MultiModem®

For
MultiModem® ZBA Series
MultiModem® IND
MultiModem® DID
MultiModem® ZPX Series
MultiModem® ZPX-ISA
MultiModem® ISI Series

AT Commands

Reference Guide

MultiTech®
Systems

AT Commands Reference Guide

The Following Products Use This Command Set:

> **External Modems:**
> MultiModem® ZBA (MT5634ZBA Series, MT5634ZBA-USB, MT5634IND, MT5634ZBA-DID)
> **Internal Modems:**
> MultiModem® ZPX (MT5634ZPX-PCI Series, MT5634ZPX-ISA)
> **Server Cards:**
> MultiModem® ISI (SI5634UPCI Series)
> **Legacy Modems:**
> MultiModem® (MT5634ZLX Series)

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Revisions

Revision Level	Date	Description
A	10/30/02	Initial release.
B	02/24/03	Change +PIG=0 to enable PCM upstream with default 1. Add #CBS4. Add +VRID.
C	10/01/03	The guide is now applicable to the ISI5634PCI.
D	11/17/03	This guide is now applicable to the MT5634ZPX-ISA. Explained the default for the S-Register S0: the default for internal modems is 0 while the default external modems is 1.
E	01/04/05	Removed **\X** command. Added **&L** for the MT5634IND. Added Index cross-references. Changed font.
F	12/30/05	Changed the description of \N1. Added a chapter on setting country codes.
G	04/11/07	Updated the Technical Support contact list.
H	12/28/07	Changed Technical Support contact list.
I	02/05/10	Updated the $FC command.
J	09/02/10	Updated Chapter 4, *Setting Your Country/Regional Code.* Added the default (0) to &L, *Leased-Line Operation.* Added a note and example to S-Registers regarding Range and Default as dependent upon country code. Added examples of S-Register ranges and defaults as determined by country codes.
	10/07/10	Updated the Multi-Tech web link to the global configuration page.

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World Headquarters

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

Technical Support

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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* (**+++**) followed immediately by the *AT* characters and the command, e.g., **+++** 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 98/95 and NT 4.0, 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 autoanswer 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, **AT&W** is equivalent to **AT&W0**. Most commands have a *default* value, which is the value that is set at the factory.

You must press ENTER (depending on the terminal program it could be some other key) 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.

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.

List of General Commands

Command	Description
AT	Attention Code
A	Answer
A/	Repeat Last Command
B	Communication Standard Setting – Bell or CCITT
D	Dial
%M	Enable Dialing Message
DS=*n*	Dial Stored Telephone Number
E	Echo Command
F	Echo Online Data Characters
H	Disconnect (Hang Up)
I	Information Request
L	Not Applicable
M	Monitor Speaker Mode
N	Modulation Handshake
O	Return to Online Data Mode
P	Set Pulse Dial Default
Q	Result Codes Enable/Disable
S*r*=*n*	Set Register Value
S*r?*	Read Register Value
T	Set Tone Dial Default
V	Result Code Format
W	Result Code Options
X	Result Code Selection
Z	Modem Reset
&C	Data Carrier Detect (DCD) Control
&D	Data Terminal Ready (DTR) Control
&E	XON/OFF Pacing Control
&F	Restore Factory Settings (Configuration)
&G	Select Guard Tone Control
&K	Flow Control Selection
&L	Leased-Line Operation
&Q	Asynchronous Communication Mode (same as \N Error Correction Mode)
&S	Data Set Ready (DSR) Control
&T	Loopback Tests
&V	Display Current Settings (Configuration and Stored Profiles)
&W	Store Current Settings (Configuration and Stored Profiles)
&Z*n*=*x*	Store Dialing Command
\A	Select Maximum MNP Block Size
\B	Transmit Break to Remote
\K	Break Control
\N	Error Correction Mode Selection
\Q	Flow Control Selection
\T	Inactivity Timer
\V	Protocol Result Code
-C	Data Calling Tone
%A	Adaptive Answer Result Code Enable
%B	View Numbers in Blacklist
%C	Data Compression Enable/Disable
%DC	AT Command Control
%DT	"AT" Command Timer
%E	Fallback and Fall Forward Control
%H	Direct Connect Enable
%R	Cisco Configuration
%S	Response Speed
$D	DTR Dialing
$EB	Asynchronous Word Length
$LB	Long Break
$RP	Response Priority
$SB	Serial Port Baud Rate

List of V.92 Commands

Command	Description
+PCW=*n*	Call Waiting Enable
+PIG=*n*	PCM Upstream Enable
+PMH=*n*	Modem-on-Hold Enable
+PMHF	V.92 Modem Hook Flash
+PMHR=*n*	Modem-on-Hold Initiate
+PMHTR=*n*	Modem-on-Hold Timer
+PQC=*n*	Quick Connect Control
+DCS=*x,y*	Select V.44 Data Compression
+DR=*n*	V.44 Data Compression Reporting
+DS44=*n*	V.44 Data Compression
+MS	Modulation Selection
$FC	Quick Connect

List of Caller ID Commands

Command	Description
+VCID	Caller ID Enable/Disable
+VDR=*x,y*	Distinctive Ring Report "ERROR"
+VRID	Allows query of modem's last call received

List of Callback Commands

These commands are used with modems that support Callback Security

Command	Description
#CBA	Callback Attempts
#CBD	Callback Delay
#CBF?	Callback Failed Attempts Display
#CBFR	Callback Failed Attempts Reset
#CBI	Local Callback Inactivity Timer
#CBN*y=x*	Store Callback Password
#CBP	Callback Parity
#CBR	Callback Security Reset
#CBS	Callback Enable/Disable
#P	Set 11-bit Parity
#S*x*	Enter Setup Password
#S=*x*	Store Setup Password

List of Escape Commands

Command	Description
+++AT	Escape Sequence
%%%ATMTSMODEM	Remote Configuration Escape Sequence

List of DID Commands

Command	Description
*DD	Digit Format
*DF	Format for Reporting Incoming DID Number
*DS	Start Protocol
*DT	Wait for Digit Time-Out Time
*DW	Busy Out After Call Completion
*DN	Number of DID Digits
*DW	Busy Out After Call Completion
*DN	Number of DID Digits

AT Commands Detail

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

Command: **A**   **Answer**
Values: n/a
Description: Answer an incoming call before the final ring.

Command: **A/**   **Repeat Last Command**
Values: n/a
Description: Repeat the last command string. Do not precede this command with **AT**. Do not press ENTER to execute.

Command: **B*n***   **Communication Standard Setting**
Values: *n* = 0-3, 15, 16
Default: 1 and 16
Description: B0   Select ITU-T V.22 mode when modem is at 1200 bps
                    B1   Select Bell 212A when modem is 1200 bps.
                    B2   Deselect V.23 reverse channel (same as **B3**).
                    B3   Deselect V.23 reverse channel (same as **B2**).
                    B15   Select V.21 when modem is at 300 bps.
                    B16   Select Bell 103 when modem is at 300 bps.

Command: **D*s***   **Dial**
Values: *s* = dial string (phone number and dial modifiers)
Default: none
Description: Dial telephone number *s*, where *s* may be up to 40 characters long and include these
                    characters: *0-9, *, #, A, B, C, D*

                    Can also include these Dial String Modifiers: **L, P, T, W, S**, comma (**,**), semicolon (**;**), **!**, **@**, **^**, and **$**.

