SocketModem®

MT2492SMI

AT Commands

Reference Guide

MultiTech®
Systems

SocketModem® MT2492SMI
> **MT2492SMI-92**
> **MT2492SMI-L-92**
> **MT2492SMI-34**
> **MT2492SMI-L-34**
> **MT2492SMI-22**
> **MT2492SMI-22L**

AT Commands Reference Guide

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Revisions

Revision Level	Date	Description
A	07/12/07	Initial release.
B	03/28/08	Removed the index entries that indicated the wrong escape sequence. Updated the Technical Support contact list.
C	02/18/10	Remove S-Registers 24 and 89 since this product does not support sleep or idle mode. Changed Technical Support text.

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World Headquarters

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, MN 55112
Phone: 763-785-3500 or 800-328-9717
Fax: 763-785-9874
Internet Address: http://www.multitech.com

Technical Support

See the Copyright and Technical Support page of the current Universal SocketModem Hardware Developer's Guide.

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Chapter 1 – AT Commands

Introduction

The AT commands are used to control the operation of your modem. They are called *AT* commands because the characters **AT** must precede each command to get the *AT*tention of the modem.

AT commands can be issued only when the modem is in command mode or online command mode.

- The modem is in *command mode* whenever it is not connected to another modem.
- The modem is in *data mode* whenever it is connected to another modem and ready to exchange data. *Online command mode* is a temporary state in which you can issue commands to the modem while connected to another modem.
- To put the modem into online command mode from data mode, you must issue an *escape sequence* (**+++**); e.g., **+++ATH** to hang up the modem. To return to data mode from online command mode, you must issue the command **ATO**.

To send AT commands to the modem you must use a communications program, such as the HyperTerminal applet in Windows or some other available terminal program. You can issue commands to the modem either directly, by typing them in the terminal window of the communications program, or indirectly, by configuring the operating system or communications program to send the commands automatically. Fortunately, communications programs make daily operation of modems effortless by hiding the commands from the user. Most users, therefore, need to use AT commands only when reconfiguring the modem; e.g., to turn auto answer on or off.

The format for entering an AT command is **AT*Xn***, where *X* is the command and *n* is the specific value for the command, sometimes called the command *parameter*. The value is always a number. If the value is zero, you can omit it from the command; thus, **ATM** is equivalent to **ATM0**. Most commands have a *default* value, which is the value that is set at the factory.

You must press ENTER (it could be some other key depending on the terminal program) to send the command to the modem. Any time the modem receives a command, it sends a response known as a *result code*. The most common result codes are *OK*, *ERROR*, and the *CONNECT* messages that the modem sends to the computer when it is connecting to another modem. See a table of valid result codes at the end of this chapter.

You can issue several commands in one line, in what is called a command *string*. The command string begins with **AT** and ends when you press ENTER. Spaces to separate the commands are optional; the command interpreter ignores them. The most familiar command string is the *initialization string*, which is used to configure the modem when it is turned on or reset, or when your communications software calls another modem.

Data and General Commands

AT   **Attention Code**
Description: The attention code precedes all command lines except A/, A: and escape sequences.

ENTER Key
Description: Press the ENTER (RETURN) key to execute a command.

+++   **Escape Sequence**
Description: Allows the modem to exit data mode and enter on-line command mode. While in on-line command mode, AT commands are sent directly to the modem.

Use the return to on-line data mode command (O<value> – Return to On-Line Data Mode) to return to data mode.

Place a pause before and after the escape sequence to prevent the modem from interpreting the escape sequence as data. The length of the pause is set by S-Register **S12**, the escape guard time. See **S12** – Escape Guard Time.

Register **S2** identifies the escape sequence character. See **S2** – Escape Character.

A/   **Repeat Last Command**
Description: This command repeats the last AT command. The modem repeats the command currently in the command buffer.
                IMPORTANT:
                   Do not use the AT prefix with this command.
                   Do not conclude the command with a terminating character (ENTER).

A   **Answer**
Description: This command instructs the modem to connect to the line and establish a connection with the remote modem or DCE. This command can be canceled if the modem receives a new command or character from the host system before the handshake begins.
Result Codes: *CONNECT* if a connection is established and the extended result code parameter is equal to 0. (See **X<value>** – Select Result Code and Monitor Call Progress).
                CONNECT <rate> if a connection is established and the extended result code parameter is not equal to 0.
                NO CARRIER if a connection cannot be established or the modem aborts the connection on request of the host system.
                OK if the commands are aborted or DTR is turned off by the host system when the data terminal ready control is not set to 0. See **&D** – DTR Control.
                ERROR if the modem is in on-line command mode when receiving the **A** command.

B   **Communication Standard Setting**
Description: This command selects the communication standard used by the modem.
Syntax: ATB<value>
Values: 0   Selects CCITT V.22 mode when modem is at 1200 bps.
                1   Select Bell 212A when modem is at 1200 bps.
                2   Deselect V.23 reverse channel (same as B3).
                3   Deselect V.23 reverse channel (same as B2).
                15   Select V.21 when the modem is at 300 bps.
                16   Select Bell 103J when the modem is at 300 bps.
Defaults: 1 and 16
Result Codes: **OK** if <value> = 0-3, 15, 16
                ERROR if <value> ≠ 1.

D   **Dial**

Description: This command instructs the modem to begin the dialing sequence. The dial string, which is made up of the telephone number and dial modifiers is entered after the **D** command.

                    A dial string can be up to 60 characters long. Any digit or symbol may be dialed as touchtone digits. Characters such as spaces, hyphens, and parentheses are ignored by the modem and may be included in the dial string to enhance readability.

Syntax: ATD<dial_strings>

Dial String Values: Phone number and dial modifiers.

Dial string modifiers:

L	Redial the last number. (Must be placed immediately after **ATD**.)
P	Select pulse-dialing.
T	Select tone-dialing.
V	Dial using speakerphone. Instructs the modem to switch to speakerphone mode and dial the number. Use the **ATH** command to disconnect the voice call.
W	Wait for dial tone. This command instructs the modem to wait for a second dial tone before processing the dial string. (**X2**, **X4**, **X5**, **X6**, or **X7** must be selected.)
,	Pause during dialing for the amount of time set in register S8.
;	Return to command mode. Instructs the modem to return to command mode after it has finished dialing without disconnecting the call. This modifier must be the last character in the dial string.
!	Hook flash. Instructs the modem to go on-hook for 0.5 seconds and then return to off-hook.
@	Wait for quiet answer. Instructs the modem to wait for 5 seconds of silence after dialing the number. If silence is not detected, the modem sends a NO ANSWER result code back to the user.
^	Disable data calling tone transmission.
$	Detect AT&T call card "bong" tone. The character should follow the phone number and precede the user's call card number: **ATDT1028806127853500$123456789**

Default: T

Result Codes: *CONNECT* if a connection is established and the extended result code parameter is equal to 0. (See **X<value>** – Select Result Code and Monitor Call Progress).

                    CONNECT <rate> if a connection is established and the extended result code parameter is not equal to 0.

                    NO CARRIER if a connection cannot be established or the modem aborts the connection on request of the host system.

                    BUSY if the **W** or **@** modifiers are used and a busy signal is detected.

                    NO ANSWER if the **@** modifiers is used and the remote ring followed by 5 seconds of silence is not detected before expiration of the connection timer. See **S7** – Connection Completion Time-Out.

                    OK if the commands are aborted or DTR is turned off by the host system when the data terminal ready control is not set to 0. See **&D<value>** – Data Terminal Ready (DTR) Control.

                    ERROR if the modem is in on-line command mode when receiving the **A** command.

