

AT Command Set Reference Guide

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Preface

Read This First

About This Manual

This reference guide provides descriptions of the AT commands that are needed to communicate with modems using the Texas Instruments TMS320 modem chipsets and reference designs.

Escape Sequence Disclaimer

The Hayes™ escape sequence (+++) is intended for public use by customers holding a license agreement with Hayes Microcomputer or those currently seeking a license. TI software replaces the +++ with the time-independent escape sequence (TIES) of +++AT or +++AT[cmd] with a time limit set by the S12 register.

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Contents

AT Commands

The AT commands described in this book are the basic, extended, fax, voice, DSVD, VoiceView, V.80, and help commands needed to communicate with the modem in manual mode. The command set provides a comprehensive description of the modem syntax, command procedures, modem/DTE commands, response messages, and S register parameters.

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1.1 Command Format and Procedures

The following sections outline the command rules and procedures for the modem.

1.1.1 Alpha Characters

Only the seven low-order bits of each character are significant to the modem; eighth or higher-order bit(s) are ignored. Unless otherwise noted, lowercase characters (values from 61h to 7Ah) and their uppercase equivalents (values from 41h to 5Ah) have the same values when received by the modem from the data terminal equipment (DTE) modem responses appear in uppercase.

1.1.2 DTE Command Conventions

DTE commands use the following conventions:

- ☐ In the command descriptions, words that are enclosed in <angle brackets> refer to syntax elements, such as arguments, that are defined in the commands section of this chapter. When you see a word in angle brackets, you specify the information within the brackets but you do not enter the brackets.
- ☐ Items that are enclosed in [square brackets] are optional and can be omitted from the command line.
- ☐ Quotations ("...") indicate that the preceding syntax element, a parameter or value, can be repeated.
- ☐ Other characters (including ?, (,), &, and =) that can appear in syntax descriptions must appear in the order shown.

1.1.3 General Command-Line Format

A command line consists of three elements:

Prefix	consists of the ASCII characters AT or at, and must always be preceded by a valid stop bit. This is so that if a modem disconnects unexpectedly, it does not misinterpret partial data as a command. All command lines begin with AT, except A/, A>, and +++. Entering AT clears the modem command buffer in preparation to accept a new command line.
Body	must be at least 60 characters. Space characters (20h) are ignored and are used for formatting purposes. The body consists of the individual commands described in sections 1.5 through 1.17.
Terminator	is a single character selected by a user-specified parameter (S3 register). The default is the carriage return, <cr> (0Dh). The terminator character may not appear in the body.

The general format of commands, except for the D and S commands, is as follows:

command <argument>

where *command* is a single character preceded by AT, followed by the command character(s). The <argument> can be a series of characters, ranging from 0 through 9, representing a decimal integer value. If a command expects an <argument> (such as another command or terminator) and it is missing, a value of 0 is assumed. All leading 0s in the <argument> are ignored by the modem. Additional commands may follow a basic format command (and associated parameter, if any) on the same command line, without any character separator. Note that the results of some commands (such as A) cause the remainder of the command line to be ignored.

See the descriptions of the D command on page 29 and the S command on page 43 for exceptions to the command-line general format.

1.1.4 Command-Line Editing

Command-line editing allows you to delete the previous character in the command line. An editing character is defined by a user-specified parameter (S5 register). The default edit character is the backspace, <bs> (08h).

The modem reads characters from the DTE to determine if they match the terminator (S3 register) first and then the editing character (S5 register) before it checks other characters.

Note: Echo

While in the command mode, the modem can echo characters received from the DTE. If enabled, each character is echoed individually at the same data rate, parity, and format as it was received.

1.1.5 Valid Values

Command identifiers are taken from the set of displayable ASCII characters (21h through 7Eh). Single-character commands consist of alpha characters A through Z (41h through 5Ah). Characters 61h through 7Ah are equivalent because lowercase characters are considered the same as their uppercase equivalents.

Note: Invalid Commands

The modem can ignore certain commands and continue to operate normally if the modem and DTE interface are not affected by the execution of the command. The modem responds with an OK rather than an ERROR response code.

1.1.6 Issuing Commands

All characters on a command line are issued at the same data rate, parity, and format. There is at least a 10-ms lapse between receipt of the previous command's entire response code and a subsequent command line. The modem does not issue an unsolicited response code to the DTE during reception and processing of a command line (between receipt of the first character of the prefix and issue of the last character of any response).

1.1.7 Executing Commands

Upon receipt of the terminator character, the modem executes commands in the command line from left to right. Each command is executed individually, regardless of what follows on the line. If all commands execute properly or if no commands appear in the command line, a single OK response code is issued after executing the final command. If an unrecognizable character or an invalid command is encountered or if any command results in an error, execution of the command line is terminated, an ERROR response is returned, and all subsequent commands on the line are ignored. Commands in the line prior to the error are executed.

1.1.8 Command Execution Time

Commands execute instantaneously, unless otherwise specified. Commands that execute immediately cannot be aborted. Some commands that require more time to execute (such as dialing or answering a call) can be aborted while in progress.

1.1.9 Aborting Commands

Commands that can be aborted are noted explicitly in the command description. Terminating commands is accomplished by transmitting any character from the DTE to the modem. A single character is sufficient to stop a command in progress. However, characters that are transmitted during the first 125 ms of a command execution are ignored to allow the DTE time to append additional control characters, such as a line feed after the command line terminator. Sending the terminator character at the same rate as the preceding command line ensures that the modem recognizes the abort; the modem may ignore characters sent at other rates. When the modem recognizes an abort, it terminates the command in progress and returns an OK or NO CARRIER result code to the DTE.

1.1.10 Modem Responses

In the command mode, the modem issues responses using the same data rate, parity, and format as the most recently received DTE command line. In the online mode, the modem issues responses using the current modem-to-DTE data rate with parity equal to the most recently received DTE command. Response characters must be contiguous, with no more than two bit times of mark idle issued between characters.

1.1.11 Basic Responses

The modem issues the following information responses and result codes.

Information Responses

Information responses consist of three parts:

- ☐ Headers
- ☐ Text lines
- ☐ Line terminators

The characters in the header are determined by a user-specified parameter (see the V command on page 45). The text line and line terminator can be repeated for multiple line responses.

Result Codes

A result code can be a number or a string, depending on a user-specified parameter (see the V command). The three types of result codes are:

- | | |
|---------------------|---|
| Intermediate | result codes inform the DTE of the ongoing progress of an action. |
| Final | result codes (such as OK, ERROR, NO CARRIER, and others which are identified in the definition of the result code) indicate that the modem has completed processing the previous command(s), and is ready to receive a new command. |
| Unsolicited | result codes (such as RING) indicate an event that is not directly associated with a command from the DTE. |

Result codes consist of four parts:

- ☐ Header
- ☐ Text
- ☐ Line terminator
- ☐ Trailer

The characters in the header and trailer are determined by a user-specified parameter (see the V command on page 45). The line terminator is the contents of the S3 register [default is carriage return, <cr> (0Dh)].

There are 40 possible result codes. See the description of the X command on page 46 for result code descriptions and their numeric equivalents. Each command description includes specific result codes and circumstances under which they can be issued in relation to the command.

1.2 Command Set Summary

Table 1–1 through Table 1–9 summarize the command set within the following functional groups:

- ☐ Basic commands (Table 1–1)
- ☐ Extended commands (Table 1–2 on page 8)
- ☐ Fax class 1 commands (Table 1–3 on page 9)
- ☐ Fax class 2.0 commands (Table 1–4 on page 10)
- ☐ Voice commands (Table 1–5 on page 12)
- ☐ DSVD commands (optional) (Table 1–6 on page 13)
- ☐ VoiceView commands (Table 1–7 on page 14)
- ☐ Help commands (Table 1–8 on page 15)

Table 1–1. Basic Commands

Command†	Description	Is discussed on page
A/	Reexecute	24
A>	Reexecute continuously	25
AT	Command prefix	26
A	Answer	27
B	US/ITU-T answer sequence	28
D	Dial	29
E	Echo	32
F	Duplex	33
H	Off-hook	34
I	Inquiry	35
L	Volume	38
M	Speaker	39
O	Online	40
P	Pulse dial	41
Q	Quiet	42
S	S register	43
T	Tone dialing	44

† AT must precede all commands except A/, A>, and +++.

Table 1–1. Basic Commands (Continued)

Command†	Description	Is discussed on page
V	Result code enable	45
X	Result code options	46
Y	Set default profile	56
Z	Reset	57
+++	Escape sequence	58
<any key>	Terminate current dial/answer operation	59
<Ctrl>S	Stop/restart help	60
<Ctrl>C	Cancel help screens	61
<Ctrl>K		

† AT must precede all commands except A/, A>, and +++.

Table 1–2. Extended Commands

Command†	Description	Is discussed on page
&A	ARQ result codes enable	62
&B	DTE data rate	63
&C	Carrier detect	64
&D	Data terminal ready	65
&F	Load factory settings	66
&G	Guard tone	67
&H	Transmit flow control	68
&I	Receive software flow control	69
&K	Data compression	70
&M	Error control and synchronous operation	71
&N	DCE link rate	72
&P	Make/break ratio	75
&R	Receive data hardware flow control	76

† AT must precede all commands.

Table 1–2. Extended Commands (Continued)

Command†	Description	Is discussed on page
&S	DSR options	77
&T	Diagnostic test	78
&U	DCE link rate floor	81
&W	Write to NVRAM	84
&Y	Break handling	85
&Z	Write dial string to NVRAM	86

† AT must precede all commands.

Table 1–3. Fax Class 1 Commands

Command†	Description	Is discussed on page
+FARX	Asynchronous receive	87
+FATX	Asynchronous transmit	88
+FCLASS	Set FCLASS	89
+FRH	Receive HDLC data with carrier	90
+FRM	Receive data with carrier	91
+FRS	Wait for silence	92
+FTH	Transmit HDLC data with carrier	93
+FTM	Transmit data with carrier	94
+FTS	Stop transmission and pause	95

† AT must precede all commands.

Table 1–4. Fax Class 2.0 Commands

(a) Commands

Command†	Description	Is discussed on page
+FDR	Data reception	96
+FDT	Data transmission	97
+FIP	Initialize fax parameters	98
+FKS	Session termination	99

† AT must precede all commands.

(b) Responses

Response†	Description	Is discussed on page
+FCO	Fax connection	100
+FDM	Transition to data modem	101
+FCI	Report remote ID, CSI	102
+FCS	DCS frame information	103
+FIS	DIS frame information	104
+FNC	Report NSC frame	105
+FNF	Report NSF frame	106
+FNS	Report NSS frame	107
+FPI	Report remote ID, CIG	108
+FPO	Remote polling indication	109
+FTC	DTC frame information	110
+FTI	Report Remote ID, TSI	111
+FPS	T.30 phase C page reception	112
+FET	Post page message	113

† AT precedes all responses.

Table 1–4. Fax Class 2.0 Commands (Continued)

(c) Parameters

Parameter†	Description	Is discussed on page
+FCCLASS	Service class selection parameter	115
+FMI	Request manufacturer ID	116
+FMM	Request model ID	117
+FMR	Request modem revision	118
+FAA	Adaptive answer	119
+FCC	Modem capabilities	120
+FCQ	Copy quality checking	121
+FCR	Capability to receive	122
+FCS	Current session parameters	123
+FCT	DTE phase C time-out	124
+FHS	Call termination status	125
+FIS	Current session negotiating position	128
+FLI	Local ID	129
+FLP	Indicate document to poll	130
+FMS	Minimum phase C speed	131
+FNR	Negotiations message reporting	132
+FNS	Nonstandard frame FIF parameter	133
+FPI	Local polling ID	134
+FSP	Request to poll	135
+FBO	Data bit order	136
+FBS	Buffer size	137
+FEA	Phase C received EOL alignment	138
+FLO	Flow control selection	139
+FPP	Packet protocol selection	140
+FPR	Serial port rate selection	141

† AT must precede all parameters.

Table 1–5. Voice Commands

Command†	Description	Is discussed on page
#BDR	Select baud rate (turn off autobaud)	142
#CID	Enable caller ID	143
#CLS	Select data, fax or voice	144
#MFR?	Identify manufacturer of modem	145
#REV?	Identify supervisor code revision level of modem	146
#VBQ	Query buffer size	147
#VBS	Bits per sample (compression factor)	148
#VBT	Beep tone timer	149
#VCI?	Identify compression method	150
#VGR	Select voice receive gain	151
#VGT	Select voice transmit gain	152
#VLS	Voice line select	153
#VRA	Ringback goes away timer	154
#VRN	Ringback never came timer	155
#VRX	Voice receive	156
#VSD	Enable silence deletion	157
#VSK	Buffer skid setting	158
#VSM	Select compression method and sampling rate	159
#VSP	Silence detection period	160
#VSR	Sampling rate selection	161
#VSS	Silence detection tuner	162
#VTD	DTMF tone reporting	163
#VTS	Generate tone signals	164
#VTX	Voice transmit	165

† AT must precede all commands.

Table 1–6. DSVD Commands (optional)

Command [†]	Description	Is discussed on page
–SAD	Set the number of audio packet delay	167
–SAT	Select audio device	168
–SHG	Select handset input gain	169
–SHV	Select handset volume	170
–SMG	Select microphone gain	171
–SPH?	Query auxiliary phone hook status	172
–SSA	Select audio compression algorithm	173
–SSE	Enable/disable DSVD	174
–SSN	Disable/enable sequence numbers for audio packets	175
–SSV	Select speaker volume	176

[†] AT must precede all commands.

Table 1–7. VoiceView Commands

Command†	Description	Is discussed on page
+FCLASS	Mode selection	177
+FLO	Flow control	178
+FMI?	Identify DCE manufacturer	179
+FMM?	Identify DCE model	180
+FMR?	Identify DCE revision	181
+FPR	Select DTE/DCE interface rate	182
–SCD	Capabilities data	183
–SDA	Originate action control	184
–SDR	Modem data mode response control	185
–SDT	Date	186
–SEM	Erase message	187
–SER?	Error status	188
–SEV	Event message suppression	189
–SFR	Fax data mode response control	190
–SIC	Reset capabilities data to default setting	191
–SIP	Initialize VoiceView parameters	192
–SKA	Keep alive timer	193
–SMT	Telephone handset mute control	194
–SOR	Reject or overflow system messages	195
–SQR	Capabilities query response control	196
–SRG	Ring generation count	197
–SRJ	Reject data mode request	198
–SRM	Retrieve message	199
–SSP	Set VoiceView transmission speeds	200
–SSQ	Start capabilities query	201
–STM	Time	202

† AT must precede all commands.

Table 1–7. VoiceView Commands (Continued)

Command†	Description	Is discussed on page
–STT	Telephone handset transaction tone control	203
–SVR	VoiceView data mode response control	204

† AT must precede all commands.

Table 1–8. Help Commands

Command†	Description	Is discussed on page
\$	Basic	208
&\$	Extended ampersand	209
D\$	Dial	210
Sn?	S register contents	211
S\$	S register description	212

† AT must precede all commands.

1.3 S Register Summary

The S Registers are memory-mapped registers that allow you to set and store the modem's operating parameters. Table 1–9 summarizes the S registers.