Dial String Characters and Modifiers

0-9	DTMF digits 0 to 9.
*	The 'star' digit (tone dialing only).
#	The 'gate' digit (tone dialing only).
A-D	Some countries may prohibit sending of these digits during dialing (tone dialing only)
L	Redial last number. (Must be placed immediately after **ATD**.)
P	Selects pulse dialing until a **T** is encountered. Affects current and subsequent dialing. Some countries prevent changing dialing modes after the first digit is dialed.
T	Selects tone dialing until a **P** is encountered. Affects current and subsequent dialing. Some countries prevent changing dialing modes after the first digit is dialed.
W	Wait for a new dial tone before continuing to dial. (**X2, X4, X5, X6,** or **X7** must be selected).
S=n	Dial the number stored in the directory (n = 0 to 3). (See &Z.)
,	Pause during dialing for set set in in register **S8**.
;	Return to command mode after dialing. Place at the end of dial string.
!	Hook Flash. Causes the modem to go on-hook for a time defined by the value of S29, then off-hook again. Country requirements may limit the time imposed.
@	Wait for quiet answer (silence). Causes the modem to wait for a ring back, then 5 seconds of silence before processing the next part of the command. If silence is not detected, the modem returns a NO ANSWER code.
^	Toggles the calling tone between enable/disable. Applicable to current dial attempt only.
$	Detect AT&T call card "bong" tone. The character should follow the phone number and precede the user's call card number: **ATDT1028806127853500$123456789**

Ignored Characters
- **( )**   Ignored: may be used to format the dial string.
- **-**   Ignored: may be used to format the dial string.
- **\<space>**   Ignored: may be used to format the dial string.
- **\<i>**   Invalid character: will be ignored.

Command: %M   **Enable Dialing Message**
Values: 0, 1
Default: 0
Description: Enables dialing message. It will display when the ATDL=n command is used and dialing from memory or DTR dialing.
0 = Disabled - turns dialing message off
1 = Enabled - turns dialing message on

Command: DS=n   **Dial Stored Telephone Number**
Values: n = 0, 1, 2
Default: none
Description: Dials a number previously stored in the directory by the **&Zn=x** command. Ex: **ATDS=2.**

Command: En   **Echo Command**
Values: n = 0 or 1
Default: 1
Description: E0   Disables echo command.
E1   Enables echo command.

Command: Fn   **Echo Online Data Characters**
Values: n = 0, 1
Default: 1
Description: F0   Enables online data character echo. (Not supported.)
F1   Disables online data character echo (included for backward compatibility).

Command: Hn   **Disconnect (Hang Up)**
Values: n = 0 or 1
Default: 0
Description: H0   The modem goes on-hook (hangs up).
H1   The modem goes off-hook (makes the phone line busy).

Command: In   **Information Request**
Values: n = 0–5, 9, 11
Default: None
Description: I0   Displays default speed and controller firmware version.
I1   Calculates and displays ROM checksum (e.g., B399).
I2   Checks ROM and verifies the checksum, displaying *OK* or *ERROR*.
I3   Displays default speed and controller firmware version.
I4   Displays firmware version for data pump (e.g., 17)..
I5   Displays the board ID: software version, hardware version, and the country ID in hexidecimal format (e.g., s0503a01V, 0,34).
I7   Displays release information and V.92 capabilities.
I9   Displays the country code in decimal format (e.g., 52).
I11   Displays diagnostic information for the last modem connection, such as DSP and firmware version, link type, line speed, serial speed, type of error correction/data compression, number of past retrains, etc.

Command: Ln   **Not Applicable**

Command: Mn   **Monitor Speaker Mode**
Values: n = 0, 1, 2, or 3
Default: 1
Description: M0   Speaker always off.
M1   Speaker on until carrier signal detected.
M2   Speaker always on when modem is off-hook.
M3   Speaker on until carrier is detected, except while dialing.

Command: **N***n*   **Modulation Handshake**
Values: *n* = 0 or 1
Default: 1
Description: N0   Modem performs handshake only at communication standard specified by **S37** and the
                          B command.
                     N1   Modem begins handshake at communication standard specified by **S37** and the **B**
                          command. During handshake, fallback to a lower speed can occur.

Command: **O***n*   **Return to Online Data Mode**
Values: 0, 1, 3
Default: None
Description: O0   Exits online command and returns to data mode (see +++AT escape sequence).
                     O1   Issues a retrain and returns to online data mode.
                     O3   Issues a rate renegotiation and returns to data mode.

Command: **P**   **Set Pulse Dial Default**
Values: P, T
Default: T
Description: Configures the modem for pulse (non-touch-tone) dialing. Dialed digits are pulsed until a **T**
                     command or dial modifier is received.

Command: **Q***n*   **Result Codes Enable/Disable**
Values: *n* = 0 or 1
Default: 0
Description: Q0   Enables result codes.
                     Q1   Disables result codes.
                     Q2   Dumb Answer Mode (also known as No Response Answer). Q2 sets the answer
                          mode to be handled without responses and echo turned off; however, the originate
                          mode remains intelligent.

Command: **S***r***=***n*   **Set Register Value**
Values: *r* = S-Register number; *n* varies
Default: None
Description: Sets the value of the register **S***r* to the value of *n*, where *n* is entered in decimal format:
                     Example: **S0=1**.

Command: **S***r***?**   **Read Register Value**
Values: *r* = S-Register number
Default: None
Description: Reads the value of the register **S***r* and displays it in 3-digit decimal form. Example: **S2?**
                     gives the response **043**.

Command: **T**   **Set Tone Dial Default**
Values: P, T
Default: T
Description: Configures the modem DTMF (touch-tone) dialing. Dialed digits are tone dialed until a **P**
                     command or dial modifier is received.

Command: **V***n*   **Result Code Format**
Values: *n* = 0 or 1
Default: 1
Description: V0   Displays result codes as digits (short form or terse).
                     V1   Displays result codes as words (long-form or verbose).

Command: **W***n*   **Result Code Options**
Values: n = 0, 1, 2
Default: 2
Description: W0   CONNECT result code reports serial port speed, disables protocol result codes.
                     W1   CONNECT result code reports serial port speed, enables protocol result codes.
                     W2   CONNECT result code reports line speed, enables protocol result codes.

Command: *Xn* **Result Code Selection**
Values: n = 0–7
Default: 4
Description: X0 Basic result codes (e.g., CONNECT); does not look for dial tone or busy signal.
    X1 Extended result codes (e.g., CONNECT 46000 V42bis); does not look for dial tone or busy signal.
    X2 Extended result codes with NO DIALTONE; does not look for busy signal.
    X3 Extended result codes with BUSY; does not look for dial tone.
    X4 Extended result codes with NO DIALTONE and BUSY.
    X5 Extended result codes with NO DIALTONE and BUSY.
    X6 Extended result codes with NO DIALTONE and BUSY.
    X7 Basic result codes with NO DIALTONE and BUSY.

Command: *Zn* **Modem Reset**
Values: *n* = 0 or 1
Default: None
Description: Z0 Resets modem to profile saved by the last **&W** command.
    Z1 Same as **Z0**.

