

AT COMMANDS

Table 1-1 summarizes the AT commands. The commands are described in detail in Tables 1-2. Result codes and messages are listed in Table 1-3.

4.1 COMMAND GUIDELINES

Each AT command has a list of possible parameters with its default value. The default value is loaded at initialization, i.e., power turn on or ATZ command. If a command requires a parameter but no parameter is entered, the modem assumes the parameter is zero. Invalid commands or parameters return the ERROR message.

The command line may contain a single command or a series of commands. The commands may be separated by a space for readability. The command line may be up to 40 characters in length. The command line is executed after the terminating character is entered. The default terminating character is a carriage return (ASCII 013), but this may be changed by writing a different value to register S3.

The command line may be edited using the backspace character (ASCII 008). This value may be programmed using the S5 register. However, the backspace will not work for values of 0 and greater than 127, or for the current value of the terminating character.

All command lines must begin with AT entered in capital or lower case letters. A command line can be terminated at any time by issuing CTRL-X (ASCII 018) after entering AT attention code. The command line will be ignored and an OK result message will be issued. The A\ command may be used to repeat the last command line. The A\ does not require a terminating character or the AT attention code.

The escape code sequence returns the modem to the command mode from the data mode. A time delay must occur between the last character transmitted and the first character of the escape code. The guard time delay can be changed by writing the value to register S12; (default 1 second). The escape code character must occur three times in succession for an escape.

Parameters that are entered for the AT and AT& commands are limited in value to 0-255, where the parameter is "MOD"ed with 256. The result must be within the specified range; if it is not, the ERROR message is issued.

Parameters entered for an S register are also "MOD"ed with 256 and the result is stored in the S register. Parameters that are out of range are stored in the S register, however, no ERROR message is reported. Functionally, however, the lower or higher limit is observed.

Parameters entered for the AT\ and AT% commands follow the same method, except that if the parameter is out of range, the upper limit is stored and no ERROR message is reported.

Table 1-1 At Command Summary

COMMAND	TITLE	DEFUALT
AI\	Re-execute Command	none
ATA	Answer	none
ATBn	Set CCITT or BELL mode	1(US) *
		0(Japan)
ATCn	Carrier Control	1
ATDn	Dial	P
ATE	Command Echo	1 *
ATFn	On-Line State Character Echo	1 *
ATHn	Switch-Hook Control	none
ATIn	Identification	none
ATLn	Speaker Volume	2 *
ATMn	Speaker Control	1
* ATNn	Modulation Handshake	1 *
ATOn	Return To The On-line State	none
ATP	Set Pulse Dial as Default	none
* ATQn	Result Code Display	0 *
ATSn?	Read S Register	none
ATSn=x	Writing To S Register	none
ATT	Set Tone Dial as Default	none *
ATVn	Result Code Form (Message Control)	1 *
ATWn	Negotiation Progress Reporting	0 *
ATXn	Extended Result Codes	4 *
ATYn	Control Long Space Disconnect	0 *
ATZn	Reset	none
AT&Cn	DCD Option	0 *
AT&Dn	DTR Option	0 *
AT&F	Restore Factory Configuration	none
AT&Gn	Set Guard Tone	0 *
AT&Jn	Telephone Jack Connection	0 *
AT&Kn	DTE/Modem Flow Control	3 *
AT&Ln	Line Type	0 *
AT&Mn	Communication Mode	(&Qn)
* AT&Pn	Dial Pulse Ratio	0(US) *
		1(Japan)
AT&Qn	Commuation Mode	5 *
AT&Rn	RTS/CTS Option	0 *
AT&Sn	DSR Option	0 *
AT&Tn	Test and Diagnostoc	4 *
AT&V	View Current Configuration and User Profile	none
AT&Wn	Store User Profile	none
AT&Xn	Clock Source Selection	0 *
AT&Yn	Designate Default User Profile	0 *
AT&Zn=x	Store Phone Number	none
AT\An	Maximum MNP Block Size	2
AT\Bn	Transmit Break	3
AT\E	Optimize Echo Cancellation	none
AT\Gn	Modem to Modem Flow Control	0
AT\Kn	Break Control	5
AT\Ln	MNP Block Transfer Control	0
AT\Nn	Operation Mode Control	3

AT\O	Originate Reliable Link Control	0	
AT\Tn	Inactivity Timer Control	0	*
AT\U	Accept Reliable Mode Control	none	
AT\Y	Switch to Reliable Mode	none	
AT\Z	Switch to Normal Mode	none	
AT%Cn	Compression Control	1	*
AT%Dn	Set Dictionary Size (V.42 bis)	2	
AT%En	Enable/Disable Auto Retrain	0	
AT%L	Report Receive Signal Level	none	
AT%Mn	Set One/Two-Way Mode (V.42 bis)	3	
AT%P	Clear V.42 bis Encoder Dictionary	none	none
AT%Q	Report Line Signal Quality	none	
AT%Sn	Set Maximum String Length (V.42 bis)	32	

* Command setting may be stored in one of two user profiles with the AT&Wn command.