Table 1–9. S Registers

S Register	Description
S0	Sets the number of rings on which to answer when modem is set to auto answer mode (default = 1).
S1	Stores the number of rings received (default = 0)
S2	Stores the ASCII decimal code for the escape code (+) character (default = 43)
S3	Stores the ASCII decimal code for the carriage return <cr> character (default = 13)
S4	Stores the ASCII decimal code for the line feed <lf> character (default = 10)
S5	Stores the ASCII decimal code for the backspace character <bs> (default = 8)
S6	Contains the time (number of seconds) that the modem waits before executing a dial string (default = 2)
S7	Stores the time (in seconds) that the modem waits to receive a carrier signal after executing a dial string or answering before returning on-hook and sending a NO CARRIER response code to the DTE (default = 60)
S8	Stores the time (in seconds) for the pause option (,) in the dial command
S9	Stores the time (in tenths of a second) that the modem waits to receive a carrier signal before recognizing a valid connection (default = 6). Note that the modem ignores settings greater than 2400 bps due to the length of handshaking sequences.
S10	Stores the time (in tenths of a second) that the modem waits after the loss of a carrier before disconnecting (default = 7)
S11	Stores the duration and spacing (in milliseconds) of dialed touch tones (default = 70)
S12	Stores the duration (in fiftieths of a second) for the guard time of the escape sequence (default = 50)
S13	Options register (default = 0). Bit-mapped options are selected/deselected by the binary representation of the following decimal values:
1	Resets the modem when the DTR is not asserted
2	Resets the non-MNP transmit buffer from 1.5K bytes to 128 bytes
4	Sets the backspace key to delete
8	Autodials the number stored in NVRAM location 0 when the DTR is asserted

Table 1–9. S Registers (Continued)

S Register	Description
S13 (continued)	16 Autodials the number stored in NVRAM location 0 if the software is reset or when the modem is powered up
	32 Disables V.32bis ASL mode
	64 Disables quick retrains
	128 Disconnects on the escape code
S14	Reserved
S15	Contains the ARQ options register (default = 0). Bit-mapped options are selected/deselected by the binary representation of the following decimal values:
	1 Disables ARQ/MNP for V.22
	2 Disables ARQ/MNP for V.22bis
	4 Disables ARQ/MNP for V.32/V.32bis/V.32terbo
	8 Disables MNP handshake
	16 Disables MNP level 4
	32 Disables MNP level 3
	64 MNP incompatibility. When S15 = 64, it performs the following:
	<input type="checkbox"/> Increases time allowed to establish connection with some modem manufacturers' products by 1 second <input type="checkbox"/> Changes MNP link identifier from a Texas Instruments standard to generic for compatibility with some modem manufacturers' products <input type="checkbox"/> Eliminates remote end echo; this prevents connecting to itself if the remote DCE echoes the MNP link request <input type="checkbox"/> Changes the delay of some control characters for compatibility with some modem manufacturers' products
S16	128 Disables V.42 operation
	Contains the test mode (default = 0) settings as follows:
	1 Reserved 2 Dial test. When a touch-tone digit is entered from the DTE in a dial string, the tone continues until a carriage return character from the DTE aborts it (for testing purposes).

Table 1–9. S Registers (Continued)

S Register	Description
S16	4 Test pattern generation. A test pattern is generated by the modem and sent out over the phone link. Pressing any key terminates this function.
	8–128 Reserved
S17	Reserved
S18	Stores the time (in seconds) for the diagnostics test mode, &T. A value of 0 disables the timer; a value of 1–255 is acceptable (default = 0).
S19	Stores the duration (in minutes) for the inactivity timer. If the modem senses no data transmission for a period of time exceeding the nonzero value in this register, it disconnects the call. A value of 0 disables the function (default = 0). All other values enable it.
S20	Reserved
S21	Stores the lengths (in 10-ms increments) of break characters sent from the modem to the DTE (default = 10). This is used in MNP or V.42 mode only.
S22	Stores the ASCII decimal code for the XON character (default = 17)
S23	Stores the ASCII decimal code for the XOFF character (default = 19)
S24	Reserved
S25	Contains the DTR recognition time (in hundredths of a second, default = 20)
S26	Reserved
S27	Connects bit-mapped operations. Contains various modulation and error correction control flags (default = 0).
	1 V.21/Bell 103 mode select (default = Bell 103)
	2 Enables unencoded modulation in V.32 mode
	4 Disables V.32 modulation
	8 Disables 2100-Hz answer tone
	16 Enables V.23 fallback mode
	32 Disables V.32bis mode
	64 Reserved
	128 Software compatibility mode. All connect messages equal to or greater than 9600 bps are expressed as CONNECT 9600.

Table 1–9. S Registers (Continued)

S Register	Description
S28	V.32 handshaking time (0–25.5 seconds)
	0 Eliminates the V.32 answer tones for faster connection
	8 Default time. All times are in tenths of a second.
	255 Disables all connections, except V.32 9600 bps
S29	V.21 answer mode fallback timer (in one-tenth-second intervals, default = 20)
S30	VoiceView deadman timer function (default = 0) (voice modems only)
S31	TAD audio level adjust (default = 128)
S32	Connects bit-mapped operations. Contains various modulation and call control flags (default = 2)
	1 V.8 call indicate enable
	2 Enables V.8 mode (default)
	4 Disables V.FC modulation
	8 Disables V.34 modulation
	16 Disables V.34+ modulation (Note: some modem references show reserved)
	34 Enables V.90, disables x2
	66 Enables x2, disables V.90
S33	V.34 & V.34+ connection-setup bit-mapped control flags (default = 0)
	1 Disables 2400 symbol rate
	2 Disables 2743 symbol rate
	4 Disables 2800 symbol rate
	8 Disables 3000 symbol rate
	16 Disables 3200 symbol rate
	32 Disables 3429 symbol rate
	64 Reserved
	128 Disables shaping

Table 1–9. S Registers (Continued)

S Register	Description
S34	V.34 & V.34+ connection-setup bit-mapped control flags (default = 0)
1	Disables 8S-2D trellis encoding
2	Disables 16S-4D trellis encoding
4	Disables 32S-2D trellis encoding
8	Disables 64S-4D trellis encoding
16	Disables nonlinear coding
32	Disables TX level deviation
64	Disables preemphasis
128	Disables precoding
S35 – S37	Reserved
S38	When the DTR drops during an ARQ call, this register sets up an optional delay (in seconds) before the modem is forced to hang up and clear the transmit buffer. This allows time for a remote modem to acknowledge receipt of all transmitted data before it is disconnected (default = 0). The modem immediately hangs up when the DTR drops.
S39	Reserved for international usage
S40	Reserved for international usage
S41	Bit mapped (default = 0)
	Bit 0: enables/disables distinctive ring
	Bits 1–2: (voice only)
	00 = full-duplex speaker phone mode
	01 = half-duplex speaker phone mode
	Bit 3: message waiting
	Bits 4–7: reserved

Table 1–9. S Registers (Continued)

S Register	Description
S42	Bit mapped (default = 0) Bits 0–2: GPI definition (Macintosh only): 000 = not active 001 = CD signal 010 = RI signal 011 = DSR signal 100 = ARQ signal 101 = undefined 110 = undefined 111 = undefined Bits 3–7: reserved

1.4 V.80 Embedded Command Support (optional)

Table 1–10 is a list of the supported embedded commands. All embedded commands are available while the modem is in the online mode only. Any embedded command transmitted while the modem is not connected and online is ignored. All embedded commands have an 8-bit format. In the case of 7-bit commands, the eighth bit must be 0.

1.4.1 General Command Line Format

An *embedded command line* is made up of two elements: the *prefix* and the *body*. The command line prefix consists of the **in** and escape character, EM, which is the ASCII character “^Y” (Ctrl–Y), 19H or 99H. The body is made up of an individual command and all associated parameters. The command character itself always follows the command prefix. All extended commands contain a length indicator and a parameter body. The size of this body is determined by value of the length field. The modem is capable of accepting 95 characters in the body.

1.4.2 Executing Commands

Upon reception of the last command character, the modem executes the command. If a character is not recognized as a valid command or execution of any command results in an error, execution of the command line is terminated at that point and all subsequent data on the *line* is ignored.

1.4.3 List of Embedded Commands

Table 1–10 lists the embedded commands. All the commands listed are preceded by a shield character (Ctrl–Y).

Table 1–10. V.80 Embedded Commands

Command (Hexadecimal)	Description	Command (Hexadecimal)	Description
2A†	TX audio packet	AD	TX/RX 13h, 19h pattern
2D†	TX data packet	AE	TX/RX 13h, 99h pattern
3A†	RX audio packet	AF	TX/RX 13h, 11h pattern
3D†	RX data packet	B0	TX: begin transparent mode RX: HDLC frame abort detected
42	RTS off	B1	TX: start frame mode or end current frame RX: end of frame detected CRC valid if DCE checked
43	RTS on	B2	TX: transmit abort RX: end of frame error
44	DTR off	B3	TX: RX enter frame hunt mode
45	DTR on	B4	RX: transmit underrun
5C	TX/RX one shield character	B5	RX: transmit data overrun
5D	TX/RX two shield characters	B6	RX: receive data overrun
62	CTS off	BA	TX: terminate carrier RX: carrier lost
63	CTS on	BB	TX: enter online command state
76	TX/RX one 99h character	BC	TX: request rate negotiation RX: rate negotiation requested
77	TX/RX two 99h characters	BD	TX: request retrain RX: retrain requested
A0	TX/RX 11h character (XON)	BE	TX: set maximum rate RX: rate negotiation/retrain complete indicate new rate
A1	TX/RX 13h character (XOFF)		
A2	TX/RX two 11h characters (XON)		
A3	TX/RX two 13h characters (XOFF)		
A4	TX/RX 19h, 99h pattern		
A5	TX/RX 19h, 11h pattern		
A7	TX/RX 99h, 19h pattern		
A8	TX/RX 99h, 11h pattern		
A9	TX/RX 99h, 13h pattern		
AA	TX/RX 11h, 19h pattern		
AB	TX/RX 11h, 99h pattern		
AC	TX/RX 11h, 13h pattern		

† Operating system independent internal data/fax/voice modem only.

1.5 Basic Commands

The following sections list and describe the basic commands necessary to communicate manually with the modem.

Command Syntax	A/
Description	Reexecutes the last command that was executed. This command does not require the AT prefix or a carriage return.
Arguments	None
Aborting Events	None

Command Syntax	A>
Description	Continuously reexecutes the last command that was executed. The S6 register value is used as a delay between reexecutions. This command does not require the AT prefix or a carriage return.
Arguments	None
Aborting Events	Any key pressed during the execution delay period terminates the operation.

AT (Command Prefix) *Basic Commands*

Command Syntax	AT <command>
Description	The prefix to modem commands. It can be typed in lowercase or uppercase, but not mixed case. AT must precede all commands except the A/, +++, and A> commands. All characters preceding AT are ignored. Entering AT notifies the modem to clear the previous command buffer in preparation for accepting a new command. All characters that follow AT are treated as commands until a line terminator character (stored in the S3 register) is received.
Arguments	None
Aborting Events	None
Other	In order for the modem to accept the AT prefix, there must be 1 ms of inactivity preceding the command on the DTE TD line.

Command Syntax	ATA
Description	Executes the answer sequence. The modem goes off hook, waits for billing delay time, then sends an answer tone and initiates a handshake sequence.
Arguments	None
DTE Interface	<p>The DSR is asserted after the modem goes off hook if the following are true:</p> <ul style="list-style-type: none"><input type="checkbox"/> The modem is not in test mode (following ITU-T V.22bis recommendation, self-test section).<input type="checkbox"/> AT&S0 is not in test mode (see page 77).
Aborting Events	<p>Any key pressed during the answer sequence aborts the command and returns the modem to the command mode.</p> <ul style="list-style-type: none"><input type="checkbox"/> DTR is low if AT&D (see page 65) is not equal to 1 after abort action.<input type="checkbox"/> DTR is low when the time stored in S7 register expires.
Other	The speaker is activated when the modem goes off hook, as set by the ATM command (see page 39). Any other commands that follow ATA are ignored.

B (US/ITU-T Answer Sequence) *Basic Commands*

Command Syntax	ATB <argument>
Description	Selects between the US answer sequence (2225 Hz) and ITU-T answer sequence (2100 Hz and 2250 Hz).
Arguments	0 or 1 0 ITU-T V.25 answer sequence. Also answers calls originating outside the US or Canada (default) 1 Bell answer tone
Aborting Events	None
Other	ATB0 is required to activate the AT&G1 and AT&G2 commands (see page 67).

Command Syntax**ATD** <argument>**Description**

The modem goes off hook and enters the originate mode (unless the R argument is used). It then waits the specified time (number of seconds stored in the S6 register) if the ATX command (see page 46) is set to 0, 1, 3, or 5, and dials the string that follows. The modem establishes a data connection and goes into a data mode (or command mode if using the “;” argument) or fails to establish a data connection and reverts to the command mode. Call progress response codes (if any) are received by the DTE (see the ATQ command on page 42, the ATV command on page 45, and the ATX command on page 46).

Arguments

The following arguments are available:

0–9 Numeric digits

#,* Extended DTMF tones

, Pause. The modem pauses for a number of seconds (stored in the S8 register) before executing the following commands or arguments in the dial string.

; Returns to the command mode after dialing is completed

! Flash switch hook. The modem goes off hook for 0.5 seconds, goes on hook for 0.5 seconds, then goes off hook again. This command transfers calls to another extension.

T Touch tone dialing. The S11 register sets the duration and spacing of touch tones.

P Pulse dialing. The modem pulse dials using the AT&P command (see page 75).

@ Waiting for an answer. The modem dials a string. If it detects at least one ring signal, it waits for a specified time (stored in the S7 register) listening for 5 seconds of silence. It then executes the rest of the dial string that follows the @ command. This command is functional only when the ATX command is set to 3, 4, 5, or 6 (see page 46).

R Reverse frequencies. The modem reverses the originate and answer frequencies so that it originates in answer mode.

Sn The modem dials the string found in NVRAM location n (n = 0–3).

“ Quote mode. When inserted at the beginning of a dial string, it can be followed by dialable letters in either touch tone or pulse dial modes. Quote mode also is used to indicate termination of dial string. The second quote is not required unless other commands follow the dial string.

/ Short delay. There is a 125-ms delay before the modem executes the dial string. This command also can be used as a nondial command.

- W** Waits for a second dial tone before proceeding with dial-tone execution. This feature is active when result code option ATX3 or greater has been issued. If the modem is set to ATX2 or lower, the modem interprets W as a comma (2-second pause default value or the value in the S8 register).
- L** The modem dials the number stored in the last dialed buffer. This buffer is reset by an ATZ command (see page 57) or by a power on reset. ATDL? displays the number in the buffer.

If no argument is specified, the modem goes off hook and waits for an answer tone in preparation for making a data connection.

DTE Interface

If AT&S1, DSR is asserted after dialing, when the modem detects the remote modem's answer tone. DSR is always asserted if AT&S0 (see page 77).

Aborting Events

Pressing any key aborts the dialing command. When a dial string is terminated, any additional commands following the dial string are not executed. Other terminating events include:

- ☐ The modem cannot establish a data connection.
- ☐ No carrier is sensed after the specified time in S7 register has elapsed.
- ☐ The modem cannot detect a ring signal or silence during processing of an @ command.
- ☐ The modem detects a busy signal and the ATX argument is set to 3, 4, 5, or 6 (see page 46).
- ☐ The modem detects no dial tone and the ATX argument is set to 2, 4, or 6 (see page 46).

Other

The modem goes off hook and dials as soon as it detects a dial tone if the ATX command is set to 2, 4, or 6 (see page 46).

The speaker is activated when the modem goes off hook, as set by the ATM command (see page 39).

A dial string can include up to 60 characters, not including the AT prefix, a carriage return <cr>, and spaces.

When in voice mode (#CLS = 8):

- 1) The modem attempts to determine when the remote has picked up the telephone line and once this determination has been made, the VCON message is sent to the DTE. This determination is initially made based upon ringback detection and disappearance. (See #VRA and #VRN commands.)
- 2) Once connected in voice mode, the modem immediately enters the command state and switches to online voice command mode. This mode enables unsolicited reporting of DTMF and answer tones to the DTE.

E (Echo) *Basic Commands*

Command Syntax	ATE <argument>
Description	Enables the echo of commands to the DTE when in the command mode. Echo is initialized by DIP switch #4. Echo also is initialized by the system reset command (see the ATZ command on page 57).
Arguments	0 or 1 0 The modem does not echo commands to the DTE in command mode. 1 The modem echoes commands to the DTE in the command mode.
Aborting Events	None
Other	The echo is turned off when parsing a command line and reverts to the state defined by the ATE command.

