

MT5634

Internal Modem

AT Command Set

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1. 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 ATtention 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., +++**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 98 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 auto answer on or off.

The format for entering an AT command is **ATXn**, 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. The default values are shown in Section 3.

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.

2. AT Command Summary

Organization of AT Commands on the following pages: 1st, by the initial command character (&, +, %), 2nd, alphabetized by the second command character (Except for listing of AT).

Command	Description
AT	Attention Code
A	Answer
A/	Repeat Last Command
Bn	Communication Standard Setting
Ds	Dial
DS=y	Dial Stored Telephone Number
En	Echo Command Mode Characters
Fn	Echo Online Data Characters
Hn	Hook Control
In	Information Request
Mn	Monitor Speaker Mode
Nn	Modulation Handshake
On	Return Online to Data Mode
P	Pulse Dialing
Qn	Result Codes Enable/Disable
Sr=n	Set Register Value
Sr?	Read Register Value
T	Tone Dialing
Vn	Result Code Format
Wn	Result Code Options
Xn	Result Code Selection
Zn	Modem Reset
&Cn	Data Carrier Detect (DCD) Control
&Dn	Data Terminal Ready (DTR) Control
&En	XON/XOFF Pass-Through
&Fn	Load Factory Settings
&Gn	V.22bis Guard Tone Control
&Kn	Flow Control Selection
&Ln	Leased Line Operation
&Pn	Pulse Dial Make-to-Break Ratio Selection
&Qn	Asynchronous Communications Mode
&Sn	Data Set Ready (DSR) Control
&Tn	Loopback Test (V.54 Test) Commands
&V	Display Current Settings
&Wn	Store Current Configuration
&Zy=x	Store Dialing Command
\An	Select Maximum MNP Block Size

Command	Description
\Bn	Transmit Break
\Kn	Break Control
\Nn	Error Correction Mode Selection
\Qn	Flow Control Selection
\Tn	Inactivity Timer
\Vn	Protocol Result Code
-Cn	Data Calling Tone
%An	Adaptive Answer Result Code Enable
%B	View Numbers in Blacklist
%Cn	Data Compression Control
%DCn	AT Command Control
%En	Fallback and Fall Forward Control
%Hn	Direct Connect Enable
%Rn	Cisco Configuration
%Sn	Command Speed Response
\$EBn	Asynchronous Word Length
\$Dn	DTR Dialing
\$MBn	Online BPS Speed
\$SBn	Serial Port Baud Rate
#CBA _n	Callback Attempts
#CBD _n	Callback Delay
#CBF?	Callback Failed Attempts Display
#CBFR	Callback Failed Attempts Reset
#CBIn	Local Callback Inactivity Timer
#CBNy= _n	Store Callback Password
#CBP _n	Callback Parity
#CBRy	Callback Security Reset
#CBS _n	Callback Enable/Disable
#P _n	Set 11-bit Parity
#Sx	Enter Setup Password
#S= _x	Store Setup Password
+VDR= _{x, y}	Distinctive Ring Report
+++AT<CR>	Escape Sequence
%%ATMTSMODEM<CR>	Remote Configuration Escape Sequence

3. AT Commands

Command:	AT	Attention Code
Values:		N/A
Description:		The attention code precedes all command lines except A/ , A: and escape sequences.
Command:		[Enter] Key
Values:		N/A
Description:		Press the [Enter] (RETURN) key to execute most commands.
Command:	A	Answer
Values:		N/A
Description:		Answer call before 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<i>n</i>	Communication Standard Setting
Values:		$n = 0-3, 15, 16$
Default:		0 and 15
Description:		B0 Select ITU-T V.22 mode when modem is at 1200 bps. B1 Select Bell 212A when modem is at 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 the modem is at 300 bps. B16 Select Bell 103J when the modem is at 300 bps.

Command: **Ds** **Dial**
Values: *s* = dial string (phone number and dial modifiers)
Default: none
Description: Dial telephone number *s*, where *s* may up to 40 characters long and include the 0–9, *, #, , B, C, and D characters, and the L, P, T, V, W, S, comma (,), semicolon (;), !, @, ^ and \$ dial string modifiers.