Table 4-2 At Command Definitions

Al	Re-execute Command. Re-executes the most recent AT command string. The principle application of this command is to place another call (e.g., Dial command) that failed to connect due to busy line, no answer, or a wrong number. This command must appear alone on a command line and must be terminated by the "/" character. (A <CR> should not be entered to terminate the command)
	Parameters : None
	Default : None
ATA	Answer. This must be the last command entered into the command line. The modem proceeds with the connect sequence in answer mode. The modem will enter the connect state after exchanging carrier with the remote modem. If no carrier is detected within the wait period specified in register S7 (default=50 seconds), the modem will disconnect.
Any	character may be entered via the DTE during the connect sequence to abort the command.
	Parameters : None
	Default : None
	Result codes :
	CONNECT XXXX If a connected is established (XXXX = telco line speed, e.g., 2400)
	NO CARRIER If a connection cannot be established, the abort timer (register S7) expires, or if the command is aborted.
	ERROR If in data mode.
ATBn	Set CCITT or BELL Mode. Selects between CCITT or BELL modes for 1200 and 300 bps.
	This command is not valid when the ATN1 command (automode detection enabled) is in effect.
	Parameters : 0, 1
	Default : 1 for U.S., 0 for Japan
	Result codes :
	OK for all valid parameters.
	ERROR otherwise
	Command options:
	ATB0= Selects CCITT V.22 and V.21 standards for communications at 1200 and

300 bps.
ATB1= Selects Bell 212A and 103 standards for communications at 1200 and 300 bps.

ATCn Carrier Control. Controls the transmit carrier. The modem is preset to turn carrier on and off as necessary (the C1 option). The signal is on when the modem is calling, answering, or

connected to the remote modem, and is off when it is not. The C0 option is NOT valid.

Parameters : 0, 1

Default : 1

Result codes :

OK for 1.

ERROR otherwise.

Command options:

ATC0 Not permitted, return error result code.

ATC1 Normal transmit carrier switching (preset).

ATDn Dial. This must be the last command on the command line. ATD causes the modem to go

off-hook, dial according to the parameters entered, and attempt to establish a connection.

If there are not parameters, then the modem goes off-hook in originate mode without dialing

a number. Punctuation may be used for clarity. Parentheses, hyphens and spaces are ignored. If any invalid character is entered, that character and all subsequent characters in the dial string are ignored. The modem truncates dial strings to 40 character.

Parameters :0-9 A B C D * # L P T R ! @ W , ; ^ S=n

Default : P

Result codes:

OK If "," dial modifier is used.

OK If key press abort during dialing process.

NO DIALTONE If ATX2 or ATX4 is selected and 1 second of dial tone is not detected within 5 seconds; or if W dial modifier is used and 3 seconds of dial tone is not detected within the time specified S7.

BUSY If busy is detected, and ATX3 or ATX4 is selected or if W dial modifier is used.

NO ANSWER If "@" dial modifier is used and 5 seconds of silence is not detected within the time specified in S7.

CONNECT XXX If a connection is established.

NO CARRIER If a connection cannot be established, the abort timer (register

S7)

expires, or a character is entered during the handshake process.

ERROR If in data mode.

The ATD Parameters are :

L Dials the last dial string that was dialed.

before P Use Pulse Dialing. Placed at the end of the command string and the dial string. Causes the modem to pulse dial the numbers.

before T Uses the DTMF dialing. Placed at the end of command string and the dialing string. Causes the modem to use DTMF tones to dial.

character R Reverse mode. Allows the modem to call an originate-only modem by forcing the call into "answer mode". Must be entered as the last of the command string (just before the <CR>).

then ! Hookflash. Causes the modem to go on-hook for 700 milliseconds and off-hook.

@ Causes the modem to listen for 5 seconds of silence. If a 5 second of silence. If a 5 second silence has not been detected within the period specified in S7 (default = 50 seconds), the modem disconnects and

returns the 'NO ANSWER' result code. If it detects a busy signal, it returns a 'BUSY' result code. If the 5 seconds of silence is detected, then the modem continues dialing the dial string.

tone W Wait for Dial Tone Before Dialing. Causes the modem to wait for a dial up to the period of time specified in S7 (default = 50) before dialing the number that follow. If the modem detects a dial tone before the given

time delay, it continues to dial. Otherwise, it goes on-hook.

, Pause During Dial. Inserted between digits in a dial string. Causes the modem to pause for the value given by register S8 (default = 2 seconds),

		before dialing the next digit. This delay can be used in place of the "Wait For Dial Tone Before Dialing".
	;	Return To Command Mode After Dialing. Added to the end of the dial string. Causes the modem to remain in the command mode after it
dials		the digits preceding the command. This allows the user to issue
additional		dial commands or dial string without overflowing the command buffer.
The		modem looks for the carrier after the final dial command is issued.
"ATHn"		aborts this command.
	^	Turn On Calling Tone. Turns on the periodic 1300 Hz calling tone if originating the call. Calling tone is enabled only on call-by-call basis.
	S=n	Dial Stored Number. Follows the dial command string. Causes the
modem		to dial a telephone number previously stored in directory location n
using		AT&Zn command.

If "ATD" is entered without parameters, the modem goes off-hook and waits for carrier; if the handshake is not completed within the period of time specified in register S7 (default = 50 seconds)

the modem goes on-hook.

The ATD command will be aborted in progress upon receipt of any character from DTE before completion of the handshake.

ATE Command Echo. Controls the echo of characters received by the modem from the local DTE while the modem is in command mode.

Parameters : 0, 1

Default : 1

Result codes :

OK for 0 and 1.

ERROR otherwise.

Command options:

ATE0= Inhibits the echoing of commands.

ATE1= Enables the echoing of commands.

ATF_n On-Line State Character Echo. Determines if the modem will echo data from the DTE. The

modem does not support the ATF0 command. However, the modem will accept ATF1 which

may be issued by some communication software packages.

Parameters : n = 0, 1

Default : 1

Result codes:

OK for 1

ERROR otherwise

Command options:

ATF0= ERROR

ATF1= Disables on-line echo

ATH_n Switch-Hook Control. Applies to asynchronous operation only. If the user enters the command mode from the data mode by issuing the escape sequence (+++), or as a result

of an ON-to-OFF transition of DTR of the AT&d1 option in effect, the user may cause the

modem to go on-hook (disconnect) by issuing the ATH command.