Command: **&C***n* **Data Carrier Detect (DCD) Control**
Values: n = 0, 1, or 2
Default: 1
Description: &C0 Forces the DCD circuit to be always high.
    &C1 DCD goes high when the remote modem's carrier signal is detected, and goes low when the carrier signal is not detected.
    &C2 DCD drops on disconnect for time set by **S18**, then goes high again (for some PBX phone systems).

Command: **&D***n* **Data Terminal Ready (DTR) Control**
Values: n = 0, 1, 2, or 3
Default: 2
Description: &D0 Modem ignores the true status of the DTR signal and responds as if it is always on.
    &D1 If DTR drops while in online data mode, the modem enters command mode, issues an OK, and remains connected.
    &D2 If DTR drops while in online data mode, the modem hangs up. If the signal is not present, the modem will not answer or dial.
    &D3 If DTR drops, the modem hangs up and resets as if an **ATZ** command were issued.

Command: **&E***n* **XON/XOFF Pacing Control**
Values: n = 12 or 13
Default: 12
Description: &E12 Disables XON/XOFF pacing.
    &E13 Enables XON/XOFF pacing. (&K4 must also be set.)

    Note: &E13 has no effect if hardware control (**&K3**) is selected.

Command: **&F***n* **Load Factory Settings**
Values: n = 0
Default: None
Description: &F0 Loads factory settings as active configuration.
    Note: See also the Z command.

Command: **&G***n* **V.22bis Guard Tone Control**
Values: n = 0, 1, or 2
Default: 0
Description: &G0 Disables guard tone.
    &G1 Sets guard tone to 550 Hz.
    &G2 Sets guard tone to 1800 Hz.
    Note: The **&G** command is not used in North America.

Command: &K_n_ **Flow Control Selection**
Values: n = 0, 3, or 4
Defaults: 3
Description: &K0   Disables flow control.
                &K3   Enables CTS/RTS hardware flow control.
                &K4   Enables XON/XOFF software flow control.

Command: &L_n_ **Leased-Line Operation**
Note: This command applies to the MT5634IND (Industrial Temperature Modem)
Values: _n_ = 0, 1, or 2
Defaults: 0
Description: &L0   The modem is set for standard dial-up operation. Default.
                &L1   The modem is set for leased line operation in originate mode.
                &L2   The modem is set for leased line operation in answer mode.

                Note: For **&L1** and **&L2**, there is a 30-second window between power up and the starting of
                        the leased line handshake. During this time, you can turn off the command, if desired.

Command: &Q_n_ **Asynchronous Communications Mode**
Values: n = 0, 5, 6, 8, or 9
Default: 5
Description: &Q0   Asynchronous with data buffering. Same as \N0.
                &Q5   Error control with data buffering. Same as \N3.
                &Q6   Asynchronous with data buffering. Same as \N0.
                &Q8   MNP error control mode. If MNP error control is not established, the modem falls
                        back according to the setting in **S36**.
                &Q9   V.42 or MNP error control mode. If neither error control is established, the modem
                        falls back according to the setting in **S36**.

Command: &S_n_ **Data Set Ready (DSR) Control**
Values: n = 0 or 1
Default: 0
Description: &S0   DSR is always high (on).
                &S1   DSR goes high only during a connection.

Command: &T_n_ **V.54 Test Commands**
Values: n = 0, 1, 3 or 6
Default: None
Description: &T0   Abort. Stops any test in progress.
                &T1   Initiates local analog loopback test.
                &T3   Initiates local digital loopback test.
                &T6   Initiates remote digital loopback test.
                Note: To stop a test, use the escape sequence (+++AT) before typing **&T0**.

Command: &V **Display Current Settings**
Values: n/a
Description: Displays the active modem settings, including the callback security settings if callback
                security is enabled. If the setup password has been entered, it also displays the callback
                security passwords.

Command: &W_n_ **Store Current Configuration**
Values: n = 0, 1
Default: 1
Description: &W0   Stores current modem settings in nonvolatile memory and causes them to be loaded
                       in place of the factory defaults at power-on or following the ATZ command. See also
                       the &F command.
                &W1   Clears user default settings from nonvolatile memory and causes the factory defaults
                       to be loaded at power-on or following the ATZ command.

Command: &Z*n*=*x* Storing a Dialing Command
Values: n = 0–3. Callback security disabled. 0, 1 used by MultiModemZPX/ZLI.
                            0, 1, 2 used by MultiModemZBA.
                            0–29. Callback security enabled.
                        x = Stored telephone number
Default: None
Description: Stores dialing command x in memory. Dial the stored number using the command ATDS=n.
                        See also the #CBSn command.

Command: \A*n* Select Maximum MNP Block Size
Values: n = 0, 1, 2, or 3
Default: 3
Description: \A0   64-character maximum.
                        \A1   128-character maximum.
                        \A2   192-character maximum.
                        \A3   256-character maximum.

Command: \B*n* Transmit Break
Values: n = 0–9 in 100 ms units
Default: 3
Description: In non-error-correction mode only, sends a break signal of the specified length to a remote
                        modem. Works in conjunction with the \K command.

Command: \K*n* Break Control
Values: n = 0–5
Default: 5
Description: Controls the modem's response to a break received from the computer, the remote modem,
                        or the \B commnd. The response is different for each.
                        Data mode. Modem receives the break from the computer:
                        \K0   Enters online command mode, no break sent to the remote modem.
                        \K1   Clears data buffers and send break to the remote modem.
                        \K2   Same as \K0.
                        \K3   Sends break immediately to the remote modem .
                        \K4   Same as \K0.
                        \K5   Sends break to the remote modem in sequence with the transmitted data.
                        Data mode. Modem receives the break from the remote modem:
                        \K0   Clears data buffers and sends break to the computer.
                        \K1   Same as \K0.
                        \K2   Sends break immediately to the computer.
                        \K3   Same as \K2.
                        \K4   Sends break to the computer in sequence with the received data.
                        \K5   Same as \K4.
                        Online command mode. Modem receives a \B*n* command from the computer:
                        \K0   Clears data buffers and sends break to the remote modem.
                        \K1   Same as \K0.
                        \K2   Sends break immediately to the remote modem.
                        \K3   Same as \K2.
                        \K4   Sends break to the remote modem in sequence with the transmitted data.
                        \K5   Same as \K4.

Command: \N*n* Error Correction Mode Selection
Values: n = 0–5, or 7
Default: 3
Description: \N0   Non-error correction mode with data buffering (same as **&Q6**).
                        \N1   For compatibility. Operates the same as \N0.
                        \N2   MNP reliable mode. If modem cannot make MNP connection, it disconnects.
                        \N3   V.42/MNP auto-reliable mode. The modem attempts first to connect in V.42 error
                                correction mode, then in MNP mode, and finally in non-error-correction (buffer)
                                mode with continued operation.
                        \N4   V.42 reliable mode.If the modem cannot make a V.42 connection, it disconnects.
                        \N5   V.42, MNP, or non-error correction (same as \N3).
                        \N7   V.42, MNP, or non-error correction (same as \N3).

Command: \Q*n*   **Flow Control Selection**
Values: n = 0, 1, or 3
Default: 3
Description: \Q0   Disables flow control (same as &K0).
                     \Q1   XON/XOFF software flow control (same as &K4).
                     \Q2   CTS-only flow control. Not supported.
                     \Q3   RTS/CTS hardware flow control (same as &K3).