E   **Echo Command**

Description:	Enables or disables the modem's echo feature. When the echo feature is selected and the modem is in the command mode, characters sent to the modem are sent back to the host and displayed on the monitor.
Syntax:	ATE<value>
Values:	0 Do not echo keyboard input to the terminal.
	1 Do echo keyboard input to the terminal.
Default:	1

F   **Online Data Character Echo Command**

Description:	Controller-based products support this command to ensure backward compatibility with communications software that issues the F1 command.
Syntax:	ATF<value>
Values:	0 Enable online data character echo. (Not supported.)
	1 Disable online data character echo (included for backward compatibility).
Default:	1
Result Codes:	**OK** if <value> = 1
	ERROR if <value> ≠ 1.

H   **Hook Control**

Description:	Instructs the modem to go on-hook to disconnect a call or go off-hook to make the telephone line busy.
Syntax:	ATH<value>
Values:	0 Go on-hook (hang up).
	1 Go off-hook (make the phone line busy).
Default:	0
Result Codes:	**OK** if <value> = 0 to 1
	ERROR if <value> ≠ 0 to 1.

I	**Request ID Information**
Description:	Use this command to display product information about the modem. In each case the information is transmitted to the host system followed by a final result code.
Syntax:	ATI<value>
Values:	0, 3 Returns the modem identity string and driver version number.
	1 Calculates a ROM checksum and displays it on the DTE (e.g., 12AB).
	2 Performs a ROM check, calculates the checksum, and then verifies the checksum by displaying OK or ERROR.
	4 Returns firmware version for the data pump (e.g., 94).
	5 Returns the code version, board ID, and country/region ID in hexadecimal.
	9 Returns the country/regional code in English.
	11 Displays connection information as described below.
Default:	0
Result Codes:	The ATI11 results are listed on two screens. To get to the second screen, press any key or ESC to Exit. The following is an example of the **ATI11** results.

Description	Status
Last Connection	V.92
Initial Transmit Carrier Rate	28800
Initial Receive Carrier Rate	50666
Final Transmit Carrier Rate	28800
Final Receive Carrier Rate	50666
Protocol Negotiation Result	LAPM
Data Compression Result	V44
Estimated Noise Level	46
Receive Signal Power Level	(-dBm) 18
Transmit Signal Power Level	(-dBm) 12
Round Trip Delay	(msec) 10

Description	Status
Near Echo Level	(-dBm) NA
Far Echo Level	(-dBm) NA
Transmit Frame Count	0
Transmit Frame Error Count	0
Receive Frame Count	1
Receive Frame Error Count	0
Retrain by Local Modem	0
Retrain by Remote Modem	0
Rate Renegotiation by Local Modem	0
Rate Renegotiation by Remote Modem	0
Call Termination Cause	0
Robbed-Bit Signaling	10
Digital Loss	(dB) 6
Remote Server ID	NA
Last PCM S PTR	EBB3
Connection Time	(msec) 19646

The **ATI11** command may be issued from on-line command mode or after the end of a call. After a call, some of the values are no longer valid.

M	**Monitor Speaker Mode**
Description:	Turns the speaker on and off.
Syntax:	ATM<value>
Values:	0 Speaker always off.
	1 Speaker on until carrier signal detected.
	2 Speaker always on when modem is off-hook.
	3 Speaker on until carrier is detected, except while dialing.
Default:	1
Result Codes:	OK if <value> = 0 to 3
	ERROR if <value> ≠ 0 to 3.

N　　　　　　　　　　**Modulation Handshake**
Description:　　　　　Sets the modem protocol for handling handshake negotiation at connection time if the communication speed of the remote modem is different from the speed of the ATN<value>
Values:　　　　　　　0　　Modem performs handshake only at communication standard specified by S-Register S37 and the B<value> command.
　　　　　　　　　　1　　Modem begins handshake at communication standard specified by S-Register S37 and the B command. During handshake, fallback to a lower speed can occur.
Default:　　　　　　1
Result Codes:　　　　**OK** if <value> = 0 to 1
　　　　　　　　　　ERROR if <value> ≠ 0 to 1.

O　　　　　　　　　　**Return Online to Data Mode**
Description:　　　　　Exits online command mode and enters online data mode. If the modem is not in online command mode when this command is received, the modem generates an ERROR result code.
Syntax:　　　　　　ATO<value>
Values:　　　　　　　0　　Exits online command mode and returns to data mode.
　　　　　　　　　　1　　Issues a retrain before returning to online data mode.
　　　　　　　　　　3　　Issues a rate renegotiations before returning to online data mode.
Default:　　　　　　0
Result Codes:　　　　*CONNECT* if <value> = 0, 1, 3 and result code and call progress monitor are set to 0 (**X0**).
　　　　　　　　　　CONNECT <rate> if <value> = 0, 1, 3 and the result code and call progress monitor are not set to 0 (**X<value>** where n = 1 to 7).
　　　　　　　　　　NO CARRIER if the connection is not successfully resumed.
　　　　　　　　　　ERROR if <value> ≠ 0, 1, 3.

P　　　　　　　　　　**Set Pulse or Tone Dialing Default**
Description:　　　　　Configures the modem for pulse (non-touch-tone) or Tone dialing. All subsequent **D<dial_string>** commands use pulse dialing until either the **T** command or a tone dial modifier is received by the modem. Tone dialing is the default setting. This command does not use parameters and generates an ERROR result code when parameters are attached to the command.
Syntax:　　　　　　ATP
Values:　　　　　　　P　　Pulse Dialing
　　　　　　　　　　T　　Tone Dialing
Default:　　　　　　T

Q　　　　　　　　　　**Result Codes Enable/Disable**
Description:　　　　　Result codes are informational messages sent from the modem and displayed on the monitor. Basic result codes include OK, CONNECT, RING, NO CARRIER, and ERROR.
　　　　　　　　　　Use the **Q<value>** command to enable or disable result code generation by the modem. If result codes are disabled and an invalid parameter value is entered, the modem does not generate an ERROR result code because result codes are turn off.
Syntax:　　　　　　ATQ<value>
Values:　　　　　　　0　　Enable result codes.
　　　　　　　　　　1　　Disable result codes.
Default:　　　　　　0
Result Codes:　　　　OK if <value> = 0 to 1
　　　　　　　　　　ERROR if <value> ≠ 0 to 1.

T   **Select Tone Dialing**

Description: Configures the modem for DTMF (touch-tone) dialing. All subsequent **D<dial string>** commands use tone dialing until either the **P** command or a pulse dial modifier is received by the modem. Tone dialing is the default setting. This command does not use parameters and generates an ERROR result code when parameters are attached to the command.

Syntax: ATT

V   **Result Code Format**

Description: Controller-based modems generate result codes using one of two formats. Verbose mode generates result codes in the familiar text formats using words. Numerical mode generates result codes as a number. Each result codes has a number assigned to it.

Use this command to switch between numerical and verbose modes.

Call progress and negotiation progress messages are affected by this command.

Syntax: ATV<value>

Values: 0   Displays result codes as digits (terse response).

           1   Displays result codes as words (verbose response).

Default: 1

Result Codes: OK if <value> = 0 to 1.

                ERROR if <value> ≠ 0 to 1.

W   **Result Code Options**

Description: Use this command to select the modem's CONNECT message options.

Syntax: ATW<value>

Values: 0   CONNECT result code reports DTE receive speed; disables protocol result codes.

           1   CONNECT result code reports DTE receive speed; enables protocol result codes.

           2   CONNECT result code reports DCE receive speed; enables protocol result codes.

Default: 2

Result Codes: OK if <value> = 0 to 2.

                ERROR if <value> ≠ 0 to 2.

X   Select Result Code and Monitor Call Progress

Description: Use this command to enable tone detection options used in the dialing process. As each function is chosen, the modem's result codes are also affected. Therefore, this command is frequently used to control the modem's responses. The primary function of this command is to control call response capabilities.

Function	Enabled	Disabled
Ext Result Codes	Modem displays basic result codes, connect messages with data rate, and an indication of the modems error correction and data compression operations.	Modem displays the basic result codes.
Dial Tone Detect	Modem dials upon detection of a dial tone, and disconnects the call if the dial tone is not detected within 10 seconds.	Modem dials a call regardless of whether it detects a dial tone. Register S6 contains the dial delay.
Busy Tone Detect	Modem monitors for busy tones.	Modem ignores any busy tones it receives.