Parameters : n=0, 1

Default : none

Result codes:

OK for 0 and 1

ERROR otherwise

Command options:

ATH0= Causes the modem to go on-hook (hang up).

ATH1= If modem is on-hook, modem goes off-hook, returns an OK response,

and

awaits further commands.

ATIn Identification. Return the product code, returns the checksum of firmware ROM, or computes the checksum of the firmware ROM and reports its error status.

The product code contains 3 digits. The checksum result consists of three ASCII numeric characters followed by a carriage return and a line feed. The error status is either OK or ERROR.

Parameters : n = 0-2

Result codes :

OK

Default : none

Command options:

ATI0 : Reports the product code.

ATI1 : Reports the checksum computed on the firmware ROM.

ERROR.

AT12	: Performs a checksum on the firmware ROM and indicates OK or
AT13	: Reports firmware revision level.
AT14	: Reports product capabilities.

ATLn Speaker Volume. Controls the internal speaker volume.
Parameters : 0-3
Default : 2
Result codes :
OK for 0 to 3.
ERROR otherwise.
Command options:
ATL0 : Selects low speaker volume.
ATL1 : Selects low speaker volume.
ATL2 : Selects medium speaker volume.
ATL3 : Selects high speaker volume.

ATMn Speaker Control. Controls the internal speaker while the modem is receiving a carrier signal or dialing. This command also enables or disables the speaker.
Parameters : n = 0 to 3
Default : 1
Result codes :
OK for 0 to 3.
ERROR otherwise.
Command options:
ATM0 Speaker is always off.
ATM1 Speaker is on during handshaking in call establishment but is turned off while the modem is receiving a carrier signal from the remote modem.
ATM2 Speaker is always on.
ATM3 Speaker goes off while the modem is receiving a carrier signal from a remote modem and while the modem is dialing. However, speaker is on during answering.

ATNn Modulation Handshake. This command can be used to assure that a connection is made only at the specified speed. If leased line is selected, this command is ignored and the modem operates as if ATN0 were selected.
Parameters : 0, 1
Default : 1
Result codes :
OK for 0 and 1.
ERROR otherwise.
Command options:
ATN0= Requires that the speed of the connection be that specified by the value held in S37; if S37=0, the speed of the connection must match that at which the last AT command was issued. If the selected speed can be achieved using more than one communication standard (e.g., Bell 212A or CCITT V.22 at 1200 bps), the modem also references the selection made with the ATB command.
ATN1= Permits handshaking to occur at any speed supported by both modems. Enables automode detection. The ATB command is ignored in this mode and the modem attempts only CCITT mode connections.

ATOn Return To The On-Line Status. Applies to asynchronous operation only. If the user enters the command mode from the data mode by issuing the escape sequence, or as a result of an ON-to-OFF transition of DTR with the AT&d1 option in effect, the user may return to data mode without terminating a call by issuing the ATO command. This command may also be used to force a retrain. If the modem is on-hook, then the modem behaves as if it went off-hook to originate without actually taking the relay off-hook.

Parameters : 0, 1
 Default : none
 Result codes:
 ERROR If &T1, &T3, or &T6-&T8 is active.
 CONNECT XXX If a connection is established.
 NO CARRIER If retrain is not successful in the time specified by S7.
 Command options:
 ATO0= Causes the modem to turn to the data mode.
 ATO1= Causes the modem to return to the data mode and to initiate a retrain when operating at 2400, 4800, 9600, 12000, 12400 bps.

ATP Set Pulse Dial as Default. Causes the modem to assume that all subsequent dial commands are pulse dialed. The user may omit the "P" from the dial string.
 Parameters : none
 Default : none
 Result codes :
 OK If issued outside dial string.

ATQn REsult Code Display. Determines whether or not the modem sends the result codes to DTE.
 (See ATXn command.)
 Parameters : n = 0, 1, 2
 Default : 0
 Result codes :
 OK for 0 and 2.
 none for 1.
 ERROR otherwise.
 Command options:
 ATQ0= Allows the modem to send the result codes to the DTE.
 ATQ1= Prohibits the modem from sending result codes to the DTE.
 ATQ2= Modem return result codes to DTE when originating a call; does not return result codes when answering a call with the exception of OK and ERROR.

ATSn? Reading S Register. Reads the contents of the S register. All the S registers may be read.
 Parameters : n = 0-95
 Default : none
 Result codes :
 OK for all parameters.

ATSn=x Writing to S Registers. Writes the value of x to the specified S register. All the registers will return the OK response if x is a legal value, however, some registers will not actually write the value anywhere. These registers are S1, S13-S15, S17, S20-S24, and S27.

Parameters : n = 0-95, x = 0-255
Default : none
Result codes :
OK for parameters n=0-95.
OK for no argument.
ERROR otherwise.

ATT Set Tone Dial as Default. Causes the modem to assume that all subsequent dial commands are tone dialed.
The user may omit the "T" from the dial string.
Parameter : none
Default : none
Result codes :
OK if issued outside dial string.

ATVn Result Code Form (Message Control). Selects whether the modem sends long form or short form result codes to the DTE. All responses are ASCII values. Long-form (verbose) responses are preceded and terminated with both carriage return and line feed control characters. Short-form (numeric) responses are only terminated with a carriage return control character. (See ATXn command).
Parameters : 0, 1
Default : 1
Result codes :
0 for 0.
OK for 1.
ERROR otherwise.
Command options:
ATV0= Allows short-form (numeric) result codes to be sent.
ATV1= Allows long-form (verbose) result codes to be sent.