Command Syntax	ATF <argument>
Description	Enables the modem to echo transmitted data to the DTE in an online mode.
Arguments	0 or 1 0 Transmitted data is echoed to the DTE in an online mode. 1 Transmitted data is not echoed to the DTE in an online mode (default). If no argument is given, an argument of 0 is assumed.
Aborting Events	None

H (On/Off Hook) *Basic Commands*

Command Syntax	ATH <argument>
Description	Connects the modem with the phone line.
Arguments	0 or 1 0 Modem goes on hook (opens phone line relay) 1 Modem goes off hook (closes phone line relay)
Aborting Events	None
Other	When in Voice Mode: <ol style="list-style-type: none">1) The H command forces #CLS = 0, but does not destroy any of the voice parameter settings such as #VBS and #VSP. Therefore, the DTE cannot issue an H command and pursue another voice call unless it issues a subsequent #CLS = 8 command. It does not have to reestablish the voice parameter settings again, unless a change in the settings is desired.2) The #BDR setting is forced back to 0, reenabling autobaud.3) If the #VLS setting is set to select a device which is not the telephone line (such as a local handset or microphone), the H command deselects this device and reselects the normal default setting (#VLS = 0). Normally, the DTE does not issue the H command while connected to a local device such as a handset, because merely selecting this device results in VCON. The normal sequence of terminating a session with such a device is to use the #VLS command to select the telephone line, which by definition makes sure it is on hook.

Command Syntax	ATI <argument>
Description	Returns various information screens to the DTE.
Arguments	<p>0, 1, 2, 3, 4, 5, 6, 7, 9, or 11</p> <p>0 A 4-digit product code, yyyy (where y is the maximum speed divided by 10 and x is a revision identifier), is sent to the DTE (default).</p> <p>1 The modem performs a checksum operation on the supervisor code and sends the results to the DTE.</p> <p>2 The modem tests RAM by writing and reading alternating hex bytes 55h and AAh into the RAM and returns a response (ERROR or OK) to the DTE.</p> <p>3 The modem returns the product ID string. This string contains the company name, the product line name, and the speed of the product. Additionally, some special features like fax and voice may be listed.</p> <p>4 The modem sends a screen of data to the DTE indicating the following present configuration settings:</p> <ul style="list-style-type: none"> <input type="checkbox"/> B, E, F, M, Q, V, and X commands <input type="checkbox"/> DTE baud rate, parity, word length, dial type (pulse or tone), and H setting (on or off hook) <input type="checkbox"/> &A, &B, &C, &D, &G, &H, &I, &K, &M, &N, &P, &R, &S, &T, and &Y <input type="checkbox"/> S register values from S0–S51 <input type="checkbox"/> The number dialed last <p>5 The modem sends two screens of data to the DTE, indicating the present configuration of the following commands stored in each NVRAM template:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Dial type (for B, F, M, X commands) <input type="checkbox"/> E, Q, and V commands <input type="checkbox"/> Stored default baud rate, parity, and word length <input type="checkbox"/> &A, &B, &G, &H, &I, &K, &M, &N, &P, &R, &S, &T, and &Y settings <input type="checkbox"/> &D and &C commands indicate: <ul style="list-style-type: none"> ■ S register values from S0, S2–S15, S19, S21–S23, S25, S27, S28, S29, S34, S38, S51 ■ Phone numbers stored in locations 0 through 3

- 6 The modem sends a diagnostic screen to the DTE with the following information from the previous data connection:
 - ☐ Number of characters sent, received, lost
 - ☐ Number of octets (compressed characters) sent and received
 - ☐ Number of blocks sent, received, and resent
 - ☐ Number of retrains requested and granted
 - ☐ Number of line reversals
 - ☐ Number of protocol blocks in error
 - ☐ Number of link time-outs and link naks
 - ☐ Negotiated settings for data compression (on/off), equalization (long/short; contained in S15, bit 1)
 - ☐ Fallback enabled/disabled indicates whether the modem negotiated a fallback during connection
 - ☐ Error correcting protocol (LAPM, MNP, or NONE)
 - ☐ DCE speed
 - ☐ Disconnect reason
 - ☐ Duration of the last call
- 7 Product configuration. One screen of data is sent to the DTE; this screen contains the following information:
 - ☐ Product type
 - ☐ Options: V.32
 - ☐ Clock frequency
 - ☐ EPROM size
 - ☐ RAM size
 - ☐ Code date
 - ☐ Code revision
- 8 Black list screen (international products only)

- 9 Plug-and-Play feature. The following shows an example of the string issued by the modem:

```
(                                ; Begin PnP
1.0                              ; Plug-and-Play Version
                                ; 1.0

                                ; *note: ASCII vs. Binary
                                ; representation

TEX                              ; EISA Manufacturer ID
                                ; (TBD)

{MODEMNAME} FAX INT ( or EXT )

\                                ; No serial number
\MODEM                          ; Class ID
\TIA578                          ; Class 1 FAX
{MODEMNAME} FAX INT ( or EXT ) ; User Name
)                                ; End PnP
```

- 11 Diagnostics. One screen of data is sent to the DTE; this screen contains the following information pertaining to the last link:

- ☐ Modulation
- ☐ Carrier frequency
- ☐ Symbol rate
- ☐ Trellis code
- ☐ Nonlinear encoding status
- ☐ Precoding status
- ☐ Preemphasis level
- ☐ Receive/transmit level
- ☐ Signal/noise ratio
- ☐ Near echo loss
- ☐ Far echo loss
- ☐ Round-trip delay time

Aborting Events

<Ctrl>C or <Ctrl>K aborts the screen display. The display of screens can be halted by <Ctrl>S and restarted by any key.

L (Volume) *Basic Commands*

Command Syntax	ATL <argument>
Description	Controls the modem speaker volume
Arguments	0–3
	0 Low volume
	1 Low volume
	2 Medium volume (default)
	3 High volume
Aborting Events	None

Command Syntax	ATM <argument>
Description	Controls the modem speaker
Arguments	0–3 <ul style="list-style-type: none">0 Turns the speaker off1 Turns the speaker on during dial string execution until a carrier is detected or the modem goes on hook (default)2 Turns the speaker on3 Turns the speaker on after last digit in dial string is dialed; turns the speaker off when a carrier is detected or until the time stored in the S7 register has elapsed
Aborting Events	None

O (Online) *Basic Commands*

Command Syntax	ATO <argument>
Description	Returns the modem to a previously established connection
Arguments	<p>0 or 1</p> <p>0 Issued when modem is off hook and when S12 = 0 for detection of escape code (online command mode). The modem remains online and returns to a connected data transfer mode (default).</p> <p>1 Issued when modem is in online command mode. Causes the modem to return to the data mode and at the same time initiates a retrain (but only if speeds are above 1200 baud).</p> <p>If this command is issued in an on hook state, an OK response code is returned.</p>
Aborting Events	None
Other	If the modem is in an online command mode, the ATO command terminates the online command mode and returns the modem to the data mode.

Command Syntax	ATP
Description	Sets the modem in pulse mode when dialing a string. This is the default setting on power up.
Arguments	None
Aborting Events	None

Q (Quiet) *Basic Commands*

Command Syntax	ATQ <argument>
Description	Enables and disables a display of result codes.
Arguments	0–2 0 Result codes are sent to the DTE (default). 1 Result codes are not sent to the DTE. 2 Result codes are not sent when in the answer mode.
Aborting Events	None
Other	The quiet mode, where no results are sent to the DTE, is used in some applications. Such applications are printer/modem installations, where publishing the result code to the DTE is undesirable.

Command Syntax	ATS $r = n$ ATS $r.b = n$
Description	Modifies an S register setting or sends the contents to the DTE.
Arguments	ATS $r = n$ r The S register number n The value ($0 \leq n \leq 255$) of the S register. Any other value for n results in an ERROR response code being issued. ATS $r.b = n$ <div>Note: ATS Command A period must immediately follow r for b to be a valid value.</div> r The S register number b The S register bit position n The value (0 or 1) of the S register bit
Aborting Events	None

T (Tone Dialing) *Basic Commands*

Command Syntax	ATT
Description	Sets the modem in touch-tone-dialing mode for dialing strings
Arguments	None
Aborting Events	None

Command Syntax	ATV <argument>
Description	Transmits result codes to the DTE. Result codes can be either verbal or numeric
Arguments	0 or 1 0 Enables numeric result codes. Numeric codes are followed by the terminating character found in the S3 register [default is carriage return, <cr> (0Dh)] (default). 1 Enables verbal result codes. Verbal codes are preceded by the terminating character contained in the S3 register [default is carriage return, <cr> (0Dh)] and followed by the character contained in the S4 register [default is line feed, <lf> (0Ah)].
Aborting Events	None

X (Result Code Options) *Basic Commands*

Command Syntax **ATX** <argument>

Description Selects and deselects result codes and call progress options according to the result codes in Table 1–11

Arguments 0–7

0 Basic subset is selected (see Table 1–11) (default).

1 Extended subset is selected (see Table 1–11).

2–6 Advanced call progress codes are selected (see Table 1–11).

7 Reserved

Table 1–11. Result Codes

Result Code	Argument						
	X0	X1	X2	X3	X4	X5	X6
0/OK	X	X	X	X	X	X	X
1/CONNECT	X	X	X	X	X	X	X
2/RING	X	X	X	X	X	X	X
3/NO CARRIER	X	X	X	X	X	X	X
4/ERROR	X	X	X	X	X	X	X
5/CONNECT 1200		X	X	X	X	X	X
6/NO DIAL TONE			X		X		X
7/BUSY				X	X	X	X
8/NO ANSWER [†]				X	X	X	X
9/RESERVED							
10/CONNECT 2400		X	X	X	X	X	
11/RINGING					X	X	X
13/CONNECT 9600		X	X	X	X	X	
18/CONNECT 4800		X	X	X	X	X	X
20/CONNECT 7200		X	X	X	X	X	X
21/CONNECT 12 000		X	X	X	X	X	X
25/CONNECT 14 400		X	X	X	X	X	X
43/CONNECT 16 800		X	X	X	X	X	X
85/CONNECT 19 200		X	X	X	X	X	X
91/CONNECT 21 600		X	X	X	X	X	X
99/CONNECT 24 000		X	X	X	X	X	X

[†] Requires @; replaces NO CARRIER

Table 1–11. Result Codes (Continued)

Result Code	Argument						
	X0	X1	X2	X3	X4	X5	X6
103/CONNECT 26 400		X	X	X	X	X	X
107/CONNECT 28 800		X	X	X	X	X	X
151/CONNECT 31 200		X	X	X	X	X	X
155/CONNECT 33 600		X	X	X	X	X	X
256/CONNECT 28 000		X	X	X	X	X	X
260/CONNECT 29 333		X	X	X	X	X	X
264/CONNECT 30 666		X	X	X	X	X	X
268/CONNECT 32 000		X	X	X	X	X	X
180/CONNECT 33 333		X	X	X	X	X	X
272/CONNECT 34 666		X	X	X	X	X	X
276/CONNECT 36 000		X	X	X	X	X	X
184/CONNECT 37 333		X	X	X	X	X	X
280/CONNECT 38 666		X	X	X	X	X	X
284/CONNECT 40 000		X	X	X	X	X	X
188/CONNECT 41 333		X	X	X	X	X	X
192/CONNECT 42 666		X	X	X	X	X	X
196/CONNECT 44 000		X	X	X	X	X	X
200/CONNECT 45 333		X	X	X	X	X	X
204/CONNECT 46 666		X	X	X	X	X	X
208/CONNECT 48 000		X	X	X	X	X	X
212/CONNECT 49 333		X	X	X	X	X	X
216/CONNECT 50 666		X	X	X	X	X	X
220/CONNECT 52 000		X	X	X	X	X	X
224/CONNECT 53 333		X	X	X	X	X	X
228/CONNECT 54 666		X	X	X	X	X	X
232/CONNECT 56 000		X	X	X	X	X	X
236/CONNECT 57 333		X	X	X	X	X	X

X (Result Code Options) *Basic Commands*

Other

Table 1–12 contains some special dialing functions. These functions are activated by the value of the ATX command. Note that neither *adaptive dialing* nor *fast dialing* can operate unless the ATX command is programmed for it. The second (*wait for second dial tone*) and third functions (*wait for answer*) implement a fixed delay only if the ATX command is not programmed for them.

Table 1–12. *Special Dialing Functions*

Dialing Function	Argument						
	X0	X1	X2	X3	X4	X5	X6
Adaptive dialing			X	X	X	X	X
Wait for second dial tone (W)				X	X	X	X
Wait for answer (@)				X	X	X	X
Fast dialing			X		X		X

The *adaptive dialing* function dials the first digit of a dial string using touch tone and senses whether the phone-line dial tone is terminated. If phone-line dial tone is terminated, it continues to dial the string using tone dialing. If phone-line dial tone is not terminated, it reverts to pulse dialing and dials the entire string, including the first digit.

The *wait for second dial tone* function dials the digits in the dial string before the W, then senses a second dial tone before continuing to dial the rest of the digits. If no dial tone is sensed after a specified time (stored in the S7 register), the modem sends a NO CARRIER code to the DTE.

Fast dialing dials a dial string as soon as it detects a dial tone.

Aborting Events

None

/ARQ Result Codes

The codes below are comprehensive.

AT&A0 disables or AT&A1 (see page 62) enables the /ARQ codes shown below. A setting of ATX1 or greater is required to enable the result codes. The default is AT&A1. Setting the S27 register to 128 results in codes for connections 7200 and above being displayed as 9600 messages.

- ☐ 14/CONNECT/ARQ (valid only when X is set to 0)
- ☐ 15/CONNECT 1200/ARQ
- ☐ 16/CONNECT 2400/ARQ
- ☐ 19/CONNECT 4800/ARQ
- ☐ 24/CONNECT 7200/ARQ
- ☐ 17/CONNECT 9600/ARQ
- ☐ 22/CONNECT 12 000/ARQ

- ☐ 26/CONNECT 14 400/ARQ
- ☐ 47/CONNECT 16 800/ARQ
- ☐ 88/CONNECT 19 200/ARQ
- ☐ 94/CONNECT 21 600/ARQ
- ☐ 100/CONNECT 24 000/ARQ
- ☐ 104/CONNECT 26 400/ARQ
- ☐ 108/CONNECT 28 800/ARQ
- ☐ 152/CONNECT 31 200/ARQ
- ☐ 156/CONNECT 33 600/ARQ
- ☐ 257/CONNECT 28 000/ARQ
- ☐ 261/CONNECT 29 333/ARQ
- ☐ 265/CONNECT 30 666/ARQ
- ☐ 269/CONNECT 32 000/ARQ
- ☐ 181/CONNECT 33 333/ARQ
- ☐ 273/CONNECT 34 666/ARQ
- ☐ 277/CONNECT 36 000/ARQ
- ☐ 185/CONNECT 37 333/ARQ
- ☐ 281/CONNECT 38 666/ARQ
- ☐ 285/CONNECT 40 000/ARQ
- ☐ 189/CONNECT 41 333/ARQ
- ☐ 193/CONNECT 42 666/ARQ
- ☐ 197/CONNECT 44 000/ARQ
- ☐ 201/CONNECT 45 333/ARQ
- ☐ 205/CONNECT 46 666/ARQ
- ☐ 209/CONNECT 48 000/ARQ
- ☐ 213/CONNECT 49 333/ARQ
- ☐ 217/CONNECT 50 666/ARQ
- ☐ 221/CONNECT 52 000/ARQ
- ☐ 225/CONNECT 53 333/ARQ
- ☐ 229/CONNECT 54 666/ARQ
- ☐ 238/CONNECT 56 000/ARQ
- ☐ 239/CONNECT 57 333/ARQ

X (Result Code Options) *Basic Commands*

Use AT&A2 (see page 62) and a setting of ATX1 or greater to substitute the following 2400 through 33600 bps result codes shown below. These codes display the call's modulation, V.90, x2, VFC, or V32, as well as ARQ or non-ARQ status.