Syntax: ATX<value>

Values:

Command	Extended Result Codes	Dial Tone Detect	Busy Tone Detect
0	Disabled	Disabled	Disabled
1	Enabled	Disabled	Disabled
2	Enabled	Enabled	Disabled
3	Enabled	Disabled	Enabled
4	Enabled	Enabled	Enabled
5, 6	Enabled	Enabled	Enabled
7	Disabled	Enabled	Enabled

Default: 4
Result Codes: OK if <value> = 0 to 7.

    ERROR if <value> $\neq$ 0 to 7.

Call Progress Result Codes:

Command	Result Codes
0	OK, RING, ERROR, CONNECT, NO CARRIER
1	OK, RING, ERROR, CONNECT<RATE>, NO CARRIER
2	OK, RING, ERROR, CONNECT<RATE>, NO CARRIER, NO DIALTONE
3	OK, RING, ERROR, CONNECT<RATE>, NO CARRIER, BUSY, BLACKLISTED
4	OK, RING, ERROR, CONNECT<RATE>, NO CARRIER, BUSY, BLACKLISTED, DELAYED, NO DIALTONE, CALL WAITING DETECTED
5, 6	OK, RING, ERROR, CONNECT<RATE>, NO CARRIER, BUSY, BLACKLISTED, DELAYED, NO DIALTONE, CALL WAITING DETECTED
7	OK, RING, ERROR, CONNECT, NO CARRIER

Z   Reset and Recall Stored Profile

Description: Use this command to make the modem go on-hook and restore the factory defaults.
    Note: Both **Z0** or **Z1** restore the same profile (See **&W** – Store Current Configuration). Agere Systems controller-based modems have only one stored profile.
Syntax: ATZ<value>
Values: 0   Reset and restore stored profile (saved by the last **&W** command).
        1   Same as **Z0**.
Default: None
Result Codes: OK if <value> = 0 to 1.
    ERROR if <value> $\neq$ 0 to 1.

&C   **Data Carrier Detect (DCD) Control**

Description: Use this command to control the modem's response to receiving a remote modem's carrier signal. Data carrier detect (DCD) is a signal from the modem to the computer indicating that the carrier signal is being received from a remote modem. The modem typically turns off DCD when it no longer detects the remote modem's carrier signal.

Syntax: AT&C<value>

Values: 0   DCD remains ON at all times.

        1   DCD turns ON when the remote modem's carrier signal is detected, and turns OFF when the carrier signal is not detected.

Default: 1

Result Codes: OK if <value> = 0 to 1.

        ERROR if <value> ≠ 0 to 1.

&D   **Data Terminal Ready (DTR) Control**

Description: Use this command to select the modem's response to the data terminal ready (DTR) signal. The host system generates the DTR signal and supplies it to the modem.

Syntax: AT&D<value>

Values: 0   Modem ignores true status of DTR signal and treats it as always on. Use this command if the computer does not provide DTR to the modem.

        1   If DTR is not detected while in online data mode, the modem enters command mode, issues an *OK*, and remains connected.

        2   If DTR signal is not detected while in online data mode, the modem disconnects.

        3   Resets the modem on the on-to-off DTR transition.

Default: 2

Result Codes: OK if <value> = 0 to 3.

        ERROR if <value> ≠ 0 to 3.

&F   **Restore Factory Default Configuration**

Description: Use this command to reset the modem to the configuration programmed at the factory. This operation replaces all of the command options* and S-register settings in the active configuration with factory default values.

        Note: In voice mode, the command line is ignored if the **AT&F** command is placed on the same line as the other commands. To load factory settings in voice mode, issue the **&F<value>** command by itself.

Syntax: AT&F<value>

Values: 0   Loads factory settings as active configuration.

Default: None

Result Codes: OK if <value> = 0.

        ERROR if <value> ≠ 0.

*   There are several noted exceptions to this command and caution should be used when determining the state of the command options once this command has been executed.

&G   **V.22bis Guard Tone Control**

Description: Use this command to select which guard tone, if any, the modem will send while transmitting in the high band (answer mode). This command is only used in V.22 and V.22 bis mode. This option is not used in North America; it is for international use only.

Syntax: AT&G<value>

Values: 0   Disables guard tone.
         1   Sets guard tone to 550 Hz.
         2   Sets guard tone to 1800 Hz.

Default: 0

Result Codes: OK if <value> = 0 to 2.

        ERROR if <value> ≠ 0 to 2.

        Note: The **&G** command is not used in North America.

&K   **Local Flow Control Selection**

Description: Use this command to select a flow control method.

Syntax: AT&K<value>

Values: 0   Disables flow control.
         3   Enables CTS/RTS hardware flow control.
         4   Enables XON/XOFF software flow control.

Default: 3

Result Codes: OK if <value> = 0, 3, or 4.

        ERROR if <value> ≠ 0, 3, or 4.

&P   **Pulse Dial Make-to-Break Ratio Selection**

Description: Use this command to select the make-to-break ratio. This command is effective only for Japan.

Syntax: AT&P<value>

Values: 0   Selects 39% to 61% make-to-break ratio at 10 pulses per second.
         1   Selects 33% to 67% make-to-break ratio at 10 pulses per second.
         2   Selects 33% to 67% make-to-break ratio at 20 pulses per second.

Default: 1

        Note: The **&P2** command is available only if the country/regional code is set to Japan.

Result Codes: OK if <value> = 0 to 2.

        ERROR if <value> ≠ 0 to 2.

&Q   **Asynchronous Communications Mode**

Description: This command is supported to ensure backward compatibility with communication software that issues the **&Q** command. The preferred method for changing the asynchronous communication mode is to use the **\N** command.

Syntax: AT&Q<value>

Values: 0   Asynchronous with data buffering. Same as **\N0**.
         5   Error control with data buffering. Same as **\N3**.
         6   Asynchronous with data buffering. Same as **\N0**.
         8   MNP error control mode. If MNP error control is not established, the modem falls back according to the setting in **S36**.
         9   V.42 or MNP error control mode. If neither error control is established, the modem falls back according to the setting in **S36**.

Default: 5

Result Codes: OK if <value> = 0, 5, 6, 8, or 9.

        ERROR if <value> ≠ 0, 5, 6, 8, or 9.

&S   **Data Set Ready (DSR)**
Description: Use this command to control DSR action.
Syntax: AT&S<value>
Values: 0   DSR is always ON.
                1   DSR goes ON only during a connection.
Default: 0
Result Codes: OK if <value> = 0,1.
                ERROR if <value> ≠ 0, 1.

&T   **Self-Test Commands**
Description: Use this command to perform diagnostic tests on the modem. Each test is designed
                to isolate a problem location when experiencing periodic data loss or random errors.
Syntax: AT&T<value>
Values: 0   Terminates the test in progress.
                1   Local analog loop. This test verifies modem operation as well as the
                           connection between the modem and the computer. Any data entered at the
                           DTE is modulated, demodulated, and then returned to the local DTE. To
                           work properly, the modem must be off-line.
                3   Local digital loopback test.
Default: None
Result Codes: OK if <value> = 0.
                CONNECT if <value> = 0 or 3.
                ERROR if <value> ≠ 0, 1, or 3.

&V   **View Active Configuration**
Description: Use this command to view the active configuration.
Syntax: AT&V

&W   **Store Current Configuration**
Description: Use this command to store the modem's command options and all S- registers
                except S3, S4, and S5. The **Z0** command or a power-up reset of the modem restores
                these profiles.
                Note: This command is not valid during a cellular call.
Syntax: AT&W<value>
Values: 0   Stores current configuration as profile 0.
Default: 0
Result Codes: OK if <value> = 0.
                ERROR if <value> ≠ 0.