ATWn Negotiation Progress Reporting. An additional set of result codes can be enabled with the W command to report progress of the negotiation phase of error-correction mode. These codes report the carrier speed (300 bps-2400 bps) and the error-correction protocol. These messages can also be reported in either numeric or verbose form. For example, both 77 and PROTOCOL:LAP-M indicate that the error-correction protocol is LAP-M (See ATXn command.)
If the error-correction link is negotiated and the connection is made, the appropriate CONNECT XXXX message is reported.
When in error-correction mode, the CARRIER XXXX message may indicate one speed, while the CONNECT XXXX message reports another.
Parameters : 0-2
Default : 0
Result codes:
OK for parameters 0-2.
ERROR otherwise.
Command options:
ATW0 Error-correction call progress not reported.
ATW1 Error-correction call progress reported.
ATW2 Error-correction call progress not reported. CONNECT XXXX message reports DCE speed.

ATXn Extended Result Codes. Determines whether the modem responds to dial tone and busy

signals, and how it displays result codes for CONNECT messages. When the modem ignores dial tone, it waits for a time delay given by register S6 (default = 2 seconds) and then dials regardless of presence or absence of dial tone; this is called blind dialing.

Parameters : 0-4

Default : 4

Result codes:

OK for parameters 0-4.

ERROR otherwise.

Command options.

ATX0 Modem ignores dial tone and busy signal. Sends CONNECT message when a connection is established by blind dialing.

ATX1 Modem ignores dial tone and busy signal. Sends CONNECT XXXX message reflecting bit rate when a connection is established by blind dialing.

ATX2 Modem ignores busy signal but waits for dial tone before dialing. If dial tone is not detected within 5 seconds, the NO DIAL TONE message is sent. Sends CONNECT XXXX message reflecting bit rate when

connection

is established.

ATX3 Modem ignores dial tone. Sends BUSY message if busy signal is detected. Sends CONNECT XXXX reflecting bit rate when connection

is

established by blind dialing.

ATX4 If dial tone is not detected within 5 seconds, sends NO DIAL TONE message. If busy signal is detected, sends BUSY message. Sends CONNECT XXXX message reflecting the bit rate when a connection is established.

Result Codes - Q, V, X, V, S95

Short Form

Long Form

0

OK

1

CONNECT

2

RING

3

NO CARRIER

4

ERROR

5

CONNECT 1200

6

NO DIALTONE

7

BUSY

8

NO ANSWER

9

CONNECT 0600

10

CONNECT 2400

11

CONNECT 4800

12

CONNECT 9600

16

CONNECT 19200

17

CONNECT 38400

18

CONNECT 57600

33

FAX

34

FCERROR

35

DATA

40

CARRIER 300

46

CARRIER 1200

47

CARRIER 2400

49

CARRIER 7200

50

CARRIER 9600

51

CARRIER 12000

52

CARRIER 14400

66

COMPRESSION CLASS 5

67	COMPRESSION V.42BIS
69	COMPRESSION NONE
70	PROTOCOL:NONE
77	PROTOCOL:LAPM
80	PROTOCOL:ALT

ATYn Control Long Space Disconnect. Determines whether modem disconnects when it receives

a continuous break from a remote modem for a period equal to , or greater than, 1.6 seconds, and sends a break for 4 seconds before disconnecting due to ON-to-OFF transition of DTR if an AT&D2 option is in effect, or upon receiving an ATH command.

Parameters : 0, 1

Default : 0

Result codes:

OK for 0 and 1.

ERROR otherwise.

Command options:

ATY0= Disable long space disconnect.

ATY1= Enable long space disconnect.

ATZn Reset. Causes the modem to disconnect and perform a warm start. This command must be

the last command on the command line. The reset actions are: 1)Clear serial port buffers.

2)Set the baud rate and parity to match the local DTE when any AT command is issued.

3)Restore the active configuration with the user profile denoted by the parameter.

Parameters : 0, 1

Default : 0

Result codes:

OK for 0 and 1.

ERROR otherwise.

AT&Cn DCD Option. Controls the Received Line Signal Detected (RLSD) [Carrier Detect(DCD)] signal of the serial port. If synchronous mode is selected, this command is ignored and the

modem functions as if the AT&C1 command has been entered.

Parameters : n = 0, 1

Default : 0

Result codes:

OK for and 1.

ERROR otherwise.

Command options:

AT&C0 RLSD is On regardless of the state of the Data carrier from the remote modem.

AT&C1 RLSD follows the state of the data carrier from the remote modem.

AT&Dn DTR Option. Determines actions taken by the modem in relation to the Data Terminal Ready (DTR) signal of the serial port. The effect of DTR loss depends upon the AT&D and AT&Q (AT&M) commands.

Parameters : n = 0-3

Default : 0

Result codes:

OK for 0 to 3.

ERROR otherwise.

The action for the event that follows DTR loss is indicated in the following table:

	&D0	&D1	&D2	&D3
&Q0	NONE	2	3	4
&Q1	1	2	3	4
&Q2	3	3	3	3
&Q3	3	3	3	3

&Q4	1	2	3	4
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The DTR-going-off events corresponding to the actions numbers in the above table are:

1. Modem disconnects and sends OK result code.
2. Modem goes into command mode if in data mode and sends the OK result code.
3. Modem disconnects, sends the OK result code, and disables auto answer while DTR is OFF
4. Modem performs a warm start (i.e., same as ATZ command). This is the DTE/AT&D3 abort.
5. If AT&Q5, AT&Q8, or AT&Q9 is in effect, the action taken is the same as AT&Q0.

AT&F Restore Factory Configuration. Loads the modem active area with the factory default values.

Parameters : none
 Default : none
 Result codes:
 OK

AT&Gn Set Guard Tone. Normally controls the generation of guard tones. This command is not implemented, however, the command structure is provided for application compatibility.