- ☐ 120/CONNECT 2400/V34
- ☐ 38/CONNECT 4800/V32
- ☐ 124/CONNECT 4800/V34
- ☐ 40/CONNECT 7200/V32
- ☐ 128/CONNECT 7200/V34
- ☐ 33/CONNECT 9600/V32
- ☐ 132/CONNECT 9600/V34
- ☐ 41/CONNECT 12 000/V32
- ☐ 136/CONNECT 12 000/V34
- ☐ 45/CONNECT 14 400/V32
- ☐ 139/CONNECT 14 400/VFC
- ☐ 140/CONNECT 14 400/V34
- ☐ 143/CONNECT 16 800/VFC
- ☐ 144/CONNECT 16 800/V34
- ☐ 147/CONNECT 19 200/VFC
- ☐ 148/CONNECT 19 200/V34
- ☐ 97/CONNECT 21 600/VFC
- ☐ 111/CONNECT 21 600/V34
- ☐ 101/CONNECT 24 000/VFC
- ☐ 113/CONNECT 24 000/V34
- ☐ 105/CONNECT 26 400/VFC
- ☐ 115/CONNECT 26 400/V34
- ☐ 109/CONNECT 28 800/VFC
- ☐ 117/CONNECT 28 800/V34
- ☐ 153/CONNECT 31 200/V34
- ☐ 157/CONNECT 33 600/V34
- ☐ 182/CONNECT 33 333/x2
- ☐ 186/CONNECT 37 333/x2
- ☐ 190/CONNECT 41 333/x2
- ☐ 194/CONNECT 42 666/x2
- ☐ 198/CONNECT 44 000/x2
- ☐ 202/CONNECT 45 333/x2
- ☐ 206/CONNECT 46 666/x2
- ☐ 210/CONNECT 48 000/x2
- ☐ 214/CONNECT 49 333/x2
- ☐ 218/CONNECT 50 666/x2
- ☐ 222/CONNECT 52 000/x2
- ☐ 226/CONNECT 53 333/x2

- ☐ 230/CONNECT 54 666/x2
- ☐ 234/CONNECT 56 000/x2
- ☐ 258/CONNECT 28 000/V90
- ☐ 262/CONNECT 29 333/V90
- ☐ 266/CONNECT 30 666/V90
- ☐ 270/CONNECT 32 000/V90
- ☐ 288/CONNECT 33 333/V90
- ☐ 274/CONNECT 34 666/V90
- ☐ 278/CONNECT 36 000/V90
- ☐ 290/CONNECT 37 333/V90
- ☐ 282/CONNECT 38 666/V90
- ☐ 286/CONNECT 40 000/V90
- ☐ 292/CONNECT 41 333/V90
- ☐ 294/CONNECT 42 666/V90
- ☐ 296/CONNECT 44 000/V90
- ☐ 298/CONNECT 45 333/V90
- ☐ 300/CONNECT 46 666/V90
- ☐ 302/CONNECT 48 000/V90
- ☐ 304/CONNECT 49 333/V90
- ☐ 306/CONNECT 50 666/V90
- ☐ 308/CONNECT 52 000/V90
- ☐ 310/CONNECT 53 333/V90
- ☐ 312/CONNECT 54 666/V90
- ☐ 314/CONNECT 56 000/V90
- ☐ 122/CONNECT 2400/ARQ/V34
- ☐ 39/CONNECT 4800/ARQ/V32
- ☐ 126/CONNECT 4800/ARQ/V34
- ☐ 44/CONNECT 7200/ARQ/V32
- ☐ 130/CONNECT 7200/ARQ/V34
- ☐ 37/CONNECT 9600/ARQ/V32
- ☐ 134/CONNECT 9600/ARQ/V34
- ☐ 42/CONNECT 12 000/ARQ/V32
- ☐ 138/CONNECT 12 000/ARQ/V34
- ☐ 46/CONNECT 14 400/ARQ/V32
- ☐ 141/CONNECT 14 400/ARQ/VFC
- ☐ 142/CONNECT 14 400/ARQ/V34
- ☐ 145/CONNECT 16 800/ARQ/VFC
- ☐ 146/CONNECT 16 800/ARQ/V34
- ☐ 149/CONNECT 19 200/ARQ/VFC
- ☐ 150/CONNECT 19 200/ARQ/V34
- ☐ 98/CONNECT 21 600/ARQ/VFC
- ☐ 112/CONNECT 21 600/ARQ/V34

X (Result Code Options) *Basic Commands*

- ☐ 102/CONNECT 24 000/ARQ/VFC
- ☐ 114/CONNECT 24 000/ARQ/V34
- ☐ 106/CONNECT 26 400/ARQ/VFC
- ☐ 116/CONNECT 26 400/ARQ/V34
- ☐ 110/CONNECT 28 800/ARQ/VFC
- ☐ 118/CONNECT 28 800/ARQ/V34
- ☐ 154/CONNECT 31 200/ARQ/V34
- ☐ 158/CONNECT 33 600/ARQ/V34
- ☐ 183/CONNECT 33 333/ARQ/x2
- ☐ 187/CONNECT 37 333/ARQ/x2
- ☐ 191/CONNECT 41 333/ARQ/x2
- ☐ 195/CONNECT 42 666/ARQ/x2
- ☐ 199/CONNECT 44 000/ARQ/x2
- ☐ 203/CONNECT 45 333/ARQ/x2
- ☐ 207/CONNECT 46 666/ARQ/x2
- ☐ 211/CONNECT 48 000/ARQ/x2
- ☐ 215/CONNECT 49 333/ARQ/x2
- ☐ 219/CONNECT 50 666/ARQ/x2
- ☐ 223/CONNECT 52 000/ARQ/x2
- ☐ 277/CONNECT 53 333/ARQ/x2
- ☐ 231/CONNECT 54 666/ARQ/x2
- ☐ 235/CONNECT 56 000/ARQ/x2
- ☐ 239/CONNECT 57 333/ARQ/x2
- ☐ 259/CONNECT 28 000/ARQ/V90
- ☐ 263/CONNECT 29 333/ARQ/V90
- ☐ 267/CONNECT 30 666/ARQ/V90
- ☐ 271/CONNECT 32 000/ARQ/V90
- ☐ 289/CONNECT 33 333/ARQ/V90
- ☐ 275/CONNECT 34 666/ARQ/V90
- ☐ 279/CONNECT 36 000/ARQ/V90
- ☐ 291/CONNECT 37 333/ARQ/V90
- ☐ 283/CONNECT 38 666/ARQ/V90
- ☐ 287/CONNECT 40 000/ARQ/V90
- ☐ 293/CONNECT 41 333/ARQ/V90
- ☐ 295/CONNECT 42 666/ARQ/V90
- ☐ 297/CONNECT 44 000/ARQ/V90
- ☐ 299/CONNECT 45 333/ARQ/V90
- ☐ 301/CONNECT 46 666/ARQ/V90
- ☐ 303/CONNECT 48 000/ARQ/V90
- ☐ 305/CONNECT 49 333/ARQ/V90
- ☐ 307/CONNECT 50 666/ARQ/V90
- ☐ 309/CONNECT 52 000/ARQ/V90

- ☐ 311/CONNECT 53 333/ARQ/V90
- ☐ 313/CONNECT 54 666/ARQ/V90
- ☐ 315/CONNECT 56 000/ARQ/V90

X (Result Code Options) *Basic Commands*

Use AT&A3 (see page 62) and a setting of ATX1 or greater to display LAPM, or MNP and data compression for the V42bis and MNP5 protocols.

- ☐ CONNECT 57 333/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 56 000/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 54 666/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 53 333/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 52 000/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 50 666/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 49 333/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 48 000/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 46 666/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 45 333/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 44 000/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 42 666/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 41 333/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 40 000/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 38 666/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 37 333/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 36 000/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 34 666/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 33 333/ARQ/(V90 or x2)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 32 000/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 30 666/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 29 333/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 28 000/ARQ/V90/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 33 600/ARQ/V34/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 31 200/ARQ/V34/LAPM/V42BIS (or MNP/MNP5)

- ☐ CONNECT 28 800/ARQ/(V34 or VFC)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 26 400/ARQ/(V34 or VFC)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 24 000/ARQ/(V34 or VFC)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 21 600/ARQ/(V34 or VFC)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 19 200/ARQ/(V34 or VFC)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 16 800/ARQ/(V34 or VFC)/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 14 400/ARQ/(V32, VFC or V34)/LAPM/V42BIS
(or MNP/MNP5)
- ☐ CONNECT 12 000/ARQ/V32/LAPM/42BIS (or MNP/MNP5)
- ☐ CONNECT 9600/ARQ/V32/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 7200/ARQ/V32/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 4800/ARQ/V32/LAPM/V42BIS (or MNP/MNP5)
- ☐ CONNECT 2400/ARQ/MNP/MNP5 (or LAPM/V42BIS)
- ☐ CONNECT 2400/NONE
- ☐ CONNECT 1200/ARQ/MNP/MNP5 (or LAPM/V42BIS)
- ☐ CONNECT 1200/NONE

Y (Set Default Profile) *Basic Commands*

Command Syntax **ATY** <argument>

Description Selects the default system profile. This command allows one of three possible profiles (two stored NVRAM configurations and a factory default setting) to be selected at power up and after a software reset. This parameter is stored separately within NVRAM and is read first before other values. This parameter determines the modem's course of action during any kind of reset. The parameter itself is reset by the AT&F command (see page 66).

Arguments 0–4

- 0 NVRAM configuration 0 (default)
- 1 NVRAM configuration 1
- 2 Factory configuration 0
- 3 Factory configuration 1
- 4 Factory configuration 2

Aborting Events None

Other The modem transmits an OK response code to the DTE before executing the command then clears the command line buffer. If the A/ command is entered subsequently, the modem acknowledges with an OK response code to the DTE but does not execute any command. Any arguments that follow in the command buffer are not executed.

Command Syntax	ATZ <argument>
Description	A software reset command. The modem resets to either of the NVRAM settings or to the factory default, depending on the argument issued with the command. The modem reads the parameter and changes settings accordingly.
Arguments	0–5 0 Load the configuration indicated by ATY command (see page 56) (default) 1 Reset and load NVRAM configuration 0 2 Reset and load NVRAM configuration 1 3 Reset and load factory configuration 0 4 Reset and load factory configuration 1 5 Reset and load factory configuration 2
Aborting Events	None
Other	<p>The modem transmits an OK response code to the DTE before executing the command then clears the command line buffer. Arguments that follow in the command buffer are not executed.</p> <p>The Z command resets all voice related parameters to default states, forces the #BDR = 0 condition (autobaud enabled), and forces the telephone line to be selected with the handset on hook. No voice parameters are stored in NVRAM, so the profile loaded does not affect the voice aspects of this command.</p>

+++ (Escape Sequence) *Basic Commands*

Command Syntax **+++**

Description Terminates the connection when the modem is in the data mode or converts to the online command mode, depending on the setting of the S13 register. The command is a 3-character sequence defined by the S2 register (default = +, decimal 43).

Arguments None

Aborting Events None

Other The escape code sequence must be preceded and followed by a *guard time* of 1/50 of a second (contained in the S12 register).

Note: Hayes Escape Sequence

The Hayes escape sequence (+++) is intended for public use by customers holding a license agreement with Hayes MicroComputer or those currently seeking a license. TI software replaces the +++ with the Time independent escape sequence (TIES) of +++AT.

Basic Commands **<any key> (Terminate Current Dial/Answer Operation)**

Command Syntax **<any key>**

Description Pressing any key on the keyboard terminates any dial or answer operations occurring at the time.

Arguments None

Aborting Events None

<Ctrl>S (Stop/Restart Help) *Basic Commands*

Command Syntax	<Ctrl>S
Description	Stops and restarts any of the help screens that can be displayed.
Arguments	None
Aborting Events	None

Command Syntax	<Ctrl>C or <Ctrl>K
Description	Cancels the display of help screens.
Arguments	None
Aborting Events	None

1.6 Extended Commands

The following sections list and describe commands that may be used to supplement the basic commands.

Command Syntax	AT&A <argument>
Description	Enable or disables a display of ARQ result codes if the ATX command argument is 1 or greater (see ATX command on page 46).
Arguments	0–3 0 Disables /ARQ connection result codes 1 Enables /ARQ connection result codes (default) 2 Indicates an additional V.32 or V.34 in result codes for calls of 4800 bps or greater 3 Identifies protocol of call: LAPM, MNP, or NONE. If the modem is negotiated for data compression, the type of compression is added to the response code: V.42bis, MNP5.
Aborting Events	None

Command Syntax	AT&B <argument>
Description	Selects a DTE interface rate
Arguments	0–2 <ul style="list-style-type: none">0 The modem DTE interface rate follows the DCE connection rate (default).1 The modem DTE interface rate follows the DTE rate, regardless of the DCE connection rate.2 The DTE rate is fixed for ARQ calls and variable for non-ARQ calls (answer mode only.) When the modem goes off hook and answers in the ARQ mode, it shifts its serial port rate to the rate written in NVRAM. In non-ARQ mode, it acts as if set to AT&B0 when answering and switches its serial port rate to match the call's connection rate.
Aborting Events	None

&C (Carrier Detect) *Extended Commands*

Command Syntax	AT&C <argument>
Description	Controls the carrier detect signal sent by the modem to the computer.
Arguments	0 or 1 0 The carrier detect (CD) override is always on (default). 1 The modem sends the carrier detect signal when it makes connection with another modem and drops the signal when it disconnects.
DTE Interface	If AT&C1, the carrier detect enters into a true state when a connection is made. The carrier detect returns to a false state after the connection is dropped.
Aborting Events	None

Command Syntax	AT&D <argument>
Description	Controls the DTR signal sent from the DTE to the modem.
Arguments	0–3 0 This is a DTR override; DTR is always on (default). 1 The online command mode is on DTR low. The modem enters the command mode on DTR transition to a low state. It returns online when DTR returns to a high state. 2 The computer must send DTR for the modem to accept commands; dropping DTR terminates a call (default). 3 The host must send DTR for the modem to accept commands; dropping DTR terminates any active call and causes the modem to do a soft reset.
DTE Interface	DTR line
Aborting Events	None

&F (Load Factory Settings) *Extended Commands*

Command Syntax	AT&F <argument>
Description	Loads the default factory setting from the ROM into the RAM.
Arguments	0–2 0 Loads standard factory configuration (default) 1 Loads factory configuration 1 for hardware flow control 2 Loads factory configuration 2 for software flow control
Aborting Events	None
Other	Below are the settings for the three factory configurations. &F/&F0 Data size: 7 bits Parity: Even Basic commands: X1 Extended commands: &A1, &H0, &I0, &R1 &F1 Data size: 8 bits Parity: None Basic commands: X4 Extended commands: &A3, &H1, &I0, &R2 &F2 Data size: 8 bits Parity: None Basic commands: X4 Extended commands: &A3, &H2, &I2, &R1

Command Syntax	AT&G <argument>
Description	Transmits a guard tone after a 2100-Hz answer tone is transmitted during a connection sequence. This command applies to overseas calls of 2400 or 1200 bps only.
Arguments	0–2 0 No guard tone sent (US/Canada) (default) 1 550-Hz guard tone follows answer tone (activated if ATB0, see page 28) 2 Enables 1800-Hz guard tone (activated if ATB0, see page 28)
Aborting Events	None

&H (Transmit Flow Control) *Extended Commands*

Command Syntax	AT&H <argument>
Description	Enables and disables flow control on the transmitting channel.
Arguments	0–3 0 Disables data flow control (default) 1 Enables hardware flow control (CTS) 2 Enables software flow control using characters stored in the S22 register for XON and the S23 register for XOFF 3 Enables hardware and software flow control
DTE Interface	CTS
Aborting Events	None

Command Syntax	AT&I <argument>
Description	Enables software flow control options.
Arguments	<p>0–5</p> <p>0 Disables flow control (XON/XOFF) of received data. All ASCII characters are transparent to the modem except the escape sequence (default).</p> <p>1 The modem responds to XON and XOFF characters defined in the S22 and S23 registers, respectively, and passes the characters to the remote DCE.</p> <p>2 The modem responds to XON and XOFF characters defined in the S22 and S23 registers, respectively, but does not pass the characters to the remote DCE.</p> <p>3 Enables Hewlett Packard host mode. The modem receives an ENQ (decimal 05 ASCII) character every 80 characters from the host through the RS-232 line and returns an ACK (decimal 06 ASCII) character to the host through the RS-232 line under two conditions:</p> <ul style="list-style-type: none"> <input type="checkbox"/> The modem responds immediately if the transmit buffers are empty. <input type="checkbox"/> The modem responds with ACK if the transmit buffers are 90% full, and responds with ACK when the transmit buffers fall below 30% full. <p>4 Enables Hewlett Packard terminal mode. The modem receives an ENQ from the remote DCE and passes it to the DTE. The modem sends no further data to the DTE until it responds with an ACK.</p> <p>5 Enables special flow control as follows:</p> <ul style="list-style-type: none"> <input type="checkbox"/> If modem is in error-correction mode, it responds the same way as if the argument were 2. <input type="checkbox"/> If modem is not in error-correction mode, it responds as though the argument were 0, except that it responds to XON and XOFF characters from the remote DCE and does not pass the characters to the DTE.
Aborting Events	None