&Z   **Store Dialing Location and Number**
Description: Use this command to store a dialing string. Controller-based modems can save four
                dialing stings. The format for the command is: **&Z<storage_location> =
                <dialing_string>**. The dial string may contain up to 40 characters. The
                ATDS=<storage_location> command dials using the stored string.
Syntax: AT&Z<location>=<stored number>
Values: <storage_location> = 0 to 2.
                <dialing_string> = Dialing command.
Default: None
Result Codes: OK if <value> = 0 to 2.
                ERROR if <value> ≠ 0 to 2.

\A	**Select Maximum MNP Block Size**
Description:	Use this command to select a *MNP* error corrected link with a maximum block size controlled by the parameter <block size>.
Syntax:	AT\A<value>
Values:	0 64-character maximum
	1 128-character maximum
	2 192-character maximum
	3 256-character maximum
Default:	3
Result Codes:	OK if <value> = 0 to 3.
	ERROR if <value> $\neq$ 0 to 3.

\B	**Transmit Break**
Description:	Use this command in non-error-controlled mode. The command causes the modem to transmit a break signal to the remote modem. The minimum break length is 100 ms and the maximum break length is 900 ms. The <break_time> parameter has values between one and nine with each increment representing 100 ms. The default of <value> = 3 corresponds to a length of 300 ms.
	The command works in conjunction with the **\K** command.
Syntax:	AT\B<value>
Values:	<break_time> = 0–9 in 100 ms units
Default:	3 (300 ms)
Result Codes:	OK if <value> = 0, 1.
	ERROR if <value> $\neq$ 0, 1.

\K   **Break Control**

Description: Use this command to control the response of the modem to a break received from the DTE, remote modem, or the **\B<value>** command. The command values are different in three situations:

Syntax: AT\K<value>

Values: **\K<value> – Modem Is Operating in Data Transfer Mode**
The modem receives a break from the DTE when it is operating in data transfer mode.

Values	Function
0, 2, 4	Enter online command mode, no break sent to remote modem.
1	Clear data buffers and send a break to remote modem.
3	Send a break to the remote modem immediately.
5	Send a non-destructive, non-expedited break to remote modem.

5 is the default.

\K<value> – Modem Is in Online Command Mode During Data Connection
The modem is in the online command state (waiting for AT commands) during a data connection, and the **\B<value>** command is received in order to send a break to the remote modem.

Values	Function
0, 1	Clear data buffers and send break to the remote modem.
2, 3	Send a break to the remote modem immediately.
4, 5	Send a break to the remote modem in sequence with data.

4, 5 are the defaults.

\K<value> – Break Is Received During Connection
The modem receives a break from the remote modem during a connection.

Values	Function
0, 1	Clear data buffers and send break to the DTE.
2, 3	Send a break to the DTE immediately.
4, 5	Send a break to the DTE in sequence with the received data.

4, 5 are the defaults.

Result Codes: OK if <value> = 0 to 5.
ERROR if <value> ≠ 0 to 5.

\N   **Error Correction Mode Selection**

Description: Use this command to select the type of error control used by the modem when sending or receiving data.

Syntax: AT\N<value>

Values:

0	Buffer mode. No error control (same as **&Q6**).
1	Direct mode.
2	MNP or disconnect mode. The modem attempts to connect using MNP2-4 error control procedures. If this fails, the modem disconnects. This is also known as MNP reliable mode.
3	V.42, MNP, or buffered. The modem attempts to connect in V.42 error control mode. If this fails, it will attempt to connect in MNP mode. If this fails, the modem connects in buffer mode and continues operation. This is also known as V.42/MNP auto reliable mode (same as **&Q5**).
4	V.42 or disconnect. The modem attempts to connect in V.42 error control mode. If this fails, the modem disconnects.
5	V.42, MNP, or buffered (same as **\N3**).
7	V.42, MNP, or buffered (same as **\N3**).

Default: 3

Result Codes: OK if <value> = 0 to 5, or 7.
ERROR if <value> ≠ 0 to 5, or 7.

\Q	**Local Flow Control Selection**
Description:	Use this command to set the local flow control method.
Syntax:	AT\Q<value>
Values:	0 Disable flow control (same as **&K0**).
	1 XON/XOFF software flow control (same as **&K4**).
	3 RTS/CTS to DTE. (same as **&K3**)
Default:	3
Result Codes:	OK if <value> = 0, 1, 3.
	ERROR if <value> ≠ 0, 1, 3.

\T	**Inactivity Timer**
Description:	Use this command to specify the delay time used by the inactivity timer. The delay time is the length of time in minutes that the modem waits during periods of inactivity before disconnecting. Periods of inactivity are defined by no data being sent or received by the DCE. To disable the inactivity timer use the **T0** command. The delay time may also be specified in S-register S30.
Syntax:	AT\T<value>
Values:	0 Inactivity timer disabled.
	1 to 255 Specifies the length of time in minutes that the modem will wait before disconnecting when no data is sent or received.
Default:	0
Result Codes:	OK if <value> = 0 to 255.
	ERROR if <value> ≠ 0 to 255.

\V	**Protocol Result Code**
Description:	Use this command to enable or disable protocol result codes.
Syntax:	\V<value>
Values:	\V0 Disables protocol result code appended to the DCE speed.
	\V1 Enables protocol result code appended to the DCE speed.
	\V2 Same as **\V1**.
Default:	\V1
Result Codes:	OK if <value> = 0, 1, 2.
	ERROR if <value> ≠ 0, 1, 2.

\X	**XON/XOFF Pass-Through**
Description:	Use this command to restrict the XON/XOFF flow control to the local DCE for processing or have the local DCE send the flow control characters to the remote DCE.
Syntax:	AT\X<value>
Values:	0 Modem processes XON/XOFF flow control characters locally.
	1 Modem passes XON/XOFF flow control characters.
Default:	0
Result Codes:	OK if <value> = 0, 1.
	ERROR if <value> ≠ 0, 1.

-C	**Data Calling Tone**
Description:	Enables or disables the V.25 data calling tone to deny or allow data discrimination.
Syntax:	AT-C<value>
Values:	0 Disable V.25 data calling tone to deny remote data discrimination.
	1 Enable V.25 data calling tone to allow remote data discrimination.
Default:	1
Result Codes:	OK if <value> = 0, 1.
	ERROR if <value> ≠ 0, 1.

%B	**View Numbers in Blacklist**
Description:	Blacklisting is a method of handling failed or troubled calls encountered during automatic dialing. This command is only used to display the contents of the blacklist when blacklisting is active. It does not affect the functionality associated with blacklisting.
	When the blacklisting option is active, use this command to display the telephone numbers and status of any failed or troubled calls. The blacklisting option is associated with the country selection. Some countries have national requirements which prohibit repeat calls to the same number through automatic dialing.
Syntax:	AT%B
Values:	N/A
Result Codes:	<list of phone numbers and their status> if country supports blacklisting.
	OK if no failed calls occur.
	ERROR if country selection does not support blacklisting.

%C	**Data Compression Control**
Description:	Use this command to enable or disable data compression. This command enables or disables V.44, V.42 *bis,* and *MNP* class 5 data compression. The command overwrites the current status of the **+DCS** command. The command is also overwritten by changes made by the **+DCS** command. On-line changes do not take effect until a disconnect occurs.
Syntax:	AT%C<value>
Values:	0 Disable V.42bis/MNP 5. No data compression.
	1 Enable V.42bis/MNP 5. Data compression enabled.
Default:	1
Result Codes:	OK if <value> = 0, 1.
	ERROR if <value> ≠ 0, 1.

%E	**Fallback and Fall Forward Control**
Description:	This command provides the option for the modem to automatically monitor line quality, to fall back when line quality is insufficient, and to fall forward when line quality is sufficient.
Syntax:	AT%E<value>
Values:	0 Disable fallback and fall forward.
	1 Enable fallback and disable fall forward.
	2 Enable fallback and fall forward.
Default:	2
Result Codes:	OK if <value> = 0, 1, 2.
	ERROR if <value> ≠ 0, 1, 2.