Parameter : n = 0-2
 Default : 0
 Result codes:
 OK for 0 to 2.
 ERROR otherwise.

AT&Jn Telephone Jack Selection. Determines how the auxiliary relay is controlled.

Parameters : n = 0, 1
 Default : 0
 Result codes:
 OK for 0 and 1.
 ERROR otherwise

Command options:

- AT&J0 Suitable for RJ-11, RJ41S, or RJ45S type phone jack. The auxiliary relay is never operated.
- AT&J1 Suitable for RJ-12 or RJ-13 type phone Jack. The A lead is connected to A1 lead while modem is off-hook
- If AT&J0 is selected, the auxiliary telco relay is opened. If AT&J1 is selected and the modem is off-hook, the auxiliary telco relay (A/A1) is closed (shorting A to A1).

AT&Kn DTE/Modem Flow Control. Determines how the modem controls the flow of data between the local DTE and the modem. When the modem terminal buffer is nearly full, the modem will either send an XOFF or drop CTS to stop the data flow. When the buffer is nearly empty, the modem will either send an XON or raise CTS to start the data flow.

The modem also responds to XON/XOFF characters of RTS stimulus from the DTE by suspending or resuming transmission accordingly. The modem responds to DTE XON/XOFF characters and also passes the XON/XOFF character to the remote modem as data if transparent flow control is selected.

When in the Direct mode (AT&Q0), flow control is not used and the modem ignores the setting of this command.

Parameters : n = 0, 3, 4, or 5

Default : 3
 Result codes:
 OK for 0, 3, 4, or 5.
 ERROR otherwise.
 Command options:
 AT&K0 Disables flow control.
 AT&K3 Enables RTS/CTS flow control.
 AT&K4 Enables XON/XOFF flow control.
 AT&K5 Enables transparent XON/Xoff flow control.

AT&Ln Line Type. Control selection of leased line or dial-up line. Although the modem has only a

single line connection, the power level is changed when setting leased line operation.
 (See S91 register.)

Parameters : n = 0, 1
 Default : 0
 Result codes:
 OK for 0 and 1.
 ERROR otherwise.
 Command options:
 AT&L0 Dial-up line.
 AT&L1 Leased line.

AT&Mn Communication Mode. Same as AT&Q0-AT&Q3.

Parameters : n = 0-3
 Default : &qn
 Result codes:
 OK for 0-3
 ERROR otherwise.

ATPn Dial Pulse Ratio. Selects the ratio of the off-hook (make) to on-hook interval used when pulse dialing.

Parameters : n = 0, 1, or 2
 Default : 0 for U.S.; 2 for Japan
 Result codes:
 OK for n = 0-2 in U.S. or for n = 1-2 in Japan
 ERROR otherwise.
 Command options:
 AT&P0 39%/61% make/break ratio @ 10 pps.
 AT&P1 33%/67% make break ratio @ 10 pps.
 AT&P2 33%/67% make break ratio @ 20 pps.

AT&Qn Commutation mode. The modem supports three basic communication modes: asynchronous, synchronous, and error correction. Synchronous and direct modes are not

available when the parallel host interface is selected.

Parameters : n = 0-9
 Default : 5
 Result codes:
 OK for 0-9.
 ERROR otherwise.

Command options:
 AT&Q0 Selects asynchronous operation in the Direct mode. In this mode, the

DTE speed must match the telco line speed.

AT&Q1 Selects synchronous mode 1 operation. Supports terminals that are

able to communicate in both asynchronous and synchronous protocols. Uses the

dial command to place a call in asynchronous mode then switches to synchronous mode once the connection is made. The modem goes on-hook and switches back to the asynchronous mode when it detects an ON-to-OFF transition on DTR or a loss of carrier from the remote modem exceeding the time interval given by register S10 (default = 1.4 seconds).

AT&Q2 Selects synchronous mode 2 operation. Supports synchronous terminals with stored number dialing. The modem automatically dials a stored number when it detects an ON-to-OFF transition on DTR. An asynchronous terminal is still needed to save and change the phone numbers stored in the NVRAM; the number is saved using the "AT&Z0=x" command. The modem dials the number stored in the first entry.

AT&Q3 Selects synchronous mode 3 operation. This mode allows the DTR to act as a Talk/Data switch. The operator manually initiates a call with DTR OFF, implying the modem is in Talk mode. The complete the call, the operaotr switches the modem to Data mode by turning DTR ON after the last number is dialed. The modem goes on-hook and switches to the asynchronous mode when an OFF-to-ON transition on DTR is detected or a loss of carrier occurs from the remote modem exceeding the time interval given by register S10 (default = 1.4 seconds.)

AT&Q4 This causes the modem to issue OK result code but has no effect on operation.

link
 configured
 the
 AT&Q5,
 connect in
 this

AT&Q5 Selects error correction mode. Modem negotiates an error-correction in accordance to the S48 and S36 settings. The modem can be to either disconnect or fall back to a normal asynchronous connection if link cannot be negotiated (refer to register S36). For example, if S48=7, and S36=7 (default settings), the modem will attempt to V.42bis, then MNP, then fall back to normal mode.

AT&Q6 Selects asynchronous operation in normal mode (Speed Buffering). In mode, the DTE speed can differ from the telco line speed.

AT&Q7 This command causes the modem to issue OK result code but has no effect on operation.

AT&Q8 This command forces the modem to behave as if S48=128. The modem will attempt an MNP connection, then attempt normal mode if bit 1 of S36=1 or direct mode if bit 1 of S36=0.

AT&Q9 This command behaves like AT&Q5 with S48=7 and S46=138. The modem will attempt a V.42bis, fallback to V.42 (LAP-M), then fallback to normal mode.