Command: \T*n*   **Inactivity Timer**
Values: n = 0, 1–255
Default: 0
Description: \Tn   Sets the time (in minutes) that the modem waits after the last character is sent or
                              received before it disconnects. A value of zero disables the timer. Applies only in
                              buffer mode.
                     Note: You can also set the inactivity timer by changing the value of S30.

Command: \V*n*   **Protocol Result Code**
Values: n = 0, 1, or 2
Default: 1
Description: \V0   Disables the appending of the protocol result code to the DCE speed.
                     \V1   Enables the appending of the protocol result code to the DCE speed.
                     \V2   Same as \V1.

Command: -C*n*   **Data Calling Tone**
Values: n = 0 or 1
Defaults: 0
Description: -C0   Disables V.25 data calling tone to deny remote data/fax/voice discrimination.
                     -C1   Enables V.25 data calling tone to allow remote data/fax/voice discrimination.

Command: %A   **Adaptive Answer Result Code Enable**
Values: n = 0 or 1
Default: 0
Description: The %A command controls whether the DATA and FAX result codes will be sent by the
                     modem. The modem must be in fax mode for this command to work. Also, the modem must
                     be set to +FAA=1, which enables the modem to distinguish between a fax and a data call.
                     When these commands are enabled, the modem sends DATA to the computer when it
                     detects data tones, and FAX when it detects fax tones. These strings are used by some
                     servers to select the appropriate communication program.
                     %A0   Disables adaptive answer result codes.
                     %A1   Enables adaptive answer result codes.
                     Note: For descriptions of the +FAA= and other fax commands, see the Multi-Tech Fax Class
                     2.1 Developer's Guide.

Command: %B   **View Numbers in Blacklist**
Values: n/a
Description: If blacklisting is in effect, AT%B displays the numbers for which the last call attempted in the
                     previous two hours failed. In countries that do not require blacklisting, the ERROR result
                     code appears.

Command: %C*n*   **Data Compression Control**
Values: n = 0 or 1
Default: 1
Description: %C0   Disable sV.42bis/MNP 5 data compression.
                     %C1   Enables V.42bis/MNP 5 data compression.

Command: %DC*n* **AT Command Control**
Values: n = 0 or 1
Default: 0
Description: %DC0   The modem responds to AT commands.
                     %DC1   The modem ignores AT commands.
                     Note: The modem will respond to AT%DC for 10 seconds after it is turned on.

Command: %DT*n* **Set Command Mode Time**
Values: 0-255 in 1 second increments
Default: 0
Description: Sets the length of time that the command mode will be disabled when set for %DC1 (the modem ignores AT commands).

Command: %E*n* **Fallback and Fall Forward Control**
Values: n = 0, 1, or 2
Default: 2
Description: %E0   Disables fallback and fall-forward.
                       %E1   Enables fallback, disables fall-forward.
                       %E2   Enables fallback and fall-forward.

Command: %H*n* **Direct Connect Enable**
Values: n = 0, 1
Default: 0
Description: %H0   Sets callback security to normal operation.
                       %H1   All callback security calls will be direct connect regardless of whether the password or phone number has the **-** character.

Command: %R*n* **Cisco Configuration**
Values: n = 0, 1
Default: 0
Description: %R0   Disables Cisco configuration.
                       %R1   Sets E0, Q1, &D0, \N0, $SB9600, and %S1 for operation with a Cisco router.

Command: %S*n* **Command Speed Response**
Values: n = 0, 1
Default: 0
Description: %S0   Sets modem to respond to AT commands at all normal speeds.
                       %S1   AT commands accepted at 115200 bps only. Other speeds are ignored.

Command: $D*n* **DTR Dialing**
Values: n = 0 or 1
Default: 0
Description: $D0   Disables DTR dialing.
                       $D1   Dials the number in memory location 0 when DTR goes high.

Command: $EB*n* **Asynchronous Word Length**
Values: n = 0 or 1
Default: 0
Description: $EB0   Enables 10-bit mode.
                       $EB1   Enables 11-bit mode.

Command: $FC **Quick Connect**
Values: n = 0, 1, or 2
Default: 0
Description: Sets quick connect
Syntax: AT$FC<value>
                       $FC0 - No quick connect
                       $FC1 - Sets quick connect speed at 1200
                       $FC2 - Sets quick connect speed at 2400

Command: $LB **Long Break**
Values: 0-255 in 10 ms increments
Default: 30 (300 ms break)
Description: Sets the length of a long break transmitted by the modem if set up by the modem.

Command: $MBn   Modem Baud Rate
Values: 75, 300, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 33600
Default: 33600
Description: Presets the **transmission** baud rate for originate operations (i.e., the speed of the modem's transmissions over the telephone lines when originating a call). With speed conversion, transmission speed can be a different baud rate than the serial port speed.
                         When the modem receives a call from another modem, it automatically switches its phone line transmission speed to match the calling mode. However, if the MultiModem originates a call to another modem that is unable to connect at the MultiModem's baud rate, it automatically drops to the lower baud rate in an attempt to match that modem's speed. For example, if the MultiModem is set for 19200 baud and calls a modem with a top speed of 2400 baud, it drops to 2400 baud.

AT$MB75	=	V.23
AT$MB300	=	300 bps
AT$MB1200	=	1200 bps
AT$MB2400	=	2400 bps
AT$MB4800	=	4800 bps
AT$MB9600	=	9600 bps
AT$MB14400	=	14400 bps
AT$MB19200	=	19200 bps
AT$MB28800	=	28800 bps
AT$MB33600	=	33600 bps

Command: $RP   Response Priority
Values: n = 0, 1
Default: 1
Description: Configures whether an incoming ring or an AT command will have priority.
                        $RP0 - AT command will have priority
                        $RP1 - Incoming call (ring) will have priority

Command: $SBn   Serial Port Baud Rate
Values: n = speed in bits per second
Default: 57600
Description:

$SB300	Set serial port to 300 bps.
$SB1200	Set serial port to 1200 bps.
$SB2400	Set serial port to 2400 bps.
$SB4800	Set serial port to 4800 bps.
$SB9600	Set serial port to 9600 bps.
$SB19200	Set serial port to 19200 bps.
$SB38400	Set serial port to 38400 bps.
$SB57600	Set serial port to 57600 bps.
$SB115200	Set serial port to 115200 bps.
$SB230400	Set serial port to 230400 bps. (V.92 models only)

V.92 Commands

Command: +PCW=n Call Waiting Enable
Values: n = 0, 1, or 2
Default: 0
Description: Controls the action to be taken upon detection of a call waiting tone in V.92 mode. Values
specified by this command are not modified when an AT&F command is issued.
+PCW=0   Toggles V.24 Circuit 125 and collects Caller ID if enabled by +VCID
+PCW=1   Hangs up
+PCW=2   Ignores V.92 call waiting
+PCW=?   Displays the allowed values
+PCW?   Displays the current value

Command: +PIG=n   PCM Upstream Enable
Values: n = 0 or 1
Default: 1
Description: Controls the use of PCM upstream during V.92 operation. PCM upstream allows faster
upload speeds to a V.92 server.
+PIG=0   Enable PCM upstream
+PIG=1   Disable PCM upstream
+PIG=?   Displays the allowed values
+PIG?   Displays the current value

Command: +PMH=n Modem on Hold Enable
Values: n = 0 or 1
Default: 1
Description: Controls if modem on hold procedures are enabled during V.92 operation. Normally
controlled by a modem on hold program. Values specified by this command are not modified
when an AT&F command is issued.
+PMH=0 Enables V.92 modem on hold
+PMH=1 Disables V.92 modem on hold
+PMH=? Displays the allowed values
+PMH?   Displays the current value

Command: +PMHF   V.92 Modem Hook Flash
Values: n/a
Default: n/a
Description: Causes the DCE to go on-hook for a specified period of time, and then return off-hook for at
least a specified period of time. The specified period of time is normally one-half second, but
may be governed by national regulations. "ERROR" is returned if MOH is not enabled.