+A8E   V.8 and V.8bis Operation Controls

Description:	Use this command to set the control parameters for early call negotiation through V.8 and V.8*bis*. **+A8E** may also be used as an action command to reinitiate V.8 or V.8 *bis* if an earlier attempt to use either protocol has failed. (ITU-T Recommendation V.251 (02/98) standardized this command. However, the controller-based command set only includes partial support for the standard.)

On-Hook: If issued while the modem is on-hook, used to precondition V.8 and V.8bis originating and answering operation. It is issued by the DTE before the Dial (D) or Answer (A) command.

Off-Hook: If issued while the modem is off-hook, to (re)start V.8 or V.8bis negotiation. For example, if initial V.8 negotiation failed, but subsequent T.30 negotiation indicated V.8 capability, this command may be used to initiate V.8 negotiation.

The *ATD* and *ATA* commands behave as specified in V.250, and +A8n indications are not generated by the modem.

For subparameter values <v8o>=6 and <v8a>=5, the +A8I indications are issued during the course of the V.8 session to notify the DTE when the relevant V.8 signals are received.

<v8o> enables or disables DCE-controlled V.8 origination negotiation.

<v8a> enables or disables DCE-controlled V.8 answer negotiation.

<v8b> disables V.8 negotiation or sets it to DCE controlled or DTE controlled negotiation.

<a8cf> sets the V.8 CI signal call function to the value specified.
The valid range for this parameter is 0 to FF, with a default of 0xC1.

Syntax:	AT+A8E=<v8o>,<v8a>,<v8cf>,<v8b>
<v8o> Values:	**<v8o>** Decimal number which enables/disables issuance of +A8x indications during modem-controlled V.8 origination negotiation.

    1   Enable DCE-controlled V.8 origination negotiation without +A8x indications. (Default)
    6   Enable DCE-controlled V.8 origination negotiation with +A8x indications.

<v8a> Values:	**<v8a>** Decimal number which enables/disables issuance of +A8x indications during modem-controlled V.8 answer negotiation.

    1   Enable DCE-controlled V.8 answer negotiation without +A8x indications. (Default)
    5   Enable DCE-controlled V.8 answer negotiation with +A8x indications.

<v8b> Values:	**<v8b>** Decimal number which enables/disables V.8bis negotiation.

    0   Disable V.8 negotiation.
    1   Enable DCE-controlled V.8bis negotiation. (Default)
    2   Enable DTE-controlled V.8 negotiation.

<v8cf> Values	**<v8cf>** Set the V.8 CI signal call function to the hexadecimal octet XY.

    00 (Default)
    21
    C1

Reporting**:**	+A8E? Reports current or selected values.
	+A8E=? Reports supported parameter values.
Result Codes:	OK if <v8o> = 1, 6 and <v8a> = 1, 5 and <v8cf> = 0 to FF and <v8b> = 0 to 2.

ERROR if <v8o> ≠ 1, 6 or <v8a> ≠ 1, 5 or <v8cf> ≠ 0 to FF or <v8b> ≠ 0 to 2.
OK if <signal> = 0–10 and <sig en> = 0, 1 and <msg en> = 0, 1 and <supp delay> = 0,1.
ERROR if <signal> ≠ 0 to 10 or <sig en> ≠ 0, 1 or <msg en> ≠ 0, 1 or <supp delay> ≠ 0,1.

+A8T　　　　　　　**Send V.8 bis Signal and/or Message**

Description:　　　　Use this command to send a V.8 bis signal or message from the local DCE. This command is only supported when V.80 is enabled.

Syntax:　　　　　　AT+A8T=<signal>,<1st message>,<2nd message>,<sig en>,<msg en>,<supp delay>

<signal> Values:　　0　None
　　　　　　　　　　1　Initiating Mre.
　　　　　　　　　　2　Initiating MRd.
　　　　　　　　　　3　Initiating CRe, low power
　　　　　　　　　　4　Initiating CRe, high power
　　　　　　　　　　5　Initiating CRd
　　　　　　　　　　6　Initiating Esi
　　　　　　　　　　7　Responding MRd, low power
　　　　　　　　　　8　Responding MRd, high power
　　　　　　　　　　9　Responding CRd
　　　　　　　　　　10 Responding Esr

<sig_en> Values:　　0　Enable detection of initiation signals. Default.
　　　　　　　　　　1　Enable detection or responding signals

<msg_en> Values:　 0　Disable detection of messages. Default.
　　　　　　　　　　1　Enable detection of V.8 *bis* messages

<supp_delay> Values:　0　No delay inserted. Default.
　　　　　　　　　　1　Insert 1.5 second delay between transmitted V.8 *bis* signal and the subsequent V.8 *bis* message

Reporting:　　　　+A8T?　　　Reports current or selected values.
　　　　　　　　　　+A8T=?　　　Reports supported parameter values.

Result Codes:　　OK if <signal> = 0 to 10 and <sig en> = 0, 1 and <msg en> = 0, 1 and <supp delay> = 0,1.
　　　　　　　　　　ERROR if <signal> ≠ 0 to 10 or <sig en> ≠ 0, 1 or <msg en> ≠ 0, 1 or <supp delay> ≠ 0,1.

+DCS　　　　　　　**Select V.42bis or V.44 Data Compression**

Description:　　　　Use this command to configure the available compression algorithms. The <v42bis> parameter enables or disables the V.42 bis and the <v44> parameter enables or disables V.44. This command works in conjunction with the **%C** command and the result of either the **%C** command or the **+DCS** command replaces the current data compression configuration.

Syntax:　　　　　　AT+DCS=<v42bis>,<v44>

Values:　　　　　　0,0　　　　　　V.42bis and V.44 data compression are both disabled.
　　　　　　　　　　0,1　　　　　　V.42bis is disabled; V.44 data compression is acceptable.
　　　　　　　　　　0,2　　　　　　V.42bis is disabled; V.44 only when connected to a V.92 server.
　　　　　　　　　　1,0　　　　　　V.42bis is acceptable; V.44 data compression is disabled.
　　　　　　　　　　1,1　　　　　　V.42bis is acceptable; V.44 data compression is acceptable.
　　　　　　　　　　1,2　　　　　　V.42bis is acceptable; V.44 only when connected to a V.92 server.

Reporting:　　　　+DCS?　　　Reports current or selected values.
　　　　　　　　　　+DCS=?　　　Reports allowed parameter values.

Result Codes:　　OK if <v42bis> = 0, 1 and <v44> = 0 to 2.
　　　　　　　　　　ERROR if <v42bis> ≠ 0, 1 or <v44> ≠ 0 to 2.

+DR   V.44 Data Compression Reporting

Description: Enables or disables the V.44 data compression report. If the compression report is enabled, the +DR:<type> intermediate result code reports the current DCE-DCE data compression type. It is issued after the Error Control Report (+ER) and before the final result code (e.g., CONNECT).

Syntax: AT+DR=<value>

Values: 0   Disables the V.44 compression report.
                 1   Enables the V.44 compression report.

Default: 0

Reporting: +DR?   Reports current or selected values.
                 +DR=?   Reports supported parameter values.

Result Codes: OK if <value> = 0, 1.
                 ERROR if <value> ≠ 0, 1.
                 +DR: NONE   Data compression not in use.
                 +DR: V42B   V.42bis is in use in both directions.
                 +DR: V44   V.44 is in use in both directions.

+DS   V.42bis Data Compression

Description: This extended-format compound parameter controls the V.42bis data compression function if this function is provided in the modem.

Syntax: AT+DS=<direction>,<compr_neg>,<max_dict>,<max_string>

<direction> Values: Specifies the desired direction(s) of operation of the data compression function from the DTE point of view.
                 0   Do not negotiate V.42 bis compression.
                 3   Modem accepts V.42 bis compression in both directions. Default.

