnect reason across the link before disconnecting. The disconnect reason displayed is LOCAL (remote link disconnect) and REMOTE (the reason the remote modem disconnected).
trminate	Terminate. A password security error occurred in the Microcom HDMS. This error occurs only with Microcom modems.
callBkfa	Callback failed. This error applies to leased line connections only. A switched line connection failed and a connection still cannot be made on the leased line.
dial-out call statistics	This category of disconnect reasons can happen only in a dial-out scenario.

Table 10 *show modem call-stats Field Descriptions (continued)*

Field	Description
noCarr	No carrier. The called number answered, but no answer tone was detected after the appropriate wait.
noDitone	No dialtone. No dial tone was detected after the modem went off hook.
busy	Busy. A busy signal was detected while the local modem was attempting to dial.
abort	Abort. A character was received from the remote host after the dial command was issued and before a connection was established.
dialStrg	Dial string error. An invalid character was detected in the dial string, which forced the dial attempt to terminate.
autoLgon	Autologon error. An autologon sequence did not successfully complete.
dialTout	Dial timeout. When a semicolon is used as a dial modifier, the modem returns to the command state as indicated by an "OK." This allows a continuation of the dial string. If a period of time elapses as specified in the S7 register without the dial string completing, the attempt is aborted with dial timeout as the disconnect reason.
rmtHgup	Remote hang-up. The modem disconnected because the remote modem disconnected the call and dropped DTR.
blacklst	Blacklist. In a country that supports blacklisting, an attempt was made to go off hook with a null dial string (ATD).
ccpNssn	CCP not seen. The credit card prompt (also known as Bong) was not detected.
faxClasz	Fax class 2 error. An abnormal termination to a fax transmission was detected.
Total	Total number of times the disconnect reason occurred among all the modems in the system.

■ show modem call-stats