Command: +PMHR=*n* Modem on Hold Initiate
Values: n = 0–13
Default: 0
Description: +PMHR is an action command that causes the modem to initiate MOH with the central site
modem. It returns the following values to indicate negotiated values. Valid only if MOH is
enabled and the modem is off-hook or in data mode. Otherwise, ERROR will be returned.
+PMHR=0   Deny MOH request
+PMHR=1   Grant MOH request with 10 second timeout
+PMHR=2   Grant MOH request with 20 second timeout
+PMHR=3   Grant MOH request with 30 second timeout
+PMHR=4   Grant MOH request with 40 second timeout
+PMHR=5   Grant MOH request with 1 minute timeout
+PMHR=6   Grant MOH request with 2 minute timeout
+PMHR=7   Grant MOH request with 3 minute timeout
+PMHR=8   Grant MOH request with 4 minute timeout
+PMHR=9   Grant MOH request with 6 minute timeout
+PMHR=10   Grant MOH request with 8 minute timeout
+PMHR=11   Grant MOH request with 12 minute timeout
+PMHR=12   Grant MOH request with 16 minute timeout
+PMHR=13   Grant MOH request with indefinite timeout
+PMHR=?   Displays the allowed values
+PMHR?   Displays the current value

Command: +PMHT=n Modem on Hold Timer

Values: n = 0–13
Default: 0
Description: Determines if the modem will accept a V.92 Modem on Hold request; sets the MoH timeout.

+PMHT=0   Deny MOH request
+PMHT=1   Grant MOH request with 10 second timeout
+PMHT=2   Grant MOH request with 20 second timeout
+PMHT=3   Grant MOH request with 30 second timeout
+PMHT=4   Grant MOH request with 40 second timeout
+PMHT=5   Grant MOH request with 1 minute timeout
+PMHT=6   Grant MOH request with 2 minute timeout
+PMHT=7   Grant MOH request with 3 minute timeout
+PMHT=8   Grant MOH request with 4 minute timeout
+PMHT=9   Grant MOH request with 6 minute timeout
+PMHT=10   Grant MOH request with 8 minute timeout
+PMHT=11   Grant MOH request with 12 minute timeout
+PMHT=12   Grant MOH request with 16 minute timeout
+PMHT=13   Grant MOH request with indefinite timeout
+PMHT=?   Displays the allowed values
+PMHT?   Displays the current value

Command: +PQC=n Quick Connect Control

Values: n = 0, 1, 2, or 3
Default: 3
Description: Controls the V.92 shortened Phase 1 and Phase 2 startup procedures (Quick Connect).
                     When line conditions are stable, quick connect results in shortened connect times; however,
                     significant fluctuation in line conditions from call to call can result in longer connect times, in
                     which case it may be advisable to disable quick connect.

+PQC=0   Enables Short Phase 1 and Short Phase 2 (Quick Connect)
+PQC=1   Enables Short Phase 1
+PQC=2   Enables Short Phase 2
+PQC=3   Disables Short Phase 1 and Short Phase 2
+PQC=?   Displays the allowed values
+PQC?   Displays the current value

Command: +DCS=x,y   Select V.44 Data Compression

Values: x = 0 or 1 (V.42*bis*)
                     y = 0, 1, or 2 (V.44)
Default: 1, 2
Description: Selects V.42bis/V.44 data compression.

+DCS=0,0   V.42bis and V.44 data compression are both disabled.
+DCS=0,1   V.42bis is disabled; V.44 data compression is acceptable.
+DCS=0,2   V.42bis is disabled; V.44 only when connected to a V.92 server.
+DCS=1,0   V.42bis is acceptable; V.44 data compression is disabled.
+DCS=1,1   V.42bis is acceptable; V.44 data compression is acceptable.
+DCS=1,2   V.42bis is acceptable; V.44 only when connected to a V.92 server.
+DCS=?   Displays the allowed values.
+DCS?   Displays the current value.

Command: +DR=n V.44 Data Compression Reporting

Values: n = 0 or 1
Default: 0
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). The intermediate result code descriptions are shown after the command -
                     descriptions.

+DR=0   Disables the V.44 compression report.
+DR=1   Enables the V.44 compression report.
+DR=?   Displays the allowed values.
+DR?   Displays the current value.
+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.

Command: +DS44=*n* V.44 Data Compression

Values: See description
Default: See description
Description: Controls the V.44 data compression function.

The command syntax is +DS44=[direction][,[0][,[0] [,[max_codewords_tx][,[max_codewords_rx][,[max_string_tx] [,[max_string_rx][,[max_history_tx][,[max_history_rx]]]]]]]]]<CR> Subparameters that are not entered retain their current value. Commas separate optional subparameters, and must be inserted to skip a subparameter. Example: +DS44=,,,2048,2048<CR> changes the maximum number of code words in both directions, and keeps all other settings at their current values.

+DS44=? Reports supported options in the format (list of supported direction values), (0), (0), (list of supported max_codewords_tx values), (list of supported max_codewords_rx values), (list of supported max_string_tx values), (list of supported max_string_rx values), (list of supported max_history_tx values), (list of supported max_history_rx values). Example: +DS44: (3, 0), (0), (0), (256-2048), (256-2048), (31-255), (31-255), (512-11008), (512-11008).

+DS44? Reports current options in the following format:
direction, 0, 0, max_codewords_tx, max_codewords_rx, max_string_tx, max_string_rx, max_history_tx, max_history_rx.
Example: +DS44: 3, 0, 0, 1024, 1024, 255, 255, 5120, 4096.

Subparameters

direction	Specifies the DTE direction of the data compression. 0 No compression. 3 Compression in both directions (default).
max_codewords_tx	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	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	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	Specifies the maximum string length to be negotiated in the receivedirection. 255 Default. 31–255 Maximum string length in receivedirection.
max_history_tx	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	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

Command: +MS= Modulation Selection
Values: See description.
Defaults: See description.
Description: This extended-format command selects modulation, enables or disables automode, and specifies the highest downstream and upstream connection rates using one to four subparameters.

The command syntax is:

+MS= [*mod*][,[*automode*][,[**0**][,[*max_rate*][,[**0**][,[*max_rx_rate*]]]]]]<CR>
Subparameters that are not entered retain their current value. Commas separate optional subparameters, and must be inserted to skip a subparameter. Example: **+MS=,0<CR>** disables automode and keeps all other settings at their current values.