<compr_neg> Values: Specifies whether or not the modem should continue to operate if the desired result is not obtained.
                 0   Do not disconnect if V.42bis is not negotiated by the remote modem as specified in <direction>. Default.

<max_dict> Values: Specifies maximum number of dictionary entries (2048 entries) negotiated. May be used by the DTE to limit the code word size transmitted, based on its knowledge of the nature of the data to be transmitted. Default = 2048.

<max_string> Values: Specifies maximum string length (32 bytes) to be negotiated. Default = 32.

Reporting: +DS?   Reports current or selected values.
                 +DS=?   Reports allowed parameter values.

Result Codes: OK
                 ERROR

+DS44   **V.44 Data Compression**

Description: Controls the V.44 data compression function.

Syntax: AT+DS44=<direction>,<compression_negotiation>,<compatibility>,
                     <max_codewords_tx>, <max_codewords_rx>,<max_string_tx>,
                     <max_string_rx>,<max_history_tx>,<max_history_rx>

<direction> Values: Specifies the DTE direction of the data compression.
                     0   No compression.
                     3   Compression in both directions (default).

<max_codewords_tx> Values:
                     Specifies the maximum number of code words to be negotiated in the transmit
                     direction.
                     1024 Default.
                     256–2048 Maximum number of code words in transmit direction.

max_codewords_rx Values:
                     Specifies the maximum number of code words to be negotiated in the receive
                     direction.
                     1024 Default.
                     256–2048 Maximum number of code words in receive direction.

max_string_tx Values:
                     Specifies the maximum string length to be negotiated in the transmit direction.
                     255 Default.
                     31–255 Maximum string length in transmit direction.

max_string_rx Values:
                     Specifies the maximum string length to be negotiated in the receive direction.
                     255 Default.
                     31–255 Maximum string length in receive direction.

max_history_tx Values:
                     Specifies the maximum length of the history buffer to be negotiated in the transmit
                     direction.
                     5120 Default.
                     512–11008 History buffer size in transmit direction.

max_history_rx Values:
                     Specifies the maximum length of the history buffer to be negotiated in the receive
                     direction.
                     4096 Default.
                     512–11008 History buffer size in receive direction

Reports: +DS44=?   Reports supported options.
                         Example: +DS44: (3, 0), (0), (0), (256-2048), (256-2048), (31-255), (31-255),
                         (512-11008), (512-11008).
                     +DS44?   Reports current or selected options.
                         Example: +DS44: 3, 0, 0, 1024, 1024, 255, 255, 5120, 4096.

Result Codes: OK
                     ERROR

+EB   **Break Handling in Error Control Operation**

Description: This extended-format compound parameter controls the break handling in V.42 operation. It accepts three numeric subparameters.

Syntax: AT+EB=<break_selection>,<default_length>

<break selection> Values:

0	Ignore break. Default.
1	Non-expedited, non-destructive.
2	Expedited, non-destructive.
3	Expedited, destructive.

<default_length> Values:

          10 ms to 90 ms Specify break length.

Reports: +EB=? Reports supported options.
          +EB?   Reports current or selected options.

+EFCS   **32-bit Frame Check Sequence**

Description: This extended-format numeric parameter controls the use of the 16-bit or 32-bit frame check sequence (FCS) option in V.42.

Syntax: AT+EFCS=<value>

Value: 0   Sets the 32-bit frame check sequence to a 16-bit frame check sequence.

Reports: +EFCS?   Reports current or selected options.
          +EFCS=?   Reports supported options.

+ER   **Error Control Report**

Description: Use this command to enable or disable the error control report.

Syntax: AT+ER<value>

Values: +ER0   Error control reporting disabled (no +ER intermediate result code transmitted). Default.
          +ER1   Error control reporting enabled (+ER intermediate result code transmitted).

Reports**:**   +ER?   Reports current or selected options.
          +ER=? Reports supported options.
          +ER <type> The +ER <type> reported is the current (negotiated or renegotiated) modem-modem error control type. If enabled, the intermediate result code is transmitted at the point during error control negotiation (handshaking) at which the modem has determined which error control protocol will be used (if any), before the final result code (e.g., CONNECT) is transmitted. Specifically, the +ER intermediate result code is issued after the modulation report (+MCR and +MRR) and before the data compression report (+DR).

Result Codes: +ER: NONE   Data compression not in use.
          +ER: LAPM   V.42 LAPM protocol is in use.
          +ER: ALT   V.42 alternative protocol is in use.
          OK   if <value> = 0, 1.
          ERROR   if <value> ≠ 0, 1.

+ES	**Error Control Selection**
Description:	Use this command to select the error correction mode. If the modem is operating in V.80 mode (synchronous buffered mode), and **+ES=,,8,** the **+ES?** will always return **+ES: 6,,8**. The setting of this command overwrites the **\N** command, and the **+ES** command is overwritten by the setting on a **\N** command.
Syntax:	AT+ES=<orig_rqst>,<orig_fbk>,<ans_fbk>

Values:	**Values Combination**	**Mode**
	+ES=1,0,1	Buffered mode
	+ES=0,1,0	Direct mode
	+ES=4,4,6	MNP or disconnect mode
	+ES=3,3,5	LAPM or disconnect mode
	+ES=4,0,6	MNP or buffered mode
	+ES=3,0,2	LAPM, MNP, or buffered mode (Default)
	+ES=2,0,2	LAPM or buffered mode
	+ES=3,2,4	LAPM, MNP, or disconnect mode
	+ES=,,8	V.42 sync buffer mode (V.80 enabled)
	+ES=6,,8	V.42 sync buffer mode (V.80 enabled)

Reports**:**	+ES?	Reports current or selected options.
	+ES=?	Reports supported options.
Result Codes:	OK	
	ERROR	

+ESA	**Set Up Error Control Parameters**
Description:	Sets the control parameters for the DCE in Synchronous Access Mode.
Syntax:	AT+ESA=<trans_idle>,<frame_idle>,<crc_type>,<nrzi_en>

Values:	**Values Combination**	**Meaning**
	+ESA=0,,,,0,0,,	Disables CRC generation and checking.
	+ESA=0,,,,1,0,,	Causes the DCE to generate a 16-bit CRC in the transmit direction in framed sub-Mode and check the CRC in the receive direction.

<crc_type> Values:	0	Disable CRC generation and checking.
	1	In framed submode, the 16-bit CRC specified in V.42 is generated by the DCE in the transmit direction and checked by the DCE in the receive direction.
Result Codes:	OK	
	ERROR	

+ETBM	**Call Termination Buffer Management**
Description:	Sets the behavior of the modem upon call termination. Only **+ETBM=0,0,0** is a valid combination. This means that the modem will discard all the buffered data when the call is terminated.
Syntax:	AT+ETBM=<pending_TD>,<pending_RD>,<timer>
	AT+ETBM=0,0,0

Values:	**<pending_TD>**	0 specifies that disconnect will occur immediately and all buffered transmit data will be discarded when the local DTE requests call disconnection.
	<pending_RD>	0 specifies that disconnect will occur immediately and all buffered receive data will be discarded when the local DTE requests call disconnection.
	<timer>	0 specifies that the modem will not attempt to deliver the buffered data before abandoning the attempt and discarding remaining data.