Dial string modifiers:

- L** Redial last number. (Must be placed immediately after **ATD**.)
- P** Pulse-dial following numbers in command.
- T** Tone-dial following numbers in command (default).
- V** Switch to speakerphone mode and dial the following number. Use **ATH** command to hang up.
- W** Wait for a new dial tone before continuing to dial. (X2, X4, X5, X6, or X7 must be selected.)
- ,** Pause during dialing for time set in register S8.
- ;** Return to command mode after dialing. (Place at end of dial string.)
- !** Hook flash. Causes the modem to go on-hook for one-half second, then off-hook again.
- @** Wait for quiet answer. Causes modem to wait for a ringback, then 5 seconds of silence, before processing next part of command. If silence is not detected, the modem returns a NO ANSWER code.
- ^** 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**

Command: **DS=y** **Dial Stored Telephone Number**
Values: *y* = 0–2 (0–1 for SMI-Parallel {internal})
Default: none
Description: Dial a number previously stored in directory number *y* by the **&Zy=x** command. Example: **ATDS=2**

Command: **En** **Echo Command Mode Characters**
Values: *n* = 0 or 1
Default: 1
Description: E0 Do not echo keyboard input to the terminal.
 E1 Do echo keyboard input to the terminal.

Command: **Fn** **Echo Online Data Characters**
Values: *n* = 1
Default: 1
 F0 Enable online data character echo. (Not supported.)
 F1 Disable online data character echo (included for backward compatibility with some software).

Command: Hn Hook Control

Values: $n = 0$ or 1
 Default: 0
 Description: H0 Go on-hook (hang up).
 H1 Go off-hook (make the phone line busy).

Command: In Information Request

Values: $n = 0-5, 9, 11$
 Default: None
 Description: I0 Display default speed and controller firmware version.
 I1 Calculate and display ROM checksum (e.g., 12AB).
 I2 Check ROM and verify the checksum, displaying *OK* or *ERROR*.
 I3 Display default speed and controller firmware version.
 I4 Display firmware version for data pump (e.g., 94).
 I5 Display the board ID: software version, hardware version, and country ID
 I9 Display the country code.
 I11 Display diagnostic information for the last modem connection, such as link type, line speed, serial speed, type of error correction/data compression, number of past retrains, etc.

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: Nn 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: On Return Online to Data Mode

Values: $n = 0, 1, 3$
 Default: None
 Description: O0 Exit online command mode and return to data mode (see +++AT<CR> escape sequence).
 O1 Issue a retrain and return to online data mode.
 O3 Issue a rate renegotiations and return to data mode.

Command: P **Pulse Dialing**
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: Qn **Result Codes Enable/Disable**
Values: $n = 0$ or 1
Default: 0
Description: Q0 Enable result codes.
 Q1 Disable result codes.
 Q2 Returns an *OK* for backward compatibility with some software.

Command: Sr=n **Set Register Value**
Values: $r =$ S-register number; n varies
Default: None
Description: Set value of register S_r to value of n , where n is entered in decimal format (e.g., $S_0=1$).

Command: Sr? **Read Register Value**
Values: $r =$ S-register number
Default: None
Description: Read value of register S_r and display it in 3-digit decimal form (e.g., **S2?** gives the response 043).

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

Command: Vn **Result Code Format**
Values: $n = 0$ or 1
Default: 1
Description: V0 Displays result codes as digits (terse response).
 V1 Displays result codes as words (verbose response).

Command:	Wn	Result Code Options
Values:		$n = 0, 1, \text{ or } 2$
Default:		2
Description:		<p>W0 CONNECT result code reports serial port speed, disables protocol result codes.</p> <p>W1 CONNECT result code reports serial port speed, enables protocol result codes.</p> <p>W2 CONNECT result code reports line speed, enables protocol result codes.</p>

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

Command:	Zn	Modem Reset
Values:		$n = 0 \text{ or } 1$
Default:		None
Description:		<p>Z0 Reset modem to profile saved by the last &W command.</p> <p>Z1 Same as Z0.</p>

Command:	&Cn	Data Carrier Detect (DCD) Control
Values:		$n = 0, 1, 2$
Default:		1
Description:		<p>&C0 Forces the DCD circuit to be always ON.</p> <p>&C1 DCD goes ON when the remote modem's carrier signal is detected, and goes OFF when the carrier signal is not detected.</p> <p>&C2 DCD turns OFF upon disconnect for time set by S18. It then goes high again (for some PBX phone systems).</p>

Command: &Dn Data Terminal Ready (DTR) Control

Values: $n = 0, 1, 2, \text{ or } 3$

Default: 2

Description: &D0 Modem ignores true status of 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, modem hangs up and resets as if **ATZ** command were issued.

Command: &En XON/XOFF Pacing Control

Values: $n = 12 \text{ or } 13$

Default: 12

Description: &E12 Disables XON/XOFF pacing.
&E13 Enables XON/XOFF pacing.

Command: &Fn Load Factory Settings

Values: $n = 0$

Default: None

Description: &F0 Load factory settings as active configuration.

Note: See also the **Z** command.

Command: &Gn V.22bis Guard Tone Control

Values: $n = 0, 1, \text{ or } 2$

Default: 0

Description: &G0 Disable guard tone.
&G1 Set guard tone to 550 Hz.
&G2 Set guard tone to 1800 Hz.

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

Command: &Kn Flow Control Selection

Values: $n = 0, 3, \text{ or } 4$

Defaults: 3

Description: &K0 Disable flow control.
&K3 Enable CTS/RTS hardware flow control.
&K4 Enable XON/XOFF software flow control.

Command: &Ln Leased Line OperationValues: $n = 0, 1, \text{ or } 2$

Defaults: 0

Description: &L0 The modem is set for standard dial-up operation.
 &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: &Pn Pulse Dial Make-to-Break Ratio SelectionValues: $n = 0, 1, \text{ or } 2$

Default: 0

Description: &P0 60/40 make-to-break ratio
 &P1 67/33 make-to-break ratio
 &P2 20 pulses per second

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

Command: &Qn Asynchronous Communications ModeValues: $n = 0, 5, 6, 8, \text{ or } 9$

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: &Sn Data Set Ready (DSR) ControlValues: $n = 0 \text{ or } 1$

Default: 0

Description: &S0 DSR is always ON.
 &S1 DSR goes ON only during a connection.

- Command: &Tn** **Loopback Test (V.54 Test) Commands**
Values: $n = 0, 1, 3, 6$
Default: None
Description: The modem can perform selected test and diagnostic functions. A test can be run only when the modem is operating in non-error-correction mode (normal or direct mode). For tests 3 and 6, a connection between the two modems must be established. To terminate a test in progress, the escape sequence (+++AT) must be entered.
- &T0 Stops any test in progress.
 - &T1 Starts a local analog loopback, V.54 Loop 3, test. If a connection exists when this command is issued, the modem hangs up. When the test starts, a *CONNECT* message is displayed.
 - &T3 Starts local digital loopback, V.54 Loop 2, test. If no connection exists, *ERROR* is returned.
 - &T6 Initiates a remote digital loopback, V.54 Loop 2, test without self-test. If no connection exists, *ERROR* is returned.
-
- Command: &V** **Display Current Settings**
Values: N/A
Description: Displays the active modem settings.
-
- Command: &Wn** **Store Current Configuration**
Values: $n = 0$ or 1
Default: 1
Description: &W0 Stores current modem settings in non-volatile memory and causes them to be loaded at power-on or following the **ATZ** command instead of the factory defaults. See **&F** command.
 &W1 Clears user default settings from non-volatile memory and causes the factory defaults to be loaded at power-on or following the **ATZ** command.
-
- Command: &Zy=x** **Store Dialing Command**
Values: $y = 0-2$ (0-1SMI-Parallel {internal})
 $x =$ Dialing command
Default: None
Description: Stores dialing command x in memory location y . Dial the stored number using the command **ATDS=y**. See Also the **#CBS** command, a callback security command.

Command: \An Select Maximum MNP Block Size

Values: $n = 0, 1, 2, \text{ or } 3$
 Default: 3
 Description: \A0 64-character maximum
 \A1 128-character maximum
 \A2 192-character maximum
 \A3 256-character maximum

Command: \Bn 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: \Kn Break Control

Values: $n = 0-5$
 Default: 5
 Description: Controls the modem's response to a break received from: computer, remote modem, or \B command. Response is different for each of three different states.

Data mode. Modem receives break from computer:

\K0 Enter online command mode, no break sent to the remote modem.
 \K1 Clear data buffers and send break to the remote modem.
 \K2 Same as \K0.
 \K3 Send break immediately to the remote modem.
 \K4 Same as \K0.
 \K5 Send break to the remote modem in sequence with the transmitted data.

Data mode. Modem receives break from remote modem:

\K0 Clear data buffers and send break to the computer.
 \K1 Same as \K0.
 \K2 Send break immediately to the computer.
 \K3 Same as \K2.
 \K4 Send break to the computer in sequence with the received data.
 \K5 Same as \K4.

Online command mode. Modem receives \Bn command from the computer:

\K0 Clear data buffers and send break to the remote modem.
 \K1 Same as \K0.
 \K2 Send break immediately to the remote modem.
 \K3 Same as \K2.
 \K4 Send break to the remote modem in sequence with the transmitted data.
 \K5 Same as \K4.

Command: \Nn **Error Correction Mode Selection**
Values: n = 0–5, or 7
Default: 3
Description:

- \N0 Non-error correction mode with data buffering (buffer mode; same as &Q6).
- \N1 Direct mode.
- \N2 MNP reliable mode. If the modem cannot make an 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: \Qn **Flow Control Selection**
Values: n = 0, 1, or 3
Default: 3
Description:

- \Q0 Disable 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: \Tn **Inactivity Timer**
Values: n = 0, 1–255
Default: 0
Description: Sets the time (in minutes) after the last character is sent or received that the modem waits before disconnecting. 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: \Vn **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: `\Xn` **XON/XOFF Pass-Through**
Values: $n = 0$ or 1
Default: 0
Description: `\X0` Modem responds to and discards XON/XOFF characters.
 `\X1` Modem responds to and passes XON/XOFF characters.
Note: This is also controlled via **&E6** and **&E7**.

Command: `-Cn` **Data Calling Tone**
Values: $n = 0$ or 1
Defaults: 1
Description: `-C0` Disable V.25 data calling tone to deny remote data/fax/voice discrimination.
 `-C1` Enable V.25 data calling tone to allow remote data/fax/voice discrimination.

Command: `%An` **Adaptive Answer Result Code Enable**
Values: $n = 0$ or 1
Default: 0
Description: The `%A` command controls whether the DATA or 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.

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: `%Cn` **Data Compression Control**
Values: $n = 0$ or 1
Default: 1
Description: `%C0` Disable V.42bis/MNP 5 data compression.
 `%C1` Enable V.42bis/MNP 5 data compression.

Command: %DCn 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 power-up.

Command: %En Fallback and Fall Forward Control

Values: $n = 0, 1,$ or 2

Default: 2

Description: %E0 Disable fallback and fall forward.
%E1 Enable fallback, disable fall forward.
%E2 Enable fallback and fall forward.

Command: %Hn 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: %Rn 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: %Sn 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. Commands at other speeds are ignored.

Command: \$Dn 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: \$EBn Asynchronous Word Length

Values: $n = 0$ or 1
 Default: 0
 Description: \$EB0 Enables 10-bit mode.
 \$EB1 Enables 11-bit mode.

Command: \$MBn Online BPS Speed

Values: $n =$ speed in bits per second
 Default: 28,800
 Description: \$MB75 Selects CCITT V.23 mode
 \$MB300 Selects 300 bps on-line
 \$MB1200 Selects 1200 bps on-line
 \$MB2400 Selects 2400 bps on-line
 \$MB4800 Selects 4800 bps on-line
 \$MB9600 Selects 9600 bps on-line
 \$MB14400 Selects 14400 bps on-line
 \$MB19200 Selects 19200 bps on-line
 \$MB28800 Selects 28800 bps on-line
 \$MB33600 Selects 33600 bps on-line

Command: \$SRPn Ring Priority vs. AT Command Priority

Values: $n = 0$ or 1
 Default: 1
 Description: \$RP0 The AT command will have priority over the ring. S1 will be reset to 0 if an AT command is received. This command is storable to memory.
 \$RP1 The ring will have priority over the AT command. S1 will increment even if an AT command and ring are received together and the incoming call will be answered when S1 is equal to S0.

Note: SocketModems do not detect ring cadence of TelTone telephone line simulators as a valid ring.

Command: \$SBn Serial Port Baud Rate

Values: $n =$ speed in bits per second
 Default: 57600
 Description: \$SB300 Sets serial port to 300 bps
 \$SB1200 Sets serial port to 1200 bps
 \$SB2400 Sets serial port to 2400 bps
 \$SB4800 Sets serial port to 4800 bps
 \$SB9600 Sets serial port to 9600 bps
 \$SB19200 Sets serial port to 19200 bps
 \$SB38400 Sets serial port to 38400 bps
 \$SB57600 Sets serial port to 57600 bps
 \$SB115200 Sets serial port to 115200 bps
 \$SB230400 Sets serial port to 230400 bps

Command: +VDR=*x*, *y*

Values:

Distinctive Ring Report

x = 0, 1 Distinctive Ring report control.

See description.

y = 0–255 Minimum ring interval in 100 ms units.

See description.

Default:

0, 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: #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: #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: $n = 0, 1, \text{ or } 2$

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: $n = 0, 1, 2, \text{ or } 3$

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 hang-up or reset.

Command: #Pn Set 11-bit Parity

Values: $n = 0 \text{ or } 1$

Default: 2

Description: #P0 No parity.
 #P1 Odd parity.
 #P2 Even parity.

Command: #Sx Enter Setup Password

Values: $x = \text{password (1-8 characters, case sensitive)}$

Default: MTSMODEM

Description: Enters the remote configuration setup password.

Command: #S=x Store Setup Password

Values: $x = \text{password (1-8 characters, case sensitive)}$

Default: MTSMODEM

Description: Stores a new remote configuration setup password.

3.1 Escape AT Commands

Command: +++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 optional command characters; then press [Enter]. Used mostly to issue the hang-up command: +++ATH<CR>.

Command: %%%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 S13.

4. 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. ATSO=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.
S9	decimal	0, 1–127	37 (%)	Sets ASCII code for remote configuration escape character. S9=0 disables remote configuration.
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 VT command
S35	decimal	0–1	1	0 disables, 1 enables the V.25 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	<p>Sets the maximum V.34 "upstream" speed at which the modem attempts to connect.</p> <p>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</p>
S38	decimal	0–23	1	<p>Sets "downstream" data rate where V.90 provides rates of 28,000 to 56,000 bps in increments of 1,333 bps.</p> <p>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</p> <p>Upstream data rates: Upstream V.90 data rates are 4800 to 33,600 bps in 2400 bps increments.</p>
S43	decimal	0–1	1	<p>For testing and debugging only. Enables/disables V.32bis start-up auto mode operation. 0 = disable; 1 = enable.</p>

Register	Unit	Range	Default	Description															
S48	decimal	7 or 128	7	<p>Enables (7) or disables (128) LAPM negotiation. The following table lists the S36 and S48 configuration settings for certain types of connections.</p> <table border="1"> <thead> <tr> <th></th> <th>S48=7</th> <th>S48=128</th> </tr> </thead> <tbody> <tr> <td>S36=0, 2</td> <td>LAPM or hang up</td> <td>Do not use</td> </tr> <tr> <td>S36=1, 3</td> <td>LAPM or async</td> <td>Async</td> </tr> <tr> <td>S36=4, 6</td> <td>LAPM, MNP, or hang up</td> <td>MNP or hang up</td> </tr> <tr> <td>S36=5, 7</td> <td>LAPM, MNP, or async</td> <td>MNP or async</td> </tr> </tbody> </table>		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
	S48=7	S48=128																	
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S36=4, 6	LAPM, MNP, or hang up	MNP or hang up																	
S36=5, 7	LAPM, MNP, or async	MNP or async																	
S89	seconds	0, 5–255	10	<p>Sets the length of time in the off-line command mode before the modem goes into standby mode or "sleep mode". A value of zero prevents standby mode; a value of 1–4 sets the value to 5. Standby mode (sleep mode or low power mode) is controlled by S89. It programs the number of seconds of inactivity before the modem will go to sleep. The default value is 0. A value of 0 disables standby mode. The modem will wake on an incoming ring or an AT command.</p>															
S108	decimal	0–3, 6, 7	6	<p>Selects the 56K digital loss if using the modem through a PBX line. The default value is -6 dB loss, the value used when calling from a typical POTS line long distance.</p> <p>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</p>															

5. 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
9	CONNECT 75	Connected at 75 bps
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

Terse	Verbose	Description
80	CONNECT 52000	Connected at 52000 bps
81	CONNECT 54000	Connected at 54000 bps
82	CONNECT 56000	Connected at 56000 bps
83	CONNECT 58000	Connected at 58000 bps
84	CONNECT 60000	Connected at 60000 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
115	CONNECT 25333	Connected at 25333 bps
116	CONNECT 26666	Connected at 26666 bps

* EC is added to these result codes when the extended result codes configuration option is enabled. EC is replaced by one of the following codes, 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

6. Remote Configuration and Country Code Configuration

6.1. Remote Configuration

Remote configuration is a network management tool that allows you to configure modems anywhere in your network from one location. With password-protected remote configuration, you can issue AT commands to a remote modem for maintenance or troubleshooting as if you were on-site.

6.1.1. Basic Procedure

The following steps are valid regardless of whether the connection is established by the local or the remote modem.

1. Establish a data connection with a remote modem.
2. Send three remote configuration escape characters followed by **AT** and the setup password and press **[Enter]**.
 - Example: `%%%ATMTSMODEM`.
 - You have four tries to enter the correct password before being disconnected. If the password is correct, the remote modem responds with **OK**.
3. You can now send AT commands to configure the remote modem.
4. When you have finished configuring the remote modem, save the new configuration by typing **AT&W0**. Press **[Enter]**.
5. Type **ATO**. Press **[Enter]** to exit remote configuration. You can now break the connection.

6.1.2. Setup

MT5634 Modems are shipped with a default setup password (MTSMODEM). Because anyone who has the User Guide knows the default setup password, you should change the password and possibly also the remote configuration escape character.

6.1.2.1. Changing the Setup Password

1. Open a data communications program such as HyperTerminal.
2. In the terminal window, type **AT#SMTSMODEM** (or **AT#Syyyyyy** if you have replaced the MTSMODEM password with yyyyyy) and press **[Enter]**. The modem responds with **OK** if the setup password is correct and **ERROR** if it is wrong.
3. To change the password, type **AT#S=yyyyyy**, where yyyyyy stands for the password and press **[Enter]**. The password can include any keyboard character and can be up to eight characters long. The modem responds with **OK**.
4. The new password is saved automatically. You can now either enter more AT commands or exit the data communications program. The next time you remotely configure the modem you must use the new setup password.

Note: You can only change the setup password locally; you cannot do it remotely. Also, passwords are case sensitive. The next time you enter the password, it must be in the same case as you set it up.

6.1.2.2. Changing the Remote Escape Character

To further improve security, you can change a remote modem's remote configuration escape character. The remote configuration escape character is stored in register **S9**. The factory default is 37, which is the ASCII code for the percent character (%). Setting **S9** to 0 (zero) disables remote configuration entirely.

Caution: If you do this remotely, you won't be able to change it back remotely!

1. Establish a remote configuration link with the remote modem as described in Basic Procedure.

Note: This command can be executed locally as well as remotely.

2. Type **ATS9=n**, where *n* is the ASCII code for the new remote configuration escape character and press **[Enter]**.
3. Save the new value by typing **AT&W** and pressing **[Enter]**.
4. Type **ATO** and press **[Enter]** to exit remote configuration.

6.2. Country Code Configuration

Different countries 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 in which you are using it.

If you are comfortable using AT commands, you can configure your modem using AT commands. You must enter these commands in your communication program's terminal window.

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

1. Type **AT%T19,0,*nm*** (*nm* stands for country 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 country has been configured, issue the following command:
ATI9
4. The country code is then displayed in decimal format.

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

Country	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



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