AT&Rn RTS/CTS Option. Controls the state off the CTS signal in the synchronous mode. CTS is

always on in the asynchronous mode unless AT&K3 has been selected.

Parameters : n = 0, 1

Default : 0

Result codes:

OK for 0 and 1.

ERROR otherwise.

Command options:

AT&R0 CTS tracks RTS. CTS is turned ON in response to an OFF-to-ON transition of RTS from the local DTE after a delay period specified by register S26 in increment of 10 milliseconds (default = 0).

AT&R1 The modem ignores RTS. CTS is held ON unless AT&K3 has been selected.

AT&Sn DSR Option. Dtermines whether DSR operates in accordance with the EIA-232-D specification or remains ON.

Parameters : n = 0, 1

Default : 0

Result codes:

OK for 0 and 1.

ERROR otherwise

Command options:

AT&S0 DSR is always ON.

AT&S1 DSR operates in accordance with the EIA-232-D specification.

AT&Tn Test and Diagnostics. Selects the the test command. Test commands must be initiated in

the command mode with asynchronous operation in the Direct mode selected (AT&Q0) at

the speed of 1200 bps or faster. A telco line connection must be established prior to initiating digital loopback test. If test conditions are not met, the modem issues the

ERROR

result code and pulses the TML output to indicate an error. If local analog loopback is initiated while the modem is connected, the modem disconnects before performing the test.

During a test, the modem sets the TML output low to turn the test indicator on. If an error is

detected, or the line was not connected for remote digital loopback test, the TML output is

pulsed to blink the TEST indicator. An initiated test is active for a period of time specified

by register S18 (test timer) before returning to the command mode. If S18 is zero, the test

aborts when the user issues the AT&T0 command.

Parameters : 0, 1, or 3-8

Default : 4

Command options:

the
will
of
characters
the
remote
a
remote
and
local
to
(0101)
validity
each
digit
loopback

AT&T0 End test in progress. The escape sequence must be issued to return the modem to the command mode prior to sending this command. Subsequent issuing of the ATO command while in the command mode will cause the local and remote modems to return to normal data mode operation if the interrupted test was digital loopback.

AT&T1 Initiates local analog loopback. This test verifies the working condition of the path between the local DTE and the remote modem. The characters received from the DTE are looped back to the DTE by modem.

AT&T3 Initiates remote digital loopback locally. The characters received from the remote modem are looped back to the remote modem by the local modem. This test verifies the working condition of the path from a modem, through a local modem, and back to the remote modem.

AT&T4 Allow the modem to respond to a request from a remote modem for a remote digital loopback test.

AT&T5 Prohibits the modem from granting a request from a remote modem for a remote digital loopback test.

AT&T6 Initiates remote digital loopback. The characters received from the local DTE are transmitted to the remote modem and looped back to the modem and looped back from the remote modem to the local modem DTE. This test verifies the working condition of the path between the DTE and the remote modem.

AT&T7 Initiates remote digital loopback with self test. This test works similarly to AT&T6 except that the modem sends an alternating zeros and ones test pattern to the remote modem and continuously examines the validity of the returned data. The modem increments an internal error counter each time an error is detected. At the end of the test, the modem return a 3-digit error count to the DTE.

AT&T8 Initiates local analog loopback with self test. This test works similarly to AT&T7 except that the test pattern is checked in the local analog mode (as in AT&T1). This allows a thorough testing of the local modem transmit and receive functions without an actual telco line connection.

AT&V View Current Configuration and User Profiles. Displays the active configuration and user profiles.
Parameters : none
Default : none

AT&Wn Store User profile. Saves the current configuration into NVRAM as one of two user profiles.
The current configuration is comprised of a list of storable parameters. These settings are restored to the active configuration upon receiving the ATZn command or at power up

(see AT&Y command). The user profile saved is denoted by the parameter value.

Parameters : n = 0, 1

Default : none

Result codes:

OK for 0 and 1.

ERROR otherwise.

Command options:

AT&W0 Saves as user profile 0.

AT&W1 Saves as user profile 1.

AT&Xn Clock Source Selection. Selects the source of the synchronous transmit clock for the modem during synchronous operation.

In asynchronous mode, the transmit and receive clocks are turned OFF. In synchronous mode, the clocks are turned ON with the frequency of 1200Hz or faster corresponding to the

speed that is selected for modem operation.

Parameters : n = 0-2

Default : 0

Result codes:

OK for 0 to 2.

ERROR otherwise.

Command options:

AT&X0 Internal timing. The modem generates the transmit clock signal and applies it to the TXCLK output at the serial interface.

AT&X1 External timing. The local DTE sources the transmit clock signal to the XTCLK input of the serial interface. The modem applies this clock to

the

TXCLK output at the serial interface.

AT&X2 Slave receive timing. The modem derives the transmit clock signal from the incoming carrier and applies it to the TXCLK output at the serial interface.

AT&Yn Designate Default User Profile. Designate which of two user profiles will be loaded into the

active configuration at power up. The user profile is denoted by the parameter value.

This

command will yield an ERROR message if the NVRAM is not installed or is not operational as detected by the NVRAM test during reset processing.

Parameters : 0, 1

Default : 0

Result codes:

OK for 0 and 1.

ERROR otherwise.

Command options:

AT&Y0 Selects user profile 0.

AT&Y1 Selects user profile 1.

AT&Zn=x Store Phone Number. Stores a 36-digit dial string(x) in the specified entry(n) for later dialing (see ATDS=n command). This command will yield an ERROR message if the NVRAM is not installed or is not operational as detected by the NVRAM test during

reset

processing.