Reports**:**	+ETBM?	Reports current or selected options.
	+ETBM=?	Reports supported options.
Result Codes:	OK	
	ERROR	

+GCAP   **Complete List of Capabilities Request**
Description: Use this command to display the modem's supported capabilities. The +GCAP
                   command is an action command that always generates an OK result code.
Syntax: AT+GCAP
                   Sample Responses
                   +GCAP: +MS, +ES, +DS, for a data modem that supports all capabilities listed.
                   Where:
                      +MS   +M commands (Modulation Control: +MS and +MR commands)
                      +ES   +E commands (Error Control: +ES, +EB, +ER, +EFCS, +ETBM)
                      +DS   +D commands (Data Compression: +DS and +DR)

+GCI   **Country of Installation**
Description: Use this command to set the modem country/region code.
Syntax: AT+GCI<country code>
Reports**:**   +GCI?   Reports current or selected options.
                   +GCI=?   Reports supported options.
Result Codes: OK or ERROR

+GMI   **Manufacturer Identification Request**
Description: Displays the modem product manufacturer.
Syntax: AT+GMI?
Reports**:**   +GMI?   Reports current or selected option.
Result Codes: OK when using the +GMI and +GMI? syntax.
                   ERROR when using the +GMI=? syntax.

+GMM   **Model Identification Request**
Description: Displays the modem identity string and driver version number.
Syntax: AT+GMM? or AT+GMM=?
Reports**:**   +GMM?   Reports current or selected options.
                   +GMM=?   Reports supported options.
Result Code: OK

+GMR   **Revision Request**
Description: Displays the version of the modem code.
Syntax: AT+GMR? or AT+GMR=?
Reports**:**   +GMR?   Reports current or selected options.
                   +GMR=?   Reports supported options.
Result Code: OK

+IFC	**DTE-DCE Local Flow Control**
Description:	Use this command to select the local flow control method. The input parameters of the **+IFC** command overwrite the settings of the **\Q** and **\X<value>** commands. The reverse is also true. By modifying the settings of the **\Q** and **\X<value>** commands, the **+IFC** command parameters are overwritten.
Syntax:	AT+IFC=<DCE_by_DTE>,<DTE_by_DCE>
Values:	+IFC=0,0 No flow control.
	+IFC=1,1 Software flow control.
	+IFC=2,2 Hardware flow control. (Default)
Reports:	+IFC? Reports current or selected options.
	+IFC=? Reports supported options.
Result Codes:	OK
	ERROR

+ILRR	**DTE-DCE Local Rate Reporting**
Description:	Use this command to display or hide the local rate report result code. If the rate report is enabled, the reported <rate> is the current DTE-DCE rate. The rate report is transmitted after any modulation, error control, or data compression reports, and before the final result code (e.g., CONNECT).
Syntax:	AT+ILRR<value>
Values:	0 Disables the local rate report. (Default)
	1 Enables the local rate report.
Reports:	+ILRR? Reports current or selected options.
	+ILRR=? Reports supported options.
Result Codes:	OK
	ERROR

+IPR=	**Fixed DTE Rate**
Description:	Use this command to set the DTE to DCE transmission rate. There are twelve fixed transmission rates used by the DTE to communicate with the DCE. These commands select one of the predefined transmission rates. If a rate is entered which is not supported, the transmission rate defaults to the next lower rate.
Syntax:	AT+IPR=<DTE rate>
Values:	+IPR=0 Automatic rate detection. (Default)
	+IPR=110 100 bits/s
	+IPR=300 300 bits/s
	+IPR=600 600 bits/s
	+IPR=1200 1200bits/s
	+IPR=2400 2400 bits/s
	+IPR=4800 4800 bits/s
	+IPR=9600 9600 bits/s
	+IPR=14400 14400 bits/s
	+IPR=19200 19200 bits/s
	+IPR=38400 38400 bits/s
	+IPR=57600 57600 bits/s
	+IPR=115200 115200 bits/s
Reports:	+IPR? Reports current or selected options.
	+IPR=? Reports supported options.
Result Code:	OK

+ITF=   **Transmit Flow Control Threshold**

Description: Use this command to set the flow control thresholds. The <off> parameter represent the off signal threshold in octets. When this threshold is reached the DCE generates a flow off signal. The <on> parameter represents the on signal threshold in octets. When the volume of data resident on the DCE goes below this value the DCE generates a flow on signal.

Syntax: AT+ITF=<off>,<on>

Reports**:**   +ITF?   Reports current or selected options.

                   +ITF=?   Reports supported options.

Result Code: OK
                   ERROR

+MR   **Modulation Reporting Control**

Description: Use this command to hide or display the modulation report. When the modulation report is enabled, the DCE transmits the +MRR: <rate>, <rx_rate> and the +MCR:<carrier> intermediate result codes to the DTE.
                   The <carrier> reported is the current modulation; for example, V.34.
                   The <rate> reported is the transmit rate in bits per second or is zero if negotiation fails.
                   The <rx_rate> is the receive channel rate and is only reported when different receive and transmit rates have negotiated.
                   The intermediate result codes are transmitted after the modulation and the rate have been determined and before any error control or data compression reports or the final result code (e.g., CONNECT) is transmitted.

Syntax: AT+MR=<value>

Values: +MR=0 Turns off the modulation report.
                   +MR=1 Turns on the modulation report.

Reports**:**   +MR?   Reports current or selected options.

                   +MR=?   Reports supported options.

Result Code: OK
                   ERROR

+MS   **Modulation Selection**

Description: Sets the modem's modulation, the modulation minimum and maximum transmission rates, and the status of automatic modulation negotiation (automode). The <carrier>, <min_rate>, and <max_rate> parameters define the modulation and its minimum and maximum transmission rates. <min_rx_rate> and <max_rx_rate> define the minimum and maximum reception rates. The minimum transmission and reception rates are always set to 0.

                   The <automode> parameter enables or disables automatic modulation negotiation. If a subsequent **+MA** command is not provided, the automode parameters are constrained by the modulation set by the <carrier> parameter. The **+MA** command can further restrict the automatic modulation negotiation settings but it cannot set a modulation that is higher than the modulation set by the **+MS** command.

                   Once a modulation is selected by the **+MS** command, the autorate in both directions and the automode is activated unless <max_rate> is specified by in the command.

                   The settings of this command overwrite the settings of S28 and S37. Likewise, changes to these registers overwrite the settings of the **+MS** command

Continued on next page

Syntax: ATMS=<carrier>,<automode>,<min_rate>,<max_rate>,<min_rx_rate>, <max_rx_rate>

<carrier> Values:

V92	V.92 (default)	
V90	V.90	
V34	V.34	
V32B	V.32bis	
V32	V.32	
V22B	V.22bis	
V.22	V.22	
Bell212A	Bell 212A*	
V23C	V.23, constant carrier, asymmetric FDM	
V21	V21	
Bell103	Bell 103*	

*The +MS command was standardized by ITU-T recommendation V.250. However, the standard command does not include the additional functionality provided by the Bell212A and Bell103 values of the <carrier> parameter.

<automode> Values: Automatic modulation negotiation is enabled or disabled by <automode>. However, if a value is specified for the <max_rate> then, automatic rate selection is disabled and the modem will attempt to connect at the specified rate.

0	Disables automode.
1	Enables automode. (Default)

<max rate> Values: The <max_rate> specifies the highest connections rate for the DCE.

31200	Determined by modulation selected in <carrier>. (Default)
300-56000	Value limited by modulation selected <carrier>.

<max rate> for each <carrier>.

V34	2400 bits/s—33600 bits/s in steps of 2400 bits/s.
V32bis	4800 bits/s—19200 bits/s in steps of 2400 bits/s.
V32	4800 bits/s—14400 bits/s in steps of 2400 bits/s.
V22bis	2400 bits/s.
V22	2200 bits/s.
V23C, Bell212A	1200 bits/s.
V.21, Bell103	300 bits/s.

Valid <max rate> Range

56000	Determined by modulation selected in <carrier>. (Default)
300-56000	Value limited by modulation selected <carrier>.

Valid <max rx rate> Value for each <carrier>

V92	28000 bits/s—56000 bits/s in steps of 1333 bits/s
V90	28000 bits/s—56000 bits/s in steps of 1333 bits/s
V34	2400 bits/s—33600 bits/s in steps of 2400 bits/s
V32bis	4800 bits/s—19200 bits/s in steps of 2400 bits/s
V32	4800 bits/s—14400 bits/s in steps of 2400 bits/s
V22bis	2400 bits/s
V22	2200 bits/s
V23C, Bell212A	1200 bits/s
V.21, Bell103	300 bits/s

Reports**:**

+MS?	Reports current or selected options.
+MS?	Reports supported options.