+MS=? Reports supported options in the format (list of supported *mod* values),(list of supported *automode* values),(0),(list of supported *max_rate* values),(0),(list of supported *max_rx_rate* values). Example: +*MS: (BELL103, V21, BELL212A, V22, V22B, V23C, V32, V32B, V34, V90, V92), (0, 1), (0), (0-33600), (0), (0-56000)*

+MS? Reports current options in the format *mod, automode, 0, max_rate, 0, max_rx_rate.*
Example: +*MS: V92, 1, 0, 31200, 0, 56000.*

Subparameters

mod	Specifies the preferred modulation (automode enabled) or the modulation to use in originating or answering a connection (automode disabled). The default is V92.

mod	Modulation	Possible rates (bps)[1]
V92[2]	V.92	56000, 54666, 53333, 52000, 50666, 49333, 48000, 46666, 45333, 44000, 42666, 41333. 40000, 38666, 37333, 36000, 34666, 33333, 32000, 30666, 29333, or 28000
V90[3]	V.90	56000, 54666, 53333, 52000, 50666, 49333, 48000, 46666, 45333, 44000, 42666, 41333. 40000, 38666, 37333, 36000, 34666, 33333, 32000, 30666, 29333, or 28000
V34	V.34	33600, 31200, 28800, 26400, 24000, 21600,19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400
V32B	V.32bis	14400, 12000, 9600, 7200, or 4800
V32	V.32	9600 or 4800
V22B	V.22bis	2400 or 1200
V22	V.22	1200
V23C	V.23	1200
V21	V.21	300
Bell212A	Bell 212A	1200
Bell103	Bell 103	300

Notes:
1. See optional <automode>, <max_rate>, and <max_RX_rate> subparameters.
2. Selects V.92 modulation as first priority. If a V.92 connection cannot be established, the modem attempts V.90, V.34, V.32bis, etc.
3. Selects V.90 modulation as first priority. If a V.90 connection cannot be established, the modem attempts V.34, V.32bis, etc.

automode	An optional numeric value that enables or disables automatic modulation negotiation using V.8 bis/V.8 or V.32 bis Annex A. Automode is disabled if values are specified for the *max_rate* and *max_rx_rate* parameters. The options are: 0 Disable automode 1 Enable automode (default)

max_rate	An optional number that specifies the highest rate at which the modem may establish an upstream (transmit) connection. The value is decimal coded in units of bps, for example, 33600 specifies the highest rate to be 33600 bps. 0 Maximum rate value limited by the modulation selected in *mod* (default). *300–33600* Maximum rate value limited by the modulation selected in *mod*. For valid *max_rate* values for each *mod* value, see the following table:

mod value	Valid max-rate values (bps)
V92, V90, V34	31200, 28800, 26400, 24000, 21600,19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400
V32B	19200, 16800, 14400, 12000, 9600, 7200, 4800
V32	14400, 12000, 9600, 7200, 4800
V22B	2400
V22, V23C, Bell212A	1200
V21, Bell103	300

max_rx_rate	An optional number that specifies the highest rate at which the modem may establish a downstream (receive) connection. The value is decimal coded in bps units; e.g., 28800 specifies the highest rate to be 28800 bps. 0 Maximum rate determined by the modulation selected in *mod* (default). 300–56000 Maximum rate value limited by the modulation selected in *mod*. See "Possible rates" in the *mod* table.

Caller ID Commands

Command: +VCID=n Caller ID Selection

Values: n = 0, 1, or 2
Default: 0
Description: Enables Caller ID detection and configures the reporting and presentation of the Caller ID
                       data that is detected after the first ring. The reported data includes the date and time of the
                       call, the caller's name and number, and a message. Set S0=2.
    +VCID=0   Disables Caller ID
    +VCID=1   Enables Caller ID with formatted data
    +VCID=2   Enables Caller ID with unformatted data
    +VCID=?   Displays the allowed values
    +VCID?   Displays the current value

Command: +VDR=x,y   Distinctive Ring Report

Values: x = 0, 1 Distinctive Ring report control. See description.
                       y = 0–255 Minimum ring interval in 100 ms units. See description.
Default: 0
Description: Enables reporting of ring cadence information to the DTE and specifies the minimum ring
                       cadence that will be reported.

    The report format is one line per silence period and one line per ring period. The length of
    the silence period is in the form *DROF=number in units of 100 ms<CR><LF>*, and the length
    of the ring is in the form *DRON=number in units of 100 ms<CR> <LF>*.

    The modem may produce a Ring event code after the DRON message if enabled by the *y*
    parameter. The *y* parameter must be set to a value equal to or smaller than the expected ring
    cadence in order to pass the report to the DTE.
    +VDR=0, n/a   Disables Distinctive Ring cadence reporting.
    +VDR=1, 0   Enables Distinctive Ring cadence reporting. Other call progress result codes
        (including RING) are reported as normal.
    +VDR=1, >0   Enables Distinctive Ring cadence reporting. The RING result code is
        reported after the falling edge of the ring pulse (i.e., after the DRON report).
    +VDR=?   Displays the allowed values.
    +VDR?   Displays the current value.

Command: +VRID Caller ID Query

Values: na
Default: na
Description: Displays Caller ID information of the last call received.

Callback Security Commands

Command: #CBAn Callback Attempts
Values: n = 1–255
Default: 4
Description: Sets the number of callback attempts that are allowed after passwords have been
                            exchanged between modems.·

Command: #CBDn Callback Delay
Values: n = 0–255
Default: 15
Description: Sets the length of time (in seconds) that the modem waits before calling back the remote
                            modem.

Command: #CBF? Callback Failed Attempts Display
Values: n/a
Default: n/a
Description: Requests the number of failed callback passwords since reset or power-up. This number
                            can be stored to nonvolatile memory using the &W command.

Command: #CBFR Callback Failed Attempts Reset
Values: n/a
Default: n/a
Description: Resets the number of failed callback passwords to 0. This does not reset the number stored
                            in nonvolatile memory.

Command: #CBIn   Local Callback Inactivity Timer
Values: n = 1–255
Default: 20
Description: Sets the time (in minutes) that the modem waits for a command before forcing the user to
                            enter the setup password again.

Command – Store Callback PCommand: #CBNy=x Store Callback Password
Values: y = 0–29
                            x = password
Defaults: None
Description: Sets the callback security password for the y memory location. The password must have 6
                            to 10 characters, and cannot include the + or - characters.

Command: #CBPn Callback Parity
Values: n = 0, 1, or 2
Default: 0
Description: Sets parity for the callback security messages.
                            #CBP0   No parity.
                            #CBP1   Odd parity.
                            #CBP2   Even parity.

Command: #CBRy Callback Security Reset
Values: y = 0–29
Default: None
Description: Clears the password and phone number in the y memory location.

Command: #CBSn Callback Enable/Disable
Values: n = 0, 1, 2, or 3
Default: 0
Description: #CBS0   Disables callback security.
                       #CBS1   Enables local and remote callback security.
                       #CBS2   Enables remote callback security only.
                       #CBS3   Disables callback security until local hangup or reset.
                       #CBS4   Enables a callback security modem to originate a call without a connection password prompt.

Command: #Pn Set 11-bit Parity
Values: n = 0 or 1
Default: 2
Description: #P0   No parity.
                       #P1   Odd parity.
                       #P2   Even parity.

Command: #Sx Enter Setup Password
Values: x= password (1–8 characters, case sensitive)
Default: MTSMODEM
Description: Enters the callback security setup password.