&K (Data Compression) *Extended Commands*

Command Syntax	AT&K <argument>
Description	Enables MNP level 5 or V.42bis data compression. An established MNP or LAPM link is required.
Arguments	<p>0–3</p> <p>0 Disables data compression. (default)</p> <p>1 Automatic selection/deselection. Data compression is enabled if:</p> <ul style="list-style-type: none"><input type="checkbox"/> The DTE data rate (see AT&B command on page 63) is greater than the link rate (see AT&N command on page 72)<input type="checkbox"/> The remote DCE supports either MNP level-5 option in the MNP link request or V.42bis in the LAPM link request. <p>2 Enables data compression. This mode keeps the modem from disabling data compression; however, error control must be enabled (see AT&M4 or AT&M5 command on page 71).</p> <p>3 Selective data compression disables MNP data compression but not MNP error correction. It allows a V.42bis connection with compression or an MNP connection without compression.</p>
Aborting Events	None

Command Syntax	AT&M <argument>
Description	Enables and disables error control option.
Arguments	0–5 <ul style="list-style-type: none">0 No error control. The MNP or V.42 link request are ignored.2 Reserved3 Reserved4 Enables automatic selection between V.42, MNP, and no error control (default).5 Enables error-control for all data links. If the remote DCE does not respond to V.42 or MNP link requests, the modem disconnects the call.
DTE Interface	DTR
Aborting Events	None

Command Syntax	AT&N <argument>
Description	Selects variable or fixed DCE data rates
Arguments	0–39
	<ul style="list-style-type: none">0 Variable link rate floor. Modem permits any minimum speed for DCE link rate (default).1 Minimum link rate at 300 bps. Modem connects to remote DCE if it operates at this rate or faster.2 Minimum link rate at 1200 bps. Modem connects to remote DCE if it operates at this rate or higher.3 Minimum link rate at 2400 bps. Modem connects to remote DCE if it operates at this rate or higher.4 Minimum link rate at 4800 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.32/V.32bis modulation.5 Minimum link rate at 7200 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.32bis modulation.6 Minimum link rate at 9600 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.32/V.32bis.7 Minimum link rate at 12 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.32bis modulation.8 Minimum link rate at 14 400 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34, V.FC or V.32bis modulation.9 Minimum link rate at 16 800 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.FC modulation.10 Minimum link rate at 19 200 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.FC modulation.11 Minimum link rate at 21 600 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.FC modulation.12 Minimum link rate at 24 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.FC modulation.13 Minimum link rate at 26 400 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.FC modulation.14 Minimum link rate at 28 800 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 or V.FC modulation.

- 15 Minimum link rate at 31 200 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 modulation.
- 16 Minimum link rate at 33 600 bps. Modem connects to remote DCE if it operates at this rate or higher using V.34 modulation.
- 17 Minimum link rate at 28 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 18 Minimum link rate at 29 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 19 Minimum link rate at 30 666 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 20 Minimum link rate at 32 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 21 Minimum link rate at 33 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 22 Minimum link rate at 34 666 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 23 Minimum link rate at 36 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 24 Minimum link rate at 37 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 25 Minimum link rate at 38 666 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 26 Minimum link rate at 40 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 27 Minimum link rate at 41 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 28 Minimum link rate at 42 666 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 29 Minimum link rate at 44 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 30 Minimum link rate at 45 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 31 Minimum link rate at 46 666 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.

&N (DCE Link Rate) *Extended Commands*

- 32 Minimum link rate at 48 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 33 Minimum link rate at 49 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 34 Minimum link rate at 50 666 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 35 Minimum link rate at 52 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 36 Minimum link rate at 53 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 37 Minimum link rate at 54 666 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 38 Minimum link rate at 56 000 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.
- 39 Minimum link rate at 57 333 bps. Modem connects to remote DCE if it operates at this rate or higher using V.90 modulation.

DTE Interface	None
LED	None
Aborting Events	None

Command Syntax	AT&P <argument>
Description	Enables either of two possible phone line relay duty cycles used during pulse dialing. One is used for the US and Canada, and the other is used for the United Kingdom (UK).
Arguments	0 or 1 0 US and Canada make/break ratio of 39% / 61% (default) 1 UK make/break ratio of 33% / 67%
Aborting Events	None
Other	To call or answer overseas modems at 300 bps, set the modem to ITU-T V.21 mode (set S27 register to 1, see page 18).

&R (Receive Data Hardware Flow Control) *Extended Commands*

Command Syntax	AT&R <argument>
Description	Enables options for received-data hardware flow control on received data.
Arguments	0–2 0 Reserved 1 The RTS signal is ignored (default). 2 The modem transmits data to the DTE only if the RTS is asserted.
DTE Interface	RTS, CTS
Aborting Events	None
Other	If both DTR and RTS are not asserted during a data connection and AT&R is set to 2, the modem transmits result codes to the DTE. This happens because in a basic program, the only way to drop the DTR is to close the COM port, forcing RTS low. In this case, the modem is not allowed to transmit a NO CARRIER response code and goes on-hook, unless it interprets this combination of events as a warrant to send the NO CARRIER response code.

Command Syntax	AT&S <argument>
Description	Specifies when the DSR signal is asserted
Arguments	0 or 1 0 DSR is always asserted. 1 DSR is asserted when the modem starts a data connection; it is not asserted when a carrier is lost (default).
DTE Interface	DSR
Aborting Events	None

Command Syntax **AT&T** <argument>

Description Controls diagnostic test modes internal to the modem.

Arguments 0–8

- 0 Terminates current test (default)
- 1 Initiates analog loopback test at any link rate, modulation (except HST), compression, or error control. The S16 register can be set to 4 for a test pattern. The modem must be off line with no other test(s) in progress, such as S16 =1. When it enters the test, the modem responds with a CONNECT message when it is ready to receive loopback characters. If the test is denied for one of the above reasons, an ERROR response message is issued. If the modem is online when an ERROR message is issued, the modem drops the call and responds with a CONNECT message. It is then ready to receive a loop-back character.

This test is terminated if in online command mode by:

- ☐ Entering AT&T0, ATH0 (see page 34), or lowering the DTR. The modem goes off line and issues an OK response.
- ☐ Entering ATZ (see page 57), which ends the test and resets the modem.
- ☐ Allowing the test timer that uses the S18 register to expire.
- ☐ Hitting any key, if the S16 register is set to 4.

2 Reserved

- 3 Initiates digital loopback test at any link rate, modulation (except HST), compression or error control. This test mode allows the remote end to test its transmit and receive paths. All data received by the local modem is returned. After receiving the command, the modem must be in the on-line command mode to start the test and issue an OK when the test is terminated.

The test is terminated, if in online command mode, by:

- ☐ Entering AT&T0, which results in an OK response.
- ☐ Entering ATH0 (see page 34) or lowering the DTR. The modem goes off line and issues an OK response.
- ☐ Entering ATZ (see page 57), which results in an OK response and resets the modem.
- ☐ Allowing the test timer that uses the S18 register to expire.

- 4 Grants remote digital loopback, which allows the local modem to respond to a request for remote digital loopback.
- 5 Denies remote digital loopback to the remote end requesting the loopback.
- 6 Initiates remote digital loopback at link rates of 2400 or 1200 bps with any compression or error control. The modem must be off hook and in the online command mode with no other tests in progress, such as S16 = 1 or 8. If this condition is met and permission is granted by the remote modem, the modem then enters the state test and responds with a CONNECT message. Setting the S16 register to 4 sends a test pattern. If the test is denied for any of these reasons, an ERROR message is issued and the modem returns to the online command mode.

The test is terminated, if in online command mode, by any of the following:

- ☐ Entering AT&T0, which results in an OK response
- ☐ Entering ATH0 (see page 34) or lowering the DTR, which results in an OK response and resets the modem
- ☐ Allowing the test timer that uses the S18 register to expire
- ☐ Hitting any key, if the S16 register is set to 4

- 7 Initiates the remote digital loopback with self test at link rates of 2400 or 1200 bps with any compression or error control. The modem must be off hook and in the online command mode with no other tests in progress, such as S16 = 4. Remote access permission must also be granted. The modem enters the test and issues an OK message. It then sends a pattern of repeating Us that cannot be seen by the user since the modem stays in the online command mode. If the test is denied for any of the reasons above, an ERROR message is issued and the modem returns to the online command mode.

The test is terminated, if in online command mode, by any of the following:

- ☐ Entering AT&T0, which gives a 3-digit error count (an error count of 255 is given for errors over 255), and issues an OK response.
- ☐ Entering ATH0 (see page 34) or lowering the DTR. The modem goes off line and issues an OK response.
- ☐ Entering ATZ (see page 57), which results in an OK response and resets the modem.
- ☐ Allowing the test timer that uses the S18 register to expire.

- 8 Initiates an analog loopback with self test at any link rate, modulation (except HST), compression, or error control. The modem must be off line with no other tests in progress, such as S16 = 1. The modem enters the test from off line and issues an OK response. The modem then sends a test pattern of repeating Us that cannot be seen by the user as the modem stays in the online command mode. If the test is denied for any of the reasons above, an ERROR message is issued. If the modem is online when the ERROR message is issued, the modem drops the call, responds with a CONNECT response, and prepares to send loop-back characters.

The test is terminated if in online command mode, by any of the following:

- ☐ Entering AT&T0, ATH0 (see page 34), or by lowering the DTR. After receiving one of these commands, the modem gives a 3-digit error count (an error count of 255 is given for errors over 255), goes off line, and issues an OK response.
- ☐ Entering ATZ (see page 57), which results in the same error response above and resets the modem.
- ☐ Allowing the test timer that uses the S18 register to expire, which results in a report and an OK response, such as AT&T0.

Aborting Events

None

Command Syntax **AT&U** <argument>

Description Sets minimum DCE connection data rates. This command works in conjunction with the AT&N command (see page 72). The following table defines the interactions:

AT&U value	AT&N = 0	AT&N > 0
AT&U = 0 or AT&U > AT&N	Modem does not limit connect speed	Modem connects at AT&N speed only
AT&U > 0	Modem connects in range from maximum speed down to AT&U setting	Modem connects in range from AT&N setting down to AT&U setting

Arguments

0–39

- 0 Variable link rate floor. Modem permits any minimum speed for DCE link rate (default).
- 1 Minimum link rate at 300 bps. Modem connects to remote DCE if it operates at this rate or faster.
- 2 Minimum link rate at 1200 bps. Modem connects to remote DCE if it operates at this rate or faster.
- 3 Minimum link rate at 2400 bps. Modem connects to remote DCE if it operates at this rate or faster.
- 4 Minimum link rate at 4800 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.32/V.32bis modulation.
- 5 Minimum link rate at 7200 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.32bis modulation.
- 6 Minimum link rate at 9600 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.32/V.32bis .
- 7 Minimum link rate at 12 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.32bis modulation.
- 8 Minimum link rate at 14 400 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34, V.FC or V.32bis modulation.
- 9 Minimum link rate at 16 800 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.FC modulation.
- 10 Minimum link rate at 19 200 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.FC modulation.
- 11 Minimum link rate at 21 600 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.FC modulation.

- 12 Minimum link rate at 24 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.FC modulation.
- 13 Minimum link rate at 26 400 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.FC modulation.
- 14 Minimum link rate at 28 800 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 or V.FC modulation.
- 15 Minimum link rate at 31 200 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 modulation.
- 16 Minimum link rate at 33 600 bps. Modem connects to remote DCE if it operates at this rate or faster using V.34 modulation.
- 17 Minimum link rate at 28 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 or V.FC modulation.
- 18 Minimum link rate at 29 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 19 Minimum link rate at 30 666 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 20 Minimum link rate at 32 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 21 Minimum link rate at 33 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 22 Minimum link rate at 34 666 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 23 Minimum link rate at 36 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 24 Minimum link rate at 37 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 25 Minimum link rate at 38 666 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 26 Minimum link rate at 40 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 27 Minimum link rate at 41 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 28 Minimum link rate at 42 666 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.

- 29 Minimum link rate at 44 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 30 Minimum link rate at 45 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 31 Minimum link rate at 46 666 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 32 Minimum link rate at 48 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 or V.FC modulation.
- 33 Minimum link rate at 49 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 34 Minimum link rate at 50 666 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 35 Minimum link rate at 52 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 36 Minimum link rate at 53 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 37 Minimum link rate at 54 666 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 38 Minimum link rate at 56 000 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.
- 39 Minimum link rate at 57 333 bps. Modem connects to remote DCE if it operates at this rate or faster using V.90 modulation.

DTE Interface None

Aborting Events None

&W (Write to NVRAM) *Extended Commands*

Command Syntax	AT&W <argument>
Description	Writes the current modem configuration to NVRAM. This command stores all commands and registers that are not used in production test commands or in the S1 register in NVRAM.
Arguments	<p>0 or 1</p> <p>0 Stores pattern 0 to NVRAM (default)</p> <p>1 Stores pattern 1 to NVRAM</p> <p><input type="checkbox"/> The following command settings are stored in NVRAM:</p> <p>B, F, M, X, E, Q, V, or L</p> <p><input type="checkbox"/> The following extended command settings are stored in NVRAM:</p> <p>&A, &B, &G, &H, &I, &K, &M, &N, &P, &R, &S, &T (stores &T4 or&T5 only), &Y, &C, or &D.</p> <p><input type="checkbox"/> The following S register settings are stored in NVRAM:</p> <p>S0, S2 to S13, S15, S19, S21 to S23, S25, S27 to S29, or S38</p> <p><input type="checkbox"/> The following settings are stored in NVRAM:</p> <ul style="list-style-type: none">■ &Z0 through &Z3 dial strings■ Word length and parity■ Data rate
Aborting Events	None

Command Syntax	AT&Y <argument>
Description	Enables various methods of handling break sequences when they are received from the DTE or remote DCE
Arguments	<p>0–3</p> <p>0 Destructive option. When the modem receives a break signal from the DTE, it clears data from the transmit buffer but does not pass the break to the remote DCE. Both local and remote modems reset data compression tables.</p> <p>1 Expedited destructive option. When the modem receives a break signal from the the DTE, it clears data from the transmit buffer, sends the break to the remote DCE modem, and resets the data compression tables (default).</p> <p>2 Expedited nondestructive option. When the modem receives a break signal from the DTE, it does not clear the transmit buffer but sends the break sequence to the remote DCE.</p> <p>3 Reserved</p>
Aborting Events	None

&Z (Write Dial String to NVRAM) *Extended Commands*

Command Syntax	AT&Zn = s AT&Zn = L
Description	<p>Writes an input dial string or writes a previously dialed string to NVRAM:</p> <ul style="list-style-type: none"><input type="checkbox"/> AT&Zn = s writes an input dial string to NVRAM<input type="checkbox"/> AT&Zn = L writes a previously input dial string to NVRAM, where n is a.
Arguments	<p>The arguments n and s are defined as follows:</p> <p>n Positions 0 through 3 (default = 0 if no value for n is given)</p> <p>s Dial string of up to 36 characters, not including the AT prefix, carriage return <cr>, and spaces. Nondial string commands are not allowed in the dial string.</p>
Aborting Events	None
Other	<p>AT&ZL? displays the last executed dial string. There are no parameters for this command.</p> <p>AT&Zn? displays the current dial string stored in NVRAM.</p> <p>Phone numbers are stored until a nondial command or a line terminator (S3 register) is encountered.</p>

1.7 Fax Class 1 Commands

The following sections list and describe the Fax Class 1 commands.

Command Syntax	AT+FARX = <argument>
Description	Enables the modem to receive data asynchronously using the modulation selected with the <argument> parameter.
Arguments	3, 24, 48, 72, 96, 97, 98, 121, 122, 145, and 146

Table 1–13. Command Options

Command	Description
+FTH = 3	V.21 channel 2300 bps
+FRH = 2	V.27ter 2400 bps
+FRH = 48	V.27ter 4800 bps
+FRH = 72	V.29 7200 bps
+FRH = 73	V.17 7200 bps long
+FRH = 74	V.17 7200 bps short
+FRH = 96	V.29 9600 bps
+FRH = 97	V.17 9600 bps long
+FRH = 98	V.17 9600 bps short
+FRH = 121	V.17 12 000 bps long
+FRH = 122	V.17 12 000 bps short
+FRH = 145	V.17 14 000 bps long
+FRH = 146	V.17 14 000 bps short

DTE Interface	The modem DTE interface is specified in EIA/TIA-578.
Aborting Events	None

+FATX (Asynchronous Transmit) *Fax Class 1 Commands*

Command Syntax **AT+FATX = <argument>**

Description Transmits data asynchronously using the modulation selected with the <argument> parameter.