Parameters : n = 0-3, x = dial string

Default : none

Result codes:

OK for all parameters.

ERROR if storage number (n) is outside allowable range or the

dial string

(x) is longer than 36-digits.

AT\An Maximum MNP Block Size. Sets the maximum block size for MNP stream link connection.

Use this command to transmit smaller blocks of data in a reliable link connection.

Parameters : n = 0-3 (if n is greater than 3, 3 is used.)

Default : 2

Result codes:

OK

Command options:

AT\A0 Sets the maximum block size to 64 characters.

AT\A1 Sets the maximum block size to 128 characters.

AT\A2 Sets the maximum block size to 192 characters.

AT\A3 Sets the maximum block size to 256 characters.

AT\Bn Transmit Break. When this command is entered during a non-MNP connection, the modem

sends a break signal to the remote modem. The length of the break is 100 times the n parameter value in milliseconds. If this command is entered in MNP mode, the modem sends a Link Attention PDU to the remote modem.

Parameters : n = 1-9 (if n = 0, the default value 3 is used; if n is greater than 9, 9 is used.)

Default : 3

Result codes:

OK if connected.

ERROR if not connected.

AT\En Optimize Echo Cancellation. The AT\E command is a one-shot command that can be used

to optimize the local echo. When the AT\E1 command is issued before a call is originated

or answered, the modem will set NET1 and NET2 so that the local echo is minimized (i.e.,

it attempts to match the local network)

After an optimization (AT\E1), NET1 and NET2 will remain in their optimized state until another connection is attempted following an AT\E command. The state of NET1 and

NET2 is stored in NVRAM unless the NVRAM is not installed or is not operational as detected by

the NVRAM test during reset processing. NET1 and NET2 default to 0 and 1, respectively, at power up.

AT\Gn Modem to Modem Flow Control. Enables or disables modem to modem flow control during

a Normal mode connection. Since the reliable link (error correction) has its own method of

flow control, the AT\Gn command is ignored when error correction is selected (AT&Q5, AT&Q8, or AT&Q9). However, the DTE to modem flow control remains active during a reliable link.

Parameters : n = 0, 1 (if n is greater than 1, 1 is used.)

Default : 0

Result codes:

OK

Command options:

AT\G0 Disable flow control (XON/XOFF).

AT\G1 Enable flow control (XON/XOFF).

AT\Kn Break Control. Determines the modem response when a BREAK is received from the DTE

or the remote modem. During MNP mode, the remote modem's BREAK control setting

determines the local modem response the handle the BREAK.

Parameters : n = 0-5 (if n is greater than 5, 5 is used.)

Default : 5

Result codes:

OK

Command options:

When a BREAK is received from the DTE during Normal or MNP mode, the modem responds as follows:

AT\K0,2,4 Modem enters the command mode (waiting for AT) without sending a BREAK to the remote modem.

AT\K1 Modem clears the terminal and modem buffers and sends a BREAK to the remote modem.

AT\K3 Modem does not clear the buffers but sends a BREAK to the remote modem.

AT\K5 Modem sends a BREAK to the remote modem in sequence with any transmitted data.

When a BREAK is received from a remote modem during Normal mode, the modem

takes the following action:

AT\K0,1Modem clears the terminal and modem buffers and sends a BREAK to the local DTE.

AT\K2,3Modem does not clear buffers but sends a BREAK to the local DTE.

AT\K4,5Modem sends a BREAK in sequence with any data being buffered.

When a BREAK is received from the DTE during Direct mode, the modem takes the following action:

AT\K0,2,4 Modem sends a BREAK to remote modem and enters command mode (waiting for AT.)

AT\K1,3,5 Modem sends a BREAK to remote modem.

Note: In LAPM, breaks are "timed", meaning the modem attempts to preserve the duration

of the break when transmitting to the remote modem. In MNP4, breaks are not "timed",

as MNP4 has no facility for maintaining the duration of the signal; a long break is the same as a short break.

AT\Ln MNP Block Transfer Control. Determines whether the modem will use Block or Stream mode for MNP link.

Parameter : n = 0, 1 (If N is greater than 1, 1 is used)

Default : 0

Result codes:

OK

Command options:

AT\L0 Uses Stream mode for MNP link connections.

AT\L1 Uses Block mode for MNP link connections.

AT\Nn Operation Mode Control. Selects the operating mode the modem uses while connecting (see AT&Qn command).

Parameters : n = 0-3 (If n is greater than 3, 3 is used)

Default : 3

Result codes:
OK

Command options:

AT\N0 Selects Normal (speed buffering) mode. This option takes effect at physical connection time. Same as AT&Q6.

AT\N1 Selects (pass through) mode. This option takes effect at physical connection time. Same as AT&Q0.
If the parallel interface is selected, the AT\N1 is interpreted as AT\N0 since Direct mode is not available with the parallel interface. (Sets S48=128 and S36=4).

AT\N2 Selects reliable link mode. This defines the modem-to-modem connection to require error correction. If an attempt to establish the reliable link fails, the modem disconnects. This command takes effect at physical connection time only. To establish MNP after a physical connection, use the AT\O, AT\U, or AT\Y command. (Sets S48=128 and S36=7).

AT\N3 Selects auto-reliable link mode. The modem will attempt an error-correction connection but will fallback to Normal mode if unable to establish an MNP link. This command takes effect at physical connection time only. To establish MNP after a physical connection, use the AT\O, AT\U, or AT\Y command.

AT\O Originate Reliable Link Control. Forces the modem to originate an MNP connection regardless of whether the modem is in originate or answer mode. The modem will send upto two link requests. If the modem does not respond after the second request, the modem returns to its previous state.
This command can be executed only if the physical connection exists, and will return the NO CARRIER message if there is no connection, or an appropriate connect message if a reliable link connection already exists. This command must be the last command on the command line.