Command: #S=x Store Setup Password
Values: x= password (1–8 characters, case sensitive)
Default: MTSMODEM
Description: Stores a new callback security and remote configuration setup password.

Escape Sequence Commands

Command: Escape Sequence+++AT<CR> Escape Sequence
Values: n/a
Description: Puts the modem in command mode (and optionally issues a command) while remaining online. Type +++AT and up to six command characters, then press ENTER. Used mostly to issue the hang-up command: +++ATH<CR>.

Command: Escape Configuration for Remote Configuration%%%ATMTSMODEM<CR>
                                   Remote Configuration Escape Sequence
Values: n/a
Description: Initiates remote configuration mode while online with remote modem. The remote configuration escape character (%) is defined in register S9.

DID Commands

The DID modem uses ***D** commands to configure the modem's DID features. The modem must be configured for the proper protocol, digit format, digit time out, digit report format, and number of digits. This configuration is determined by the company from which the DID line is ordered and the setup used by the phone company. The DID configuration parameter settings of the modem can be viewed as part of the report of the **AT&V** command and can be stored with **AT&X0** command.

Command: ***DS**   **Start Protocol**
Values: n = 0, 1, 2 or 3
Default: 0
Description: There are three different types of DID start protocols: **Wink, Immediate,** and **Delay Dial.**

                 In the **Wink Start** protocol, the central office closes the loop and draws current. The modem senses the current draw and will reverse the DC polarity for a short pulse to sign that it sees the incoming call and is ready to accept the DID digits.

                 Delay Dial is the same as Wink Start with the exception that the length of the reverse pulse is not defined. When the DID modem senses the current draw, it will reverse the DC voltage until it is ready to receive the DID digits.

                 On an **Immediate Start** DID line, the central office closes the loop for a short time and then sends the DID digits without waiting for a response from the DID modem.

                 After the central office sends the DID digits all three lines operate the same way. The modem will reverse the DC polarity to signal the beginning of the call and the central office will open the channel to the caller and begin billing. When the call is completed, the DID modem will return the DC voltage to normal polarity and the central office will open the circuit.

                 While the modem is monitoring the DID line for current draw, it is also monitoring the POTS line for incoming rings.

                 *DS0   Disables DID detection of incoming DID calls (DC voltage still applies to DID line)
                 *DS1   Wink Start
                 *DS2   Immediate Start
                 *DS3   Delay Dial

Command: ***DT**   **Wait for Digit Time-Out Time**
Values: DTn - n=0-30 seconds
Default: 0
Description: This command is used to configure the time between each digit the modem will wait. If the modem has not received the proper number of digits when the timer expires, it will report the digits it has received so far and move on to the answering sequence described in the *DN command.

Command: ***DD**   **Digit Format**
Values: 0, 1, 2
Default: 0
Description: This command is used to configure the modem for the format the central office will send the incoming digits. At this time, only DTMF is supported.
                 *DD0   DTMF
                 *DD1   Pulse
                 *DD2   MF (MultiFrequency)

Command: ***DN**   **Number of DID Digits Expected**
Values: 0-7
Default: 0
Description: This command is used to configure the modem for the expected number of digits from the central office (the central office will send the last few digits of the called number). When the proper number of digits are received, the modem will pass the digit information to the host computer. After passing the digits the modem will answer the incoming call if S0 is greater than 0. Otherwise the modem will wait for the host computer to issue an ATA command.

Command:	***DW**	**Busy-Out Timer at End of Call**

Values: 0-255
Default: 0
Description: This command defines the amount of time to busy out the modem upon disconnecting from a DID call. The delay is ended when the timer runs out or a *DS command is received.

    *DW0   This command *disables* the delay. It ends the delay, but it also places the DID line a busy-out state.

    *DW255   This command will extend the delay indefinitely.

About the Busy-Out Features and Functions

A Direct Inward Dial (DID) line can be put in a "Busy Out" state by reversing the battery polarity the modem supplies to the line. This will cause a caller to receiver either a busy signal in a single line system or roll over to the next line in a trunk system.

The line is busied out in the following cases.
- Modem is set to the factory default DID start format *DS0
- Modem receives an incoming ring on the POTS line
- Modem is given the dial command ATD
- Modem is set with the *DW command to busy-out delay after finishing a call

Command:	***DF**	**Format for Reporting Incoming DID Number**

Values: 0, 1, 2
Default: 0
Description: This command allows for three different reporting formats of the incoming number information. This information is output when either the proper number of digits have been received or the time out timer has expired and before the modem answers the call. When set to *DFI, the modem will output one line for every digit received. For the other formats, the modem will only output one line per call.

    *DF0   "DID:xxx" - Default
    *DF1   "DTMFx" for each digit
    *DF2   "RINGxxx"

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).

Notes: *Range* and *Default* are dependent upon the Country Code you are using.
The ranges and defaults below are for North America and Europe.
Examples of other country ranges and defaults are given at the end of this chapter.

Register	*Unit*	*Range*	*Default*	*Description*
S0	1 ring	0–15	0, 1	Sets the number of rings until the modem answers. **ATS0=0** disables autoanswer completely. Set S0=2 for Caller ID. Internal Modem Default is 0. External Modem Default is 1
S1	1 ring	0-127	0	Counts the rings that have occurred.
S2	decimal	0–127	43	Sets ASCII code for the escape sequence character. Values greater than 127 disable escape.
S3	decimal	0–127	13	Sets the ASCII code for the carriage return character.
S4	decimal	0–127	10	Sets the ASCII code for line feed character.
S5	decimal	0–127	8	Sets the ASCII code for the backspace character. Values over 32 disable it.
S6	seconds	2–65	3	Sets the time the modem waits after it goes off-hook before it begins to dial the telephone number.
S7	seconds	1–255	65	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	2–65	2	Sets the length of a pause caused by a comma character in a dialing command.
S9	decimal	0–255	37	Sets ASCII code for remote configuration escape character. **S9=0** disables remote configuration.
S10	100 ms	1–255	20	Sets how long a carrier signal must be lost before the modem disconnects.
S11	1 ms	50–150	100	Sets spacing and duration of dialing tones.
S18	50 ms	0–255	20	Sets the time the Callback Delay signal drops before going high again. Used for some PBX and CBX phone systems. See **&C2** command.
S28	decimal	0–1	1	0 disables, 1–255 enables V.34 modulation.
S30	1 minute	0–255	0	Sets the time the modem waits before it disconnects 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 data calling tone, which allows remote data/fax/voice 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**.)

Register	*Unit*	*Range*	*Default*	*Description*
S37	decimal	0–19	0	Sets the maximum V.34 "upstream" speed at which the modem attempts to connect.

Value   Speed
0   maximum modem 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

Register	*Unit*	*Range*	*Default*	*Description*
S38	decimal	0–255	1	Sets the maximum 56K "downstream" speed at which the modem attempts to connect. The default maximum speed is 56K bps. **Note:** When using V.34 or V.32 client-to-client connections in poor conditions, setting **S38=0** may result in better performance.