Arguments 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, and 146

Table 1–14. Command Options

Commands	Description
+FTH = 3	V.21 channel 2300 bps
+FRH = 2	V.27ter 2400 bps
+FRH = 48	V.27ter 4800 bps
+FRH = 72	V.29 7200 bps
+FRH = 73	V.17 7200 bps long
+FRH = 74	V.17 7200 bps short
+FRH = 96	V.29 9600 bps
+FRH = 97	V.17 9600 bps long
+FRH = 98	V.17 9600 bps short
+FRH = 121	V.17 12 000 bps long
+FRH = 122	V.17 12 000 bps short
+FRH = 145	V.17 14 000 bps long
+FRH = 146	V.17 14 000 bps short

DTE Interface The modem DTE interface is specified in EIA/TIA-578.

Aborting Events None

Command Syntax	AT+FCLASS = <argument>
Description	Sets the current FCLASS to <argument>
Arguments	0 or 1 0 Data mode 1 Group 3 fax service class 1 mode
Aborting Events	None
Other	+FCLASS? returns the current FCLASS. +FCLASS=? returns the possible values for FCLASS.

+FRH (Receive HDLC Data With Carrier) *Fax Class 1 Commands*

Command Syntax **AT+FRH = <argument>**

Description Enables the modem to receive the HDLC framed data using the modulation selected with the <argument> parameter and deliver the next frame to the DTE.

When the modem detects the selected carrier with an HDLC flag, the modem responds with a CONNECT response code to the DTE. If a different signal is detected, the modem responds with a +FCERROR (connect error) response code to the DTE and returns to the command state.

Arguments 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, and 146

Table 1–15. Command Options

+FTH = 3	V.21 channel 2300 bps
+FRH = 2	V.27ter 2400 bps
+FRH = 48	V.27ter 4800 bps
+FRH = 72	V.29 7200 bps
+FRH = 73	V.17 7200 bps long
+FRH = 74	V.17 7200 bps short
+FRH = 96	V.29 9600 bps
+FRH = 97	V.17 9600 bps long
+FRH = 98	V.17 9600 bps short
+FRH = 121	V.17 12 000 bps long
+FRH = 122	V.17 12 000 bps short
+FRH = 145	V.17 14 000 bps long
+FRH = 146	V.17 14 000 bps short

DTE Interface The modem/DTE interface is specified in EIA/TIA-578.

Aborting Events A loss of carrier aborts the +FRH command: the modem responds with a NO CARRIER response code to the DTE and returns to the command state.

Command Syntax **AT+FRM = <argument>**

Description Enables the modem to receive data using the modulation selected with the < argument> parameter.

When the modem detects the selected carrier, the modem responds with a CONNECT response code to the DTE. If a different signal is detected, the modem responds with a +FCERROR (connect error) response code to the DTE and returns to the command state.

Arguments 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, and 146

Table 1–16. Command Options

Command	Description
+FTH = 3	V.21 channel 2300 bps
+FRH = 2	V.27ter 2400 bps
+FRH = 48	V.27ter 4800 bps
+FRH = 72	V.29 7200 bps
+FRH = 73	V.17 7200 bps long
+FRH = 74	V.17 7200 bps short
+FRH = 96	V.29 9600 bps
+FRH = 97	V.17 9600 bps long
+FRH = 98	V.17 9600 bps short
+FRH = 121	V.17 12 000 bps long
+FRH = 122	V.17 12 000 bps short
+FRH = 145	V.17 14 000 bps long
+FRH = 146	V.17 14 000 bps short

DTE Interface The modem filters transparent commands, <DLE> <char>, as specified in EIA/TIA-578.

Aborting Events A loss of carrier aborts the +FRM commands the modem responds with a NO CARRIER response.

+FRS (Wait For Silence) *Fax Class 1 Commands*

Command Syntax	AT+FRS = <argument>
Description	Enables the modem to monitor the line for inactivity for a specified amount of time. The value <argument> is specified in 10-ms increments with limits from 0 to 255. This command terminates when the specified time of inactivity on the line is detected or the DTE transmits another character to the modem, which is then discarded. In either event, an OK response code is returned to the DTE.
Arguments	0–255 in 10 ms increments
Aborting Events	Any character sent from the DTE to the modem aborts the +FRS command. The modem responds with an OK response code to the DTE.

Command Syntax **AT+FTH = <argument>**

Description Enables the modem to transmit data framed in the HDLC protocol using the modulation selected with the <argument> parameter. Table 1–17 lists the possible values for the <argument> parameter.

The modem responds with a CONNECT response code to the DTE and transmits signal converter training (if required) followed by flags until the first byte of data is sent by the DTE.

Arguments 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, and 146

Table 1–17. Command Options

Command	Description
+FTH = 3	V.21 channel 2300 bps
+FRH = 2	V.27ter 2400 bps
+FRH = 48	V.27ter 4800 bps
+FRH = 72	V.29 7200 bps
+FRH = 73	V.17 7200 bps long
+FRH = 74	V.17 7200 bps short
+FRH = 96	V.29 9600 bps
+FRH = 97	V.17 9600 bps long
+FRH = 98	V.17 9600 bps short
+FRH = 121	V.17 12 000 bps long
+FRH = 122	V.17 12 000 bps short
+FRH = 145	V.17 14 000 bps long
+FRH = 146	V.17 14 000 bps short

DTE Interface The modem DTE interface is specified in EIA/TIA-578.

Aborting Events None

+FTM (Transmit Data With Carrier) *Fax Class 1 Commands*

7Command Syntax **AT+FTM = <argument>**

Description Enables the modem to transmit data using the modulation selected with the <argument> parameter.

The modem responds with a CONNECT response code and transmits the proper training sequence in the selected mode, followed by a constant series of 1 bits, until data is received from the DTE.

Arguments 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, and 146

Table 1–18. Command Options

Command	Description
+FTH = 3	V.21 channel 2300 bps
+FRH = 2	V.27ter 2400 bps
+FRH = 48	V.27ter 4800 bps
+FRH = 72	V.29 7200 bps
+FRH = 73	V.17 7200 bps long
+FRH = 74	V.17 7200 bps short
+FRH = 96	V.29 9600 bps
+FRH = 97	V.17 9600 bps long
+FRH = 98	V.17 9600 bps short
+FRH = 121	V.17 12 000 bps long
+FRH = 122	V.17 12 000 bps short
+FRH = 145	V.17 14 000 bps long
+FRH = 146	V.17 14 000 bps short

DTE Interface The modem filters transparent commands, <DLE> <char>, as specified in EIA/TIA-578.

Aborting Events The modem is interrupted when it receives a <DLE> <ETX> character from the DTE.

Command Syntax	AT+FTS = <argument>
Description	Halts the modem transmission. The modem waits a specified amount of time and responds with an OK response code to the DTE. The value <argument> is specified in 10-ms intervals with limits from 0 to 255.
Arguments	0–255 in 10 ms increments
Aborting Events	None

1.8 Fax Class 2.0 Commands

Along with the commands listed and described in the following sections, the Fax Class 2.0 command set includes two additional operations not found in the Fax Class 1 command set. They are:

Testing: +F<parameter_name>=?

Testing a parameter returns the message OK, indicating that the command is supported.

Executing: +F<parameter_name>

Executing performs the operations of the commands as detailed in the following subsections.

Command Syntax

AT+FDR

Description

Initiates data reception. This command may be issued after:

- ☐ Answering
- ☐ Dialing
- ☐ Receiving a document
- ☐ Receiving a page

Other

+FDR=? tests whether this command is supported by the modem.

Command Syntax **AT+FDT**

Description Requests that the modem transmit a message transmission page (phase C). It is issued at the beginning of each page, either in pre-message (phase B) or in post page message response (phase D). When the modem is ready to accept Phase C data, it issues the negotiation responses and the CONNECT result code to the DTE.

The modem filters the data stream as specified in EIA/TIA-592. If it detects <DLE><ppm> characters, which are data stream terminators, it returns the OK result code. The modem also performs the subsequent actions specified by <ppm> and returns to the command state.

Other **+FDT=?** tests whether this command is supported by the modem.

+FIP (Initialize Fax Parameters) *Fax Class 2.0 Commands*

Command Syntax **AT+FIP**

Description Initializes the class 2.0 parameters to their default values. This command does not change the setting of +FCLASS.

Other **+FIP=?** tests whether this command is supported by the modem.

Command Syntax	AT+FKS
Description	Initiates an orderly termination of a fax session. It sends a DCN message and hangs up; at the end of the termination process, the modem reports the +FKS response with the result code OK, goes on hook, and sets +FCLASS to 0.
Other	+FKS=? tests whether this command is supported by the modem.

1.9 Fax Class 2.0 Modem Responses

Class 2.0 modems are categorized by their four response types. They are:

- ☐ Phase A (call setup)
- ☐ Phase B (premessage procedure)
- ☐ Phase C (message transmission)
- ☐ Phase D (postmessage procedure)

1.9.1 Phase A Responses (Call Setup)

The Phase A responses are those that indicate when a connection has been made to another station or modem.

Command Syntax	AT+FCO
Description	Indicates a connection has been made to a group 3 fax station

Command Syntax

AT+FDM

Description

Indicates that a connection has been made with a remote data modem and that the local station is going to switch to a data modem. This response is enabled when +FAA = 1 and disabled when +FAA = 0.

1.9.2 Phase B Responses (Premessage Procedure)

The Phase B responses are those that generate the location or destination of the message before it is sent.

Command Syntax **AT+FCI**

Description Reports the remote CSI ID string. The ATD, ATA, AT+FDT, or AT+FDR commands may generate this message.

Command Syntax **AT+FCS:** <argument>**Description** Reports the current session parameters. This message is sent after a +FDT or +FDR command is executed and new DCS frames are sent.

The values of current session parameters are reported in the following order: <VR>, <LBR>, <WD>, <LN>, <DF>, <EC>, <BT>, and <ST>. Shown in Table 1–19 are the possible report values.

Table 1–19. +FCC, +FCS, and +FIS Subparameters

Label	Function	Values	Description
VR	Vertical resolution	0	Normal, 98 lpi
		1	Fine, 196 lpi
BR	Bit rate	0	2400 bps (default)
		1	4800 bps
		2	7200 bps
		3	9600 bps
WD	Page width	0	1728 pixels in 215 mm (default)
		1	2048 pixels in 255 mm
		2	2432 pixels in 303 mm
LN	Page length	0	A4, 297 mm
		1	B4, 364 mm
		2	Unlimited length (default)
DF	Data compression format	0	1-D modified Huffman
EC	Error correction	0	Disabled
BF	Binary file transfer	0	Disabled
ST	Scan time per line	VR = 0	VR = 1
		0 (default)	0 ms
		1	5 ms
		2	10 ms
		3	10 ms
		4	20 ms
		5	20 ms
		6	40 ms
		7	40 ms

+FIS (DIS Frame Information) *Fax Class 2.0 Modem Responses*

Command Syntax **AT+FIS:** <argument>

Description Reports the remote station's capabilities. The ATD, ATA, +FDT, or +FDR commands may generate this message.

The values of remote station's capabilities are reported in the following order: <VR>, <LBR>, <WD>, <LN>, <DF>, <EC>, <BT>, and <ST>. Shown in Table 1–19 are the possible report values.

Command Syntax

AT+FNC

Description

Reports a nonstandard commands frame. The ATD, ATA, +FDT, or +FDR commands may generate this message.

+FNF (Report NSF Frame) *Fax Class 2.0 Modem Responses*

Command Syntax **AT+FNF**

Description Reports a nonstandard facilities frame. The ATD, ATA, +FDT, or +FDR commands may generate this message.

Command Syntax **AT+FNS**

Description Reports a nonstandard setup frame. The ATD, ATA, +FDT, or +FDR commands may generate this message.

+FPI (Report Remote ID, CIG) *Fax Class 2.0 Modem Responses*

Command Syntax **AT+FPI**

Description Reports the remote CIG ID string. The ATD, ATA, +FDT, or +FDR commands may generate this message.

Command Syntax **AT+FPO**

Description Indicates that the remote station has a document to poll. The ATD, ATA, +FDT, or +FDR commands may generate this message.

+FTC (DTC Frame Information) *Fax Class 2.0 Modem Responses*

Command Syntax **AT+FTC**

Description Reports the remote station's capabilities. The ATD, ATA, +FDT, or +FDR commands may generate this message.

The values of remote station's capabilities are reported in the following order: <VR>, <LBR>, <WD>, <LN>, <DF>, <EC>, <BT>, and <ST>. Shown in Table 1–19 are the possible report values.

Command Syntax **AT+FTI**

Description Reports the remote TSI ID string. The ATD, ATA, +FDT, or +FDR commands may generate this message.

1.9.3 Phase C Responses (Message Transmission)

The Phase C responses generate summary reports detailing the history of the transmitted message.

Command Syntax **AT+FPS** <PPR>, <LC>, <BLC>, <CBLC>, <LBC>

Description The +FPS message is generated by the receiving station at the end of data reception. The arguments are as follows:

PPR Reports the post page response according to Table 1–20

LC Line count: reports the number of lines sent

BLC Bad line count: reports the number of bad lines set

CBLC Consecutive bad line count: reports the number of consecutive bad lines sent

LBC Lost byte count: reports the number of lost bytes

Table 1–20. Post Page Response (PPR)

Value	Label	Result Code	Description
1	MCF	OK	Page is good
2	RTN	ERROR	Page is bad; retrain requested
3	RTP	OK	Page is good; retrain requested
4	PIP	OK	Page is good; remote request for a procedure interrupt
5	PIN	ERROR	Page is bad; remote request for a procedure interrupt

1.9.4 Phase D Responses (Post Page Message Procedure)

Command Syntax **AT+FET**

Description The post page message indicates, as shown in Table 1–21, whether or not the transmitting station has more data.

Table 1–21. Post Page Message (PPM) Codes

PPM CODE	T.30 MNEMONIC	Description
0	MPS	Another page, same document
1	EOM	Another document
2	EOP	No more data

1.10 Fax Class 2.0 Parameters

The parameters that control the operation of a class 2.0 fax modem are listed and discussed in this section. There are three operations that can be performed on these parameters. They are:

Reading: +F<parameter_name>?

Reading a parameter returns the current value stored for that parameter.

Testing: +F<parameter_name>=?

Testing a parameter returns all the possible legal values for that parameter.

Setting: +F<parameter_name>=<value>

If the given value is a legal value for the parameter, the given value is saved. If the given value is an illegal value, the parameter remains unchanged and an error message is returned.

Parameters designated as read only cannot be set or tested.

Unless otherwise specified, parameters with valid values of 0 and 1 must correspond with Table 1–22.

Table 1–22. Class 2.0 Parameters Having Valid Values of 1 and 0

Value	Description
0	Disabled
1	Enabled

Command Syntax	AT+FCLASS <argument>
Description	Sets the modem to operate as a data modem or a fax modem. The +FCLASS parameter must be set to 2.0 to use the class 2.0 commands. The first time +FCLASS = 2.0 is executed, all fax parameters are set to their default values. Subsequent executions of +FCLASS = 2.0 have no effect other than to set the serial port rate according to the +FPR parameter.
Arguments	0, 1, or 2 0 Data modem (default) 1 Fax modem, class 1 2 Fax modem, class 2.0
Other	+FCLASS? returns the current +FCLASS value. +FCLASS=? returns a list of possible values for +FCLASS.

+FMI (Request Manufacturer ID) *Fax Class 2.0 Parameters*

Command Syntax **AT+FMI**

Description Returns the manufacturer's identification string. This is a read-only command.

Command Syntax **AT+FMM**

Description Returns the model's identification number. This is a read-only command.

+FMR (Request Modem Revision) *Fax Class 2.0 Parameters*

Command Syntax **AT+FMR**

Description Returns the modem's revision dates. This is a read-only command.

Command Syntax	AT+FAA <argument>
Description	Controls the mode that the modem answers in and whether automatic mode switching is enabled
Arguments	0 or 1 0 Answer as class 2.0 fax only. No automatic switching occurs (default) 1 Detects whether data modem or fax is calling and choose the appropriate mode
Other	+FAA? returns the current value of +FAA +FAA=? returns a list of possible values for +FAA

+FCC (Modem Capabilities) *Fax Class 2.0 Parameters*

Command Syntax **AT+FCC**

Description Constrain modem capability for all sessions. Any modification to +FCC causes the +FCC values to be copied into +FIS (see +FIS on page 128).

Values VR, BR, WD, LN, DF, EC, BF, ST
(Default = 0, 0, 0, 2, 0, 0, 0, 0)

Table 1–23. +FCC Subparameters

Label	Function	Values	Description	
VR	Vertical resolution	0	Normal, 98 lpi (default)	
		1	Fine, 196 lpi	
BR	Bit rate	0	2400 bps	
		1	4800 bps	
		2	7200 bps	
		3	9600 bps	
WD	Page width	0	1728 pixels in 215 mm	
		1	2048 pixels in 255 mm	
		2	2432 pixels in 303 mm	
LN	Page length	0	A4, 297 mm	
		1	B4, 364 mm	
		2	Unlimited length (default)	
DF	Data compression format	0	1-D modified Huffman	
EC	Error correction	0	Disabled	
BF	Binary file transfer	0	Disabled	
ST	Scan time per line		VR = 0	VR = 1
		0	0 ms	0 ms
		1	5 ms	5 ms
		2	10 ms	5 ms
		3	10 ms	10 ms
		4	20 ms	10 ms
		5	20 ms	20 ms
		6	40 ms	20 ms
		7	40 ms	40 ms

Command Syntax **AT+FCQ** <argument>

Description Controls the detection and correction of data errors when transmitting and receiving data.

Arguments RQ, TQ

Table 1–24. +FCQ Values

Subparameter	Value	Description
RQ	0	Receive checking disabled; +FPS is set to 1
	1	Receive checking enabled (default)
	2	Receive checking enabled. Modem detects and correct errors
TQ	0	Transmit checking disabled (default)
	1	Transmit checking enabled; modem sends <CAN> following any errors
	2	Transmit checking enabled; modem detects and corrects errors

Other **+FCQ?** returns the current values of +FCQ.
+FCQ=? returns a list of possible values of +FCQ.

+FCR (Capability to Receive) *Fax Class 2.0 Parameters*

Command Syntax	AT+FCR <argument>
Description	Enables or disables fax reception.
Arguments	0 or 1 0 Disabled 1 Enabled (default)
Other	+FCR? returns the current values of +FCR. +FCR=? returns a list of possible values of +FCR.

Command Syntax **AT+FCS**

Description Returns the current session capabilities as negotiated by the receiving and transmitting stations. This is a read-only command.
The +FCS command is set to the default values after:

- 1) Modem initialization
- 2) Execution of +FIP (initialize parameters) command
- 3) Termination of a session

Values VR, BR, WD, LN, DF, EC, BF, ST
(Default = 0, 0, 0, 0, 0, 0, 0, 0)

Table 1–25. +FCS Subparameters

Label	Function	Values	Description
VR	Vertical resolution	0	Normal, 98 lpi (default)
		1	Fine, 196 lpi
BR	Bit rate	0	2400 bps
		1	4800 bps
		2	7200 bps
		3	9600 bps
WD	Page width	0	1728 pixels in 215 mm
		1	2048 pixels in 255 mm
		2	2432 pixels in 303 mm
LN	Page length	0	A4, 297 mm (default)
		1	B4, 364 mm
		2	Unlimited length
DF	Data compression format	0	1-D modified Huffman
EC	Error correction	0	Disabled
BF	Binary file transfer	0	Disabled
ST	Scan time per line		VR = 0 VR = 1
		0	0 ms 0 ms
		1	5 ms 5 ms
		2	10 ms 5 ms
		3	10 ms 10 ms
		4	20 ms 10 ms
		5	20 ms 20 ms
		6	40 ms 20 ms
		7	40 ms 40 ms

+FCT (DTE Phase C Time-Out) *Fax Class 2.0 Parameters*

Command Syntax **AT+FCT**<argument>

Description Determines how long the modem waits for a command after transmitting all available phase C data. If the time-out is reached, the modem issues an orderly abort command, +FKS.

Arguments 0–255 seconds
(default = 30)

Command Syntax **AT+FHS****Description** Indicates the cause of the most recent hangup. This is a read-only command.**Values** 0–FFh*Table 1–26. FHS Values*

Value (hex)	Description
0–0F	Call placement and termination:
00	Normal and proper end of connection (default)
01	Ring detect without successful handshake
02	Call aborted from +FKS or <CAN>
03	No loop current
04	Ringback detected; no answer
05	Ringback detected; answer without CED
10–1F	Transmit phase A and miscellaneous errors:
10	Unspecified phase A error
11	No answer
20–3F	Transmit phase B hang-up codes:
20	Unspecified transmit phase B error
21	Remote cannot receive or send
22	COMREC (communication recode) error in transmit phase B
23	COMREC invalid command received
24	RSPREC error
25	DCS sent three times without response
26	DIS/DTC received three times
27	Failure to train at 2400 bps or +FMS value
28	RSPREC (response recode) invalid response received
40–4F	Transmit phase C hang-up codes:
40	Unspecified transmit phase C error
41	Unspecified image format error
42	Image conversion error
43	DTE to DCE underflow

Table 1–26. FHS Values Continued)

44	Unrecognized transparent data command
45	Image error; line length wrong
46	Image error; page length wrong
47	Image error; wrong compression code
50–6F	Transmit phase D hang-up codes:
50	Unspecified transmit phase D error
51	RSPREC error
52	No response to MPS
53	Invalid response to MPS
54	No response to EOP
55	Invalid response to EOP
56	No response to EOM
57	Invalid response to EOM
58	Unable to continue after PIN or PIP
70–8F	Receive Phase B hang-up codes:
70	Unspecified receive phase B error
71	RSPREC error
72	COMREC error
73	T.30 T2 time-out; expected page not received
74	T.30 T1 time-out; after EOM received
90–9F	Receive phase C hang-up codes:
90	Unspecified receive phase C error
91	Missing EOL
93	DCE to DTE buffer overflow
A0–BF	Receive phase D hang-up codes:
A0	Unspecified receive phase D errors
A1	RSPREC invalid response
A2	COMREC invalid response
A3	Unable to continue after PIN or PIP

Table 1–26. FHS Values (Continued)

C0–DF	Reserved for future standardization
E0–EF	Reserved for manufacturer use

+FIS (Current Session Negotiating Position) *Fax Class 2.0 Parameters*

Command Syntax **AT+FIS**

Description Defines the modem's capabilities for the current session. The +FIS parameter is set to the values stored in +FCC after:

- 1) Modem initialization
- 2) Execution of +FIP (initialize parameters) command
- 3) Modification of the +FCC parameters
- 4) Termination of a session

Values VR, BR, WD, LN, DF, EC, BF, ST
(Default = 0, 0, 0, 2, 0, 0, 0, 0)

Table 1–27. +FIS Subparameters

Label	Function	Values	Description
VR	Vertical resolution	0	Normal, 98 lpi (default)
		1	Fine, 196 lpi
BR	Bit rate	0	2400 bps
		1	4800 bps
		2	7200 bps
		3	9600 bps
WD	Page width	0	1728 pixels in 215 mm
		1	2048 pixels in 255 mm
		2	2432 pixels in 303 mm
LN	Page length	0	A4, 297 mm
		1	B4, 364 mm
		2	Unlimited length (default)
DF	Data compression format	0	1-D modified Huffman
EC	Error correction	0	Disabled
BF	Binary file transfer	0	Disabled
ST	Scan time per line		VR = 0 VR = 1
		0	0 ms 0 ms
		1	5 ms 5 ms
		2	10 ms 5 ms
		3	10 ms 10 ms
		4	20 ms 10 ms
		5	20 ms 20 ms
		6	40 ms 20 ms
		7	40 ms 40 ms

Command Syntax	AT+FLI <argument>
Description	Sets the local ID string used by the remote station to identify the originating station.
Arguments	Up to 20 printable ASCII characters (Default = null string)
Other	+FLI? returns the current value of +FLI. +FLI=? returns a list of possible values of +FLI.

+FLP (Indicate Document to Poll) *Fax Class 2.0 Parameters*

Command Syntax **AT+FLP** <argument>

Description Indicates whether there is a document to poll.

Arguments 0 or 1

0 Indicates that there is no document to poll (default)

1 Indicates that a document exists to poll. This parameter is reset to 0 after the polled document is sent.

Command Syntax **AT+FMS=<argument>**

Description Sets the minimum rate for data transmission in phase C.

Note: If the receiving modem cannot accept this minimum transmission rate, the call is disconnected. This parameter can be used to limit the data transfer time and cost.

Value 0–5

Table 1–28. Transmission Rates

Value	Data Transmission Rate
0	2400 bps (default)
1	4800 bps
2	7200 bps
3	9600 bps
4	12 000 bps
5	14 400 bps

+FNR (Negotiations Message Reporting) *Fax Class 2.0 Parameters*

Command Syntax **AT+FNR** <argument>

Description Enables or disables reporting of various messages. A value of 0 disables reporting. A value of 1 enables reporting. The default for each label is 0.

Arguments RPR, TPR, IDR, NSR
(Default = 0, 0, 0, 0)

Table 1–29. +FNR Subparameters

Label	Reports Affected
RPR	Receiver parameters, +FIS and +FTC
TPR	Transmitter parameters, +FCS
IDR	ID strings, +FTI, +FCI, and +FPI
NSR	Nonstandard frames, +FNF, +FNS, and +FNC

Command Syntax	AT+FNS <argument>
Description	Stores a nonstandard facilities frame to be used as NSF or NSS. The string can be appended by repeated writes. If a null string is written, then the string is initialized to null and the previous octets are deleted.
Arguments	String of hex offsets to a maximum of 90 (Default = null string)

+FPI (Local Polling ID) *Fax Class 2.0 Parameters*

Command Syntax **AT+FPI** <argument>

Description Used by the remote station to identify the originating station

Arguments Up to 20 printable ASCII characters
(Default = null string)

Command Syntax	AT+FSP<argument>
Description	Indicates whether the originating station wants to receive a polled document.
Arguments	0 or 1
	0 Indicates that the originating station does not want to poll (default)
	1 Indicates that the originating station can receive a polled document. This parameter is reset to 0 after a polled document is received. Note: For a station to receive a polled document, +FCR capability to receive must also be set to 1.

1.10.1 DTE-DCE Interface Parameters

The DTE-DCE interface parameters provide a

Command Syntax **AT+FBO** <argument>

Description Controls the bit order for phase C data transfers. The bit order for phase B and phase D data transfers is always direct order.

Arguments 0 or 1

0 Selects direct bit order for phase C data transfers (default)

1 Selects reversed bit order for phase C data transfers

Command Syntax **AT+FBS**

Description Reports the sizes of the transmit and receive buffers. The first value is the transmit buffer size and the second value is the receive buffer size. This is a read only command.

Value TBS, RBS
(Default = 1800, 4000)

+FEA (Phase C Received EOL Alignment) *Fax Class 2.0 Parameters*

Command Syntax	AT+FEA <argument>
Description	Enables or disables byte alignment of EOL markers in the data stream
Arguments	0 or 1
	0 Disables EOL alignment (default)
	1 Enables EOL alignment

Command Syntax	AT+FLO <argument>
Description	Selects the method of flow control used in data transfer between the modem and the serial port.
Arguments	0–2
	0 XON / XOFF control disabled
	1 XON / XOFF control enabled (default)
	2 Hardware flow control

+FPP (Packet Protocol Selection) *Fax Class 2.0 Parameters*

Command Syntax	AT+FPP=<argument>
Description	Enables and disables packet protocol.
Arguments	0 or 1
	0 Disables packet protocol (default)
	1 Enables packet protocol

Command Syntax **AT+FPR** <argument>

Description Selects the serial port rate used by the modem. A value of 0 selects the modem to autobaud with the remote station.

Arguments 0–24

Table 1–30. +FPR Values

Value	Port Rate
0	Autobaud (default)
1	2400
2	4800
4	9600
8	19 200
16	38 400
24	57 600

1.11 Voice Commands

The audio response or voice commands perform functions that allow you to set the internal and external modes of communication; by modem or manually. The commands are listed and described in the following sections.

Command Syntax	AT#BDR = <argument>
Description	Forces the modem to select a specific DTE/modem baud rate without further speed sensing on the interface
Arguments	<p>0–48</p> <p>0 Enables autobaud detection on the DTE interface (default)</p> <p>1–48 Sends an OK message at the current speed, then switches to the new speed defined by $n \times 2400$ bps, unless and until another #BDR = n command is received. Autobaud is disabled, and the character format is maintained at the format most recently detected.</p>
DTE Interface	When modem is in online voice command mode and the #BDR setting is non-zero (no autobaud selected), the modem supports a full-duplex DTE interface. This means that the DTE can enter commands at any time, even if the modem is in the process of sending a shielded code, indicating DTMF detection to the DTE. When the modem is selected in online voice command mode and the #BDR setting is 0 (autobaud selected), shielded code reporting to the DTE is disabled.
Aborting Events	None
Other	#BDR? returns the current setting of the #BDR command as an ASCII decimal value in result code format.

Command Syntax	AT#CID = <argument>
Description	Selects or disables caller ID recognition and reporting in any mode
Arguments	0–2 0 Disables caller ID (default) 1 Enables formatted caller ID reporting of ICLID SDM (single data message) and MDM (multiple data message) packets 2 Enables unformatted caller ID reporting of any ICLID packet received after the first RING cycle including SDM, MDM, or call waiting packets
Aborting Events	None
Other	#CID? returns the current value of #CID.

#CLS (Select Data, Fax, or Voice) *Voice Commands*

Command Syntax **AT#CLS = <argument>**

Description #CLS= selects data, fax, or voice mode

Arguments 0, 1, 2, or 8

- 0 Data. This is similar to setting +FCLASS = 0, and instructs the modem to act like a data modem on subsequent answer or originate operations. When a disconnect or inactivity time-out in the nonautobaud mode is detected, the modem automatically sets the #CLS setting to 0 and hangs up. This ensures that the modem is always in a known state, despite disorderly DTE behavior (default).
- 1 Class 1 fax mode. This is similar to setting +FCLASS = 1, which tells the modem that it is a class 1 fax modem. Once this is set, either the +FAA or +FAE command can be used to force subsequent answers to conform to class 1 adaptive answers.
- 2 Class 2.0 fax mode. This is similar to setting +FCLASS = 2, which tells the modem that it is a class 2.0 fax modem. Once this is set, the +FAA command can be used to force subsequent answers to conform to class 2.0 adaptive answers.
- 8 Voice mode. This is the main setting the DTE uses to effect directed or adaptive answer or originate sequences involving voice modes. All telephone calls initialized by #CLS = 8 (after answer or successful call progress) cause the modem to be in online voice command mode.

Command Syntax **AT#MFR?**

Description Returns the modem manufacturer information

#REV? (Identify Supervisor Code Revision Level of Modem) *Voice Commands*

Command Syntax **AT#REV?**

Description Returns the revision level of the modem. Enabled only in voice mode.

Command Syntax **AT#VBQ?**

Description Returns the size of the modem's voice transmit and voice receive buffers in ASCII decimal, followed by the OK result code.

#VBS (Bits Per Sample) *Voice Commands*

Command Syntax	AT#VBS = <argument>
Description	Selects the degree of ADPCM voice compression to be used in bits per sample
Arguments	2, 3 or 4 (default = 4)
Aborting Events	None
Other	#VBS? returns the current setting of the #VBS command as an ASCII decimal value in result code format.

Command Syntax	AT#VBT=<argument>
Description	Defines the time period used by the modem as the DTMF or fixed tone duration for generating tones via the D command while in online voice command mode. The time period is specified in tenths of a second up to four seconds.
Arguments	0–40 0 Disables the tone generation capability 1–40 Sets the tone duration time (default = 10)
Aborting Events	None
Other	#VBT? returns the current setting of the #VBT command as an ASCII decimal value in result code format.

#VCI? (Identify Compression Method) *Voice Commands*

Command Syntax **AT#VCI?**

Description Returns the modem's compression method and raw bits-per-sample capability

Command Syntax **AT#VGR = <argument>**

Description Sets the speaker volume, when the modem is in speakerphone mode. Based on this parameter, the threshold for the AGC is set inside the DCE. The number has no meaning when not in speakerphone mode. Values larger than 128 indicate a larger gain than nominal and values less than 128 indicate a smaller gain than nominal.

Arguments 0–255

0 Mute speaker

1–255 Sets the volume of the speaker when in speakerphone mode (default = 128)

#VGT (Select Voice Transmit Gain) *Voice Commands*

Command Syntax **AT#VGT = <argument>**

Description Sets the sensitivity of the microphone in speakerphone mode. Based on this parameter, the threshold for the AGC is set inside the DCE. The number has no meaning when not in speakerphone mode. Values larger than 128 indicate a larger gain than nominal and values less than 128 indicate a smaller gain than nominal.

Arguments 0–255

0 Mute

1–255 Sets microphone sensitivity when in speaker-phone mode
(default = 128)

Command Syntax	AT#VLS = <argument>
Description	Selects which devices are routed through the modem
Arguments	<p>0, 1, 2, 3, 4, 6 or ?</p> <ul style="list-style-type: none">0 The default option on the modem. This command instructs the modem that when entering any of the three voice-operating submodes (online command, transmit, or receive), the telephone line interface should be routed through the modem. The OK response is sent to the DTE, and any previous connection is lost (i.e., the modem ends up on hook as a result of issuing this command to connect to the telephone line).1 This argument instructs the modem to route only the handset through the modem. You can choose this setting before recording a greeting message.2 This argument instructs the modem to route only the speaker through the modem. You can choose this setting before playing back any message. The modem immediately switches to online voice command mode, and the VCON response is generated for completeness. However, since this is an output-only device, nothing can happen until the DTE sends the #VTX command.3 This argument instructs the modem that only the auxiliary input device (microphone) should be routed through the modem. You can choose this setting before recording a greeting message.4 This argument is the same as #VLS = 0, except that the modem enables the internal speaker as well as the telephone line/handset circuit.6 This argument instructs the modem that both the microphone and speaker should be routed through the modem. You can choose setting for full duplex AEC speakerphone operation.? Requests a report of the device types available for selection. The response is a series of numbers separated by commas, and each number indicates a device position number.
Aborting Events	None
Other	#VLS? returns the current setting of the #VLS command as an ASCII decimal value in result code format.

#VRA (“Ringback Goes Away” Timer) *Voice Commands*

Command Syntax	AT#VRA = <argument>
Description	When originating a voice call (#CLS=8), sets the “ringback goes away” timer value. This value is the amount of time (in units of 100 ms) to be measured from when the ringback cadence stops once detected. If ringback is not detected within this period, the modem assumes that the remote has picked up the line and switches to online voice command mode. Every time a ringback cycle is detected, this timer is reset.
Arguments	0–255 0 Turns off the “ringback goes away” timer 1–255 Defines the period without ringback (after at least one ringback has been detected) in 100-ms units (default = 70)
Aborting Events	None
Other	#VRA? returns the current setting of the #VRA command as an ASCII decimal value in result code format.

Command Syntax	AT#VRN = <argument>
Description	Used to set the “ringback never came” timer value when originating a voice call (#CLS=8). This value is the amount of time (in 100 ms units) to be measured from completion of dialing. If ringback is not detected within this period, the modem assumes the remote has picked up the line and switches to online voice command mode.
Arguments	0–255 0 Turns off the “ringback never came” timer 1–255 Defines the period without ringback after dialing in 100-ms units (default = 100)
Aborting Events	None
Other	#VRN? returns the current setting of the #VRN command as an ASCII decimal value in result code format.

#VRX (Voice Receive) *Voice Commands*

Command Syntax **AT#VRX**

Description Used when a voice file is received from the line, microphone, or handset. The #VLS command should have been previously issued to select the input source.

Arguments None

Aborting Events None

Command Syntax	AT#VSD = <argument>
Description	Enables or disables silence deletion in the voice receive mode
Arguments	0 or 1 0 Turns off the silence deletion (default). 1 Turns on the silence deletion if the silence sensitivity setting #VSS is non-zero. The aggressiveness of the silence deletion is controlled by #VSS.
Aborting Events	None
Other	#VSD? returns the current setting of the #VSD command as an ASCII decimal value in result code format.

#VSK (Buffer Skid Setting) *Voice Commands*

Command Syntax	AT#VSK <argument>
Description	Sets the number of bytes of spare space in the modem's buffer during voice transmit mode after the XOFF threshold is reached. This equates to the skid spare buffer space. This is the amount of data the DTE can continue to send, after being told to stop sending data by the modem, before the modem voice transmit buffer overflows.
Arguments	0–255 Defines the unused bytes remaining in the modem voice transmit buffer after an XOFF is sent to the DTE (default = 255)
Aborting Events	None
Other	#VSK? returns the current setting of the #VSK command as an ASCII decimal value in result code format.

Command Syntax	AT#VSM = <cmi>,<vsr>
Description	Selects the method of compression. The sampling rate is set at 8000 and cannot be changed.
Arguments	cmi, vsr cmi 128 GSM (default) 129 G.721 ADPCM 130 IMAADPCM vsr 8000

#VSP (Silence Detection Period) *Voice Commands*

Command Syntax **AT#VSP = <argument>**

Description Sets the voice receive mode silence detection period (inactivity timer) value of the inactivity timer in voice receive mode. The parameter, in units of 100 ms, can be used when receiving voice data. This is the amount of time, which if elapsed without receiving any ADPCM data, causes the modem to send the <DLE>s or <DLE>q codes after ensuring that the buffer is empty. There are two cases:

- 1) With the modem's silence deletion feature enabled, the #VSP setting is in effect an inactivity timer. The modem must reset this timer on every byte of voice data received.
- 2) With the modem's silence deletion feature disabled, the modem determines what constitutes silence. This involves monitoring and debouncing the modem value for average energy. If this debounced value is less than an arbitrary threshold constituting the modem's definition of silence for a period greater than that defined by the #VSP setting, the modem sends the <DLE>q or <DLE>s shielded code to the DTE.

Arguments 0–255

0 Turns off the silence period detection timer

1–255 Defines the period without received voice data in 100 ms units (default = 55)

Aborting Events None

Other **#VSP?** returns the current setting of the #VSP command as an ASCII decimal value in result code format.

Command Syntax	AT#VSR = <argument>
Description	Determines the necessary DTE interface speed, along with the #VBS (bits per sample command), to transmit and receive in the voice mode
Arguments	8000 (Default)
Aborting Events	None
Other	#VSR? returns the current setting of the #VSR command as an ASCII decimal value in result code format.

#VSS (Silence Detection Tuner) *Voice Commands*

Command Syntax	AT#VSS = <argument>
Description	Enables or disables silence detection in voice receive mode and controls the sensitivity employed by the modem in compressing periods of silence.
Arguments	<p>0–3</p> <p>0 Disables silence detection by the modem when in voice receive mode</p> <p>1 Low sensitivity setting. When this command is received by the modem, the system is configured to the state that is least likely to detect and compress periods of silence. It is still able to do so if the line is very quiet.</p> <p>2 Midrange sensitivity setting. When this command is received by the modem, the system is configured to a state which is likely to be the best overall compromise on normal telephone lines (default).</p> <p>3 High sensitivity setting. When this command is received by the modem, the system is configured to the state that is most likely to detect and compress periods of silence.</p>
Aborting Events	None
Other	#VSS? returns the current setting of the #VSS command as an ASCII decimal value in result code format.

Command Syntax	AT#VTD = <argument>
Description	Queries and controls which types of tones can be detected and reported to the DTE via shielded codes in voice transmit, voice receive, and online voice command modes.
Arguments	<p>i, j, k, or ?</p> <p>i, j, k Corresponds (in ASCII hexadecimal) to the desired capabilities for voice transmit, voice receive, and online voice command modes, respectively. The possible values for each bit are shown in Table 1–31.</p> <p>? Returns the tone reporting capabilities of the modem.</p>

Table 1–31. #VTD Tone Detection/Reporting Bit Settings

Bit	Description
0	0 = Disable DTMF tone capability 1 = Enable DTMF tone capability
1	0 = Disable V.25 1300-Hz calling tone capability 1 = Enable V.25 1300-Hz calling tone capability
2	0 = Disable T.30 1100-Hz facsimile calling tone capability 1 = Enable T.30 1100-Hz facsimile calling tone capability
3	0 = Disable V.25/T.30 2100-Hz answer tone capability 1 = Enable V.25/T.30 2100-Hz answer tone capability
4	0 = Disable Bell 2225-Hz answer tone capability 1 = Enable Bell 2225-Hz answer tone capability
5	0 = Disable call progress tone and cadence (for example, busy and dial tone) capability 1 = Enable call progress tone and cadence (for example, busy and dial tone) capability
6–7	Reserved

Aborting Events	None
Other	#VTD? Returns the current setting of the #VTD command as an ASCII decimal value in result code format.

#VTS (Generate Tone Signals) *Voice Commands*

Command Syntax **AT#VTS**

Description

Can be issued to play one or more DTMF or other tones (such as a beep) if the modem is in the online voice command mode. The modem parses and plays the tones defined in the parameter in the order listed, and no key abort is accepted. The parameter can have three types of elements separated by commas: dual or single tones, and varying DTMF digits. The dual or singles tones are represented by a substring enclosed in square brackets [], within the parameter. Each such substring consists of three subelements corresponding to two frequencies in hertz (0, or 200–3000) and a duration (ASCII decimal in units of 100 ms). The varying DTMF digits are represented by a substring enclosed in curly braces { }, within the parameter. Each such substring consists of two sub-elements corresponding to a DTMF digits (0–9,A–D,*,#), and alternate durations in units of 100 ms.

Arguments

None

Example

AT#VTS=1, 2, [1100, 1300, 50], {*, 6}, [800, 1300, 50], 9

The perform this operation, do the following:

- 1) Play the DTMF 1 tone at the default duration set by #VTD.
- 2) Play the DTMF 2 tone at the default duration set by #VTD.
- 3) Play the discrete tones at 1100 Hz and 1300 Hz at 500 ms duration.
- 4) Play the DTMF * tone at the default duration set by #VTD.
- 5) Play the discrete tones at 800 Hz and 1300 Hz at 500 ms.
- 6) Play the DTMF 9 tone at the default duration set by #VTD.

Command Syntax	AT#VTX
Description	Switches to voice transmit mode. This command can be issued only if the modem is in the online voice command mode (indicated previously with the VCON message).
Arguments	None
Other	#VTX is used when a voice file is to be transmitted to the line, speaker, or handset. The #VLS command should have been previously issued to select the output source.

1.12 Result Code for Voice Operation

The two result codes, VCON and CONNECT, are used as bridges whereby voices operations can traverse back and forth as circumstances dictate.

1.12.1 VCON

VCON is sent:

- ☐ when the modem is configured for voice (#CLS=8)
- ☐ after answering or originating a call, the modem enters the online voice command mode for the first time. Typically, this follows an off hook in answer mode and after ringback ceases in originate mode.
- ☐ When the DTE requests a switch from voice transmit mode to online voice command mode by issuing a <DLE><ETX> to the modem.
- ☐ When the DTE requests a switch from voice receive mode to online voice command mode via the key abort.

1.12.2 CONNECT

CONNECT is sent when switching from the online voice command mode to either voice receive mode via the #VRX command or to voice transmit mode via the #VTX command. This message informs the DTE that it may receive or send compressed data.

1.13 DSVD Commands

This section lists and defines the commands for modems with DSVD options.

Command Syntax	AT–SAD = <argument>
Description	Sets the number of audio packet delays
Arguments	0–3 (default = 3)
Other	–SAD=? returns a list of allowed values for –SAD. –SAD? returns the current value of –SAD.

–SAT (Select Audio Device) *DSVD Commands*

Command Syntax	AT–SAT = <argument>
Description	–SAT= selects the audio device
Arguments	0–2
	0 Handset (default)
	1 Headset
	2 Microphone/speaker

Command Syntax	AT–SHG = <argument>
Description	Selects the handset gain. The default is 0. The other numbers increase the gain over the default value.
Arguments	0–2 (default = 0)

–SHV (Select Handset Volume) *DSVD Commands*

Command Syntax **AT–SHV = <argument>**

Description Selects the handset volume. The default is 0. The other numbers represent an increase over the default value.

Arguments 0–2
(default = 0)

Command Syntax	AT–SMG = <argument>
Description	Selects the microphone gain. The default is 0. The other numbers represent an increase in gain over the default value.
Arguments	0–2 (default = 0)

–SPH? (Query Auxillary Phone Hook Status) *DSVD Commands*

Command Syntax **AT–SPH?**

Description Returns the auxiliary phone hook status: on hook or off hook.

Command Syntax	AT–SSA = <argument>
Description	Selects the audio compression algorithm. Only TrueSpeech™ is supported at this time.
Arguments	1 TrueSpeech

–SSE (Enables/Disables DSVD) *DSVD Commands*

Command Syntax	AT–SSE = <argument>
Description	Enables or disables the DSVD
Arguments	0 or 1 0 DSVD disabled (default) 1 DSVD enabled
Other	–SSE? returns the DSVD functionality status.

Command Syntax	AT–SSN=<argument>
Description	–SSN= enables/disables the sequence numbers for audio packets.
Arguments	0 or 1
	0 Disabled
	1 Enabled (default)

–SSV (Select Speaker Volume) *DSVD Commands*

Command Syntax **AT–SSV = <argument>**

Description Selects the speaker volume. The default is 0. The other numbers increase the volume over the default value.

Arguments 0–2
(default = 0)

1.14 VoiceView Commands

This section discusses and defines the voice view commands which are

Command Syntax **AT+FCLASS = <argument>**

Description Selects the DCE service classes: data, fax, or VoiceView. (Others, such as +FCLASS = 8, specified in IS-101, may also be supported but are not addressed here.) The service class may be set by the DTE from the choices available in the DCE. This parameter is mandatory.

A value of +FCLASS = 80 indicates the VoiceView operation as described here. VoiceView recognizes a service class of 0 as the mandatory default operation if the mode is supported.

If +FCLASS = 0 is not supported, +FCLASS = 80 is the default. The default service class is set in response to the ATZ reset command. Service classes 1 and 2.0 specify fax service classes. VoiceView DCE may support any or all of other standard +FCLASS modes of operation. The mode of operation may be explicitly changed via this command or other commands issued by the DTE.

Arguments

0, 1, 2.0, or 80

0 Data service class (default if supported)

1 Fax service class 1

2.0 Fax service class 2.0

80 VoiceView service class (default if +FCLASS not supported)

Command Syntax **AT+FLO = <value>**

Description Allows the DTE to identify and select the types of flow control provided and used. Support of in-band bidirectional DC1/DC3 (XON/XOFF) flow control is mandatory; flow control using V.24 circuits 106 and 133 is optional. A setting of 0 is provided for configurations where no flow control is necessary or flow control is provided by other means. A setting of 1, the default, means that XON/XOFF can be used in either direction. A setting of 2 means that CCITT circuit 133 is used for flow control of the DCE by the DTE and circuit 106 for flow control of the DTE by the DCE.

Arguments 0–2

- 0 No flow control or manufacturer specific control
- 1 XON/XOFF flow control may be used (default)
- 2 CCITT circuits 133 and 106 may be used for flow control

Command Syntax

AT+FMI?

Description

Reports the manufacturer's identification information. Typically, the text consists of the name of the manufacturer, but the manufacturer may choose to provide more information. The maximum text length is 80 characters. The first eight characters must be unique.

+FMM? (Identify DCE Model) *VoiceView Commands*

Command Syntax

AT+FMM?

Description

Reports the product identification information. Typically, the text consists of the name of the product, but the manufacturer may choose to provide more information. The maximum text length is 80 characters. The first eight characters must be unique.

Command Syntax

AT+FMR?

Description

Reports the version, revision level, or other pertinent information for the device. Typically, the text consists of the version of the product, but the manufacturer may choose to provide more information. The maximum text length is 80 characters. The first eight characters must be unique.

+FPR (Select DTE/DCE Interface Rate) *VoiceView Commands*

Command Syntax **AT+FPR = <argument>**

Description Allows the DTE to select among various fixed DTE/DCE interface rates and autobaud. The selected rate stays in effect until the DTE selects another rate. The selected rate takes effect after the DCE returns the OK result code. The default setting of the parameter +FCLASS = 80 