Result Code: OK
                               ERROR

Chapter 2 – S-Registers

Certain modem values, or parameters, are stored in memory locations called S-Registers. Use the **S** command to read or to alter the contents of S-Registers (see previous section).

Register	Unit	Range	Default	Description
S0	1 ring	0, 1–255	1	Sets the number of rings until the modem answers. ATS0=0 disables auto answer completely.
S1	1 ring	0–255	0	Counts the rings that have occurred.
S2	decimal	0–127 128–255	43 (+)	Sets ASCII code for the escape sequence character. Values greater than 127 disable escape.
S3	decimal	0–127	13 (^M)	Sets the ASCII code for the carriage return character.
S4	decimal	0–127	10 (^J)	Sets the ASCII code for the line feed character.
S5	decimal	0–32 33–127	8 (^H)	Sets the ASCII code for the backspace character. Values greater than 32 disable backspace.
S6	seconds	2–65*	2*	Sets the time the modem waits after it goes off-hook before it begins to dial the telephone number.
S7	seconds	35-65*	50*	Sets the time the modem waits for a carrier signal before aborting a call. Also sets the wait for silence time for the @ dial modifier.
S8	seconds	0–65	2	Sets the length of a pause caused by a comma character in a dialing command.
S10	100 ms	1–254	20	Sets how long a carrier signal must be lost before the modem disconnects.
S11	1 ms	50–150*	95*	Sets spacing and duration of dialing tones.
S28	decimal	0, 1–255	1	0 disables, 1–255 enables V.34 modulation.
S30	1 minute	0, 1–255	0	Sets the length of time that the modem waits before disconnecting when no data is sent or received. A value of zero disables the timer. See also the **\T** command
S35	decimal	0–1	1	0 disables, 1 enables the V.25 calling tone, which allows remote data discrimination.
S36	decimal	0–7	7	Specifies the action to take in the event of a negotiation failure when error control is selected. (See **S48**.)

S37	decimal	0–19	0	Sets the maximum V.34 "upstream" speed at which the modem attempts to connect. 0 = maximum speed 1 = reserved 2 = 1200/75 bps 3 = 300 bps 4 = reserved 5 = 1200 bps 6 = 2400 bps 7 = 4800 bps 8 = 7200 bps 9 = 9600 bps 10 = 12000 bps 11 = 14400 bps 12 = 16800 bps 13 = 19200 bps 14 = 21600 bps 15 = 24000 bps 16 = 26400 bps 17 = 28800 bps 18 = 31200 bps 19 = 33600 bps
S38	decimal	0–23	1	Sets "downstream" data rate where V.90 provides rates of 28,000 to 56,000 bps in increments of 1,333 bps. 0 = V.90 disabled 1 = V.90 auto rate 2 = 28,000 bps 3 = 29,333 bps 4 = 30,666 bps 5 = 32,000 bps 6 = 33,333 bps 7 = 34,666 bps 8 = 36,000 bps 9 = 37,333 bps 10 = 38,666 bps 11 = 40,000 bps 12 = 41,333 bps 13 = 42,666 bps 14 = 44,000 bps 15 = 45,333 bps 16 = 46,666 bps 17 = 48,000 bps 18 = 49,333 bps 19 = 50,666 bps 20 = 52,000 bps 21 = 53,333 bps 22 = 54,666 bps 23 = 56,000 bps **Upstream data rates:** Upstream V.90 data rates are 4800 to 33,600 bps in 2400 bps increments.
S43	decimal	0–1	1	For testing and debugging only. Enables/disables V.32bis start-up auto mode operation. 0 = disable; 1 = enable.

S48   decimal   7 or 128   7   Enables (7) or disables (128) LAPM negotiation . The following table lists the **S36** and **S48** configuration settings for certain types of connections.

	S48=7	S48=128
S36=0, 2	LAPM or hang up	Do not use
S36=1, 3	LAPM or async	Async
S36=4, 6	LAPM, MNP, or hang up	MNP or hang up
S36=5, 7	LAPM, MNP, or async	MNP or async

Chapter 3 – Result Codes

In command mode your modem can send responses called **Result Codes** to your computer. Result codes are used by communications programs and can also appear on your monitor.

Terse	Verbose	Description
0	OK	Command executed
1	CONNECT	Modem connected to line
2	RING	Ring signal detected
3	NO CARRIER	Carrier signal lost or not detected
4	ERROR	Invalid command
5 *	CONNECT 1200	Connected at 1200 bps
6	NO DIALTONE	No dial tone detected
7	BUSY	Busy signal detected
8	NO ANSWER	No answer at remote end
10*	CONNECT 2400	Connected at 2400 bps
11*	CONNECT 4800	Connected at 4800 bps
12*	CONNECT 9600	Connected at 9600 bps
13*	CONNECT 14400	Connected at 14400 bps
14*	CONNECT 19200	Connected at 19200 bps
18	CONNECT 57600	Connected at 57600 bps
24*	CONNECT 7200	Connected at 7200 bps
25*	CONNECT 12000	Connected at 12000 bps
28	CONNECT 38400	Connected at 38400 bps
40*	CONNECT 300	Connected at 300 bps
55*	CONNECT 21600	Connected at 21600 bps
56*	CONNECT 24000	Connected at 24000 bps
57*	CONNECT 26400	Connected at 26400 bps
58*	CONNECT 28800	Connected at 28800 bps
59*	CONNECT 31200	Connected at 31200 bps
60*	CONNECT 33600	Connected at 33600 bps
70	CONNECT 32000	Connected at 32000 bps
71	CONNECT 34000	Connected at 34000 bps
72	CONNECT 36000	Connected at 36000 bps
73	CONNECT 38000	Connected at 38000 bps
74	CONNECT 40000	Connected at 40000 bps
75	CONNECT 42000	Connected at 42000 bps
76	CONNECT 44000	Connected at 44000 bps
77	CONNECT 46000	Connected at 46000 bps
78	CONNECT 48000	Connected at 48000 bps
79	CONNECT 50000	Connected at 50000 bps
80	CONNECT 52000	Connected at 52000 bps
81	CONNECT 54000	Connected at 54000 bps
82	CONNECT 56000	Connected at 56000 bps
86	CONNECT 16800	Connected at 16800 bps
87	CONNECT 115200	Connected at 115200 bps
88	DELAYED	Delay is in effect for the dialed number
89	BLACKLISTED	Dialed number is blacklisted
90	BLACKLIST FULL	Blacklist is full
91	CONNECT 230400	Connected at 230400 bps
100	CONNECT 28000	Connected at 28000 bps
101	CONNECT 29333	Connected at 29333 bps
102	CONNECT 30666	Connected at 30666 bps
103	CONNECT 33333	Connected at 33333 bps
104	CONNECT 34666	Connected at 34666 bps

105	CONNECT 37333	Connected at 37333 bps
106	CONNECT 38666	Connected at 38666 bps
107	CONNECT 41333	Connected at 41333 bps
108	CONNECT 42666	Connected at 42666 bps
109	CONNECT 45333	Connected at 45333 bps
110	CONNECT 46666	Connected at 46666 bps
111	CONNECT 49333	Connected at 49333 bps
112	CONNECT 50666	Connected at 50666 bps
113	CONNECT 53333	Connected at 53333 bps
114	CONNECT 54666	Connected at 54666 bps

When the extended result code configuration is enabled, one of the following codes is appended to the result code depending on the type of error control connection:

V42bis – V.42 error control (LAP-M) and V.42bis data compression
V42 – V.42 error control (LAP-M) only
MNP5 – MNP 4 error control and MNP 5 data compression
MNP4 – MNP 4 error control only
NoEC – No error control protocol).

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