Value   Rate
0   56K disabled
1   56K autorate
2   28000 bps
3   29333 bps
4   30666 bps
5   32000 bps
6   33333 bps
7   34666 bps
8   36000 bps
9   37333 bps
10   38666 bps
11   40000 bps
12   41333 bps
13   42666 bps
14   44000 bps
15   45333 bps
16   46666 bps
17   48000 bps
18   49333 bps
19   50666 bps
20   52000 bps
21   53333 bps
22   54666 bps
23   56000 bps

Register	*Unit*	*Range*	*Default*	*Description*
S42	decimal	0–1	1	Enables/disables the 56K auto rate. When 56K auto is disabled, fallback to V.34 is also disabled. 0 = disable; 1 = enable.

Register	*Unit*	*Range*	*Default*	*Description*
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 Hangup	Do not use
S36=1, 3	LAPM or Async	Async
S36=4, 6	LAPM, MNP, or Hangup	MNP or Hangup
S36=5, 7	LAPM, MNP, or Async	MNP or Async

Register	*Unit*	*Range*	*Default*	*Description*
S89	seconds	0–65	0	Sets the length of time in the off-line command mode before the modem goes into standby mode. A value of zero prevents standby mode; a value of 1–4 sets the value to 5.
S108	decimal	0–255	7	Selects the 56K digital loss if using the modem thru a PBX line. The default value is -6 dB loss, the value used when calling from a typical POTS line long distance.

Value	Digital loss
0	-0 dB digital loss, no robbed-bit signaling
1	-3 dB PBX digital loss
2	-2 dB digital loss
3	-3 dB digital loss
6	-6 dB digital loss
7	-0 dB digital loss with robbed-bit signaling

Register	*Unit*	*Range*	*Default*	*Description*
S109	decimal	0–255	18	Selects the 56K operating mode.

Value	56K mode
0	56K mode (V.90 disabled)
1	Dual mode (56K or V.90)
2	V.90 mode (56K disabled)

Examples of Ranges and Defaults Determined by Country Codes

Register	Country Code 16: Japan		Country Code 48: Hong Kong		Country Code 1: Australia		Country Code 9: New Zealand	
	Range	*Default*	*Range*	*Default*	*Range*	*Default*	*Range*	*Default*
S0	0-15	1	0-15	1	0-6	2	0-4	3
S1	--	0	--	0	--	0	--	0
S2	0-127	43	0-127	43	0-127	43	0-127	43
S3	0-127	13	0-127	13	0-127	13	0-127	13
S4	0-127	10	0-127	10	0-127	10	0-127	10
S5	0-127	8	0-127	8	0-127	8	0-127	8
S6	4-65	4	2-65	3	2-5	4	4	4
S7	35-59	59	35-65	65	30-60	60	30-60	60
S8	2-65	2	2-65	2	2-5	2	0-4	4
S9	0-255	37	0-255	37	0-255	37	0-255	37
S10	1-255	20	1-255	20	1-255	20	1-255	15
S11	65-150	95	50-150	95	50-150	95	50-150	90
S18	0-255	20	0-255	20	0-255	20	0-255	20
S28	0-1	1	0-1	1	0-1	1	0-1	1
S30	0-255	0	0-255	0	0-255	0	0-255	0
S35	0-1	0	0-1	0	0-1	1	0-1	1
S36	0-7	7	0-7	7	0 or 7	7	0-7	7
S37	0-19	0	0-19	0	0-19	0	0-19	0
S38	0-255	1	0-255	1	0-255	1	0-255	1
S42	0-1	1	0-1	1	0-1	1	0-1	1
S48	7	7	7	7	7	7	7	7
S89	0-65	0	0-65	0	0-65	0	0-65	0
S108	0-255	7	0-255	7	0-255	7	0-255	7
S109	0-255	18	0-255	54	0-255	54	0-255	54

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 are displayed 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
24	CONNECT 7200 *	Connected at 7200 bps
25	CONNECT 12000 *	Connected at 12000 bps
26	CONNECT 16800 *	Connected at 16800 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, 56K rate
71	CONNECT 34000 *	Connected at 34000 bps, 56K rate
72	CONNECT 36000 *	Connected at 36000 bps, 56K rate
73	CONNECT 38000 *	Connected at 38000 bps, 56K rate
74	CONNECT 40000 *	Connected at 40000 bps, 56K rate
75	CONNECT 42000 *	Connected at 42000 bps, 56K rate
76	CONNECT 44000 *	Connected at 44000 bps, 56K rate
77	CONNECT 46000 *	Connected at 46000 bps, 56K rate
78	CONNECT 48000 *	Connected at 48000 bps, 56K rate
79	CONNECT 50000 *	Connected at 50000 bps, 56K rate
80	CONNECT 52000 *	Connected at 52000 bps, 56K rate
81	CONNECT 54000 *	Connected at 54000 bps, 56K rate
82	CONNECT 56000 *	Connected at 56000 bps, 56K rate
88	DELAYED	Delay is in effect for the dialed number
89	BLACKLISTED	Dialed number is blacklisted
90	BLACKLIST FULL	Blacklist is full
100	CONNECT 28000 *	Connected at 28000 bps, 56K rate
101	CONNECT 29333 *	Connected at 29333 bps, 56K rate
102	CONNECT 30666 *	Connected at 30666 bps, 56K rate
103	CONNECT 33333 *	Connected at 33333 bps, 56K rate
104	CONNECT 34666 *	Connected at 34666 bps, 56K rate
105	CONNECT 37333 *	Connected at 37333 bps, 56K rate
106	CONNECT 38666 *	Connected at 38666 bps, 56K rate
107	CONNECT 41333 *	Connected at 41333 bps, 56K rate
108	CONNECT 42666 *	Connected at 42666 bps, 56K rate
109	CONNECT 45333 *	Connected at 45333 bps, 56K rate
110	CONNECT 46666 *	Connected at 46666 bps, 56K rate
111	CONNECT 49333 *	Connected at 49333 bps, 56K rate
112	CONNECT 50666 *	Connected at 50666 bps, 56K rate
113	CONNECT 53333 *	Connected at 53333 bps, 56K rate
114	CONNECT 54666 *	Connected at 54666 bps, 56K rate
115	CONNECT 25333 *	Connected at 25333 bps, 56K rate
116	CONNECT 26666 *	Connected at 26666 bps, 56K rate

* *Wh*en the extended result code configuration option 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	

Chapter 4 – Setting Your Country or Regional Code

Note: This chapter applies to global modems only.

Different countries/regions have different requirements for how modems must function. Therefore, before you use the modem, you must configure it to match the defaults of the country/region in which you are using it.

To configure the modem for a specific country/region, execute the following AT commands:

1. Type **AT%T19,0,nn** (*nn* stands for the country/region code). Press **Enter**. **OK** is displayed.
2. Then save the changes by issuing the following command: **AT&F&W**
3. To verify that the correct code has been configured, issue the following command:

   ATI9

   The country/region code is then displayed in decimal format.

   The following is an example of country/region, AT commands, and result codes.

Country/Region	AT Command (Hexadecimal)	Result Code (Decimal)
Euro/NAM*	AT%T19,0,34 (default)	52
Australia	AT%T19,0,01	1
Czech Republic	AT%T19,0,25	37
Japan	AT%T19,0,10	16
New Zealand	AT%T19,0,9	9

Countries/Regions Supported

See the list on the Multi-Tech Web site for countries and regions supported.

http://www.multitech.com/global/configuration.go

The Global Modem Country/Region Approvals displays at the bottom of the page. On this page you can view approvals, configuration strings (includes the country/regional code) and responses available in list form by selecting country/region and/or product.

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