Parameter : None

Default : None.

AT\Tn Inactivity Timer Control. Determines the length in 1-minute intervals that the modem will wait before disconnecting when no data is sent or received. In MNP mode, any data transmitted or received by the modem will reset the timer. In non-MNP mode, any data transmitted or received by the modem will reset the timer. The inactivity timer is inoperative in synchronous mode and in direct mode.

Parameters : n = 0-42 (If n is greater than 42, 42 is used.)

Default : 0

Result codes:
OK

AT\U Accept Reliable Mode Control. Causes the modem to wait upto 12 seconds for a link

request from the remote modem to establish an MNP link, regardless of whether the modem is in original or answer mode. If the link request is not received within the time period, the

modem returns to its previous state.

This command can be executed only if a physical connection exists, and will return the NO CARRIER message if there is no connection, or an appropriate connect message if

a

reliable link connection already exists. This command must be the last command in the command line.

Parameters : none

Default : none

AT\Y Switch To Reliable Mode. Causes the modem to establish a reliable link. Depending on whether the modem is in originate or answer mode, the modem wither accepts a link request from the remote modem or sends a link request, respectively. If the MNP connection attempt fails, the modem return to its previous state. This command can be executed only if a physical connection exists, and will return the NO CARRIER message if there is no connection, or an appropriate connect message if a reliable link connection already exists.

This command must be the last command on the command line.

Parameters : none

Default : none

AT\Z Switch To Normal Mode. Causes the modem to switch to the normal mode after a reliable link is established. Switching to normal mode erases any data that may be in the terminal and modem buffers.

This command can be executed only if an MNP connection exists, and will return the NO CARRIER message if there is no connection, or an appropriate connect message if

a reliable link connection previously existed. This command must be the last command on a command line.

Parameters : none

Default : none

AT%Cn Compression Control. Determines whether or not the modem will use data compression.

Parameters : 0, 1 (If n is greater than 1, 1 is used.)

Default : 1

Result codes:

OK

Command options:

AT%C0 = Disables data compression.

AT%C1 = Enables data compression.

AT%Dn Set Dictionary Size (V.42 bis). Sets the V.42 bis dictionary size.

Parameters : 0-3

Default : 2

Result codes:

OK

Command options:

AT%D0 = 512

AT%D1 = 1024

AT%D2 = 2048

AT%D3 = 4096 (one-way compression only).*

* For tow-way compression (AT%M3), the dictionary size is set for 2048 if

AT%D3 is issued.

AT%En Enable/Disable Auto-Retrain. Determine whether ot not the modem automatically will monitor the line quality and requests a retrain when necessary during a 14400, 12000, 9600, 4800, or 2400 bps connection.

Parameters : n = 0, 1 (If n is greater than 1, 1 is used.)

Default : 0

Result codes:

OK

Command options:

AT%E0 = Disables auto-retrain.

AT%E1 = Enables auto-retrain.

AT%L Report Received Signal Level. Retrurns a value identifying the received signal level. The possible values are:

009 Received level of -9 dBm
010 Received level of -10 dBm
011 Received level of -11 dBm

.
.
.

043 Received level of -43 dBm

If the received signal is greater than -9 dBm, 009 will be reported. If the received signal is less than -43 dBm, 043 will be reported.

Parameters : none

Default : none

Result codes:

OK

AT%Mn Set One/Two-Way Compression Modem (V.42 bis). Selects the one/two way compression

mode when using V.42 bis compression.

Parameters : 0-3

Default : 3

Command options:

AT%M0 = Compression disabled.

AT%M1 = Transmit compression only.

AT%M2 = Recieve compression only.

AT%M3 = Two-way compression

AT%P Clear V.42 bis Encoder Dictionary. Resets the local modem V.42 bis encoder dictionary and

sends a command code to the remote modem to reset the remote V.42 bis dictionary.

Parameters : none

Default : none

Result codes:

OK If encoder dictionary is in use.

ERROR If the encoder dictionary is not in use.

AT%Q Report Line Signal Quality. Returns the high-order byte of the calculated Eye Quality Monitor

(EQM) value. The high-order byte can range from 0 to 255. However, when the value is 8 or

greater, the modem will automatically retrain if enabled by the AT%E1 command. The value

for the normal connection ranges from about 0 to 2 and approaches 8 for a progressively

poorer connection.

Parameters : none

Default : none

Result codes:

OK

AT%Sn Set Maximum String Length (V.42 bis). Sets the maximum number of characters that can be

compressed into one word

Parameters : 6-250

Default : 32 characters

Table 1-3. Result Codes and Messages

Short Form	Long Form
0	OK
1	CONNECT
2	RING
3	NO CARRIER
4	ERROR
5	CONNECT 1200
6	NO DIALTONE
7	BUSY
8	NO ANSWER
9	CONNECT 0600
10	CONNECT 2400
11	CONNECT 4800
12	CONNECT 9600
16	CONNECT 19200
17	CONNECT 38400
18	CONNECT 57600
33 (Note 2)	FAX
34 (Note 2)	FCERROR
35 (Note 2)	DATA
40	CARRIER 300
46	CARRIER 1200
47	CARRIER 2400
49	CARRIER 7200
50	CARRIER 9600
51	CARRIER 12000
52	CARRIER 14400
66	COMPRESSION CLASS 5
67	COMPRESSION V.42BIS
69	COMPRESSION NONE
70	PROTOCOL:NONE
77	PROTOCOL:LAPM
80	PROTOCOL:ALT

Notes:

1. See ATQn and ATXn commands.
2. Short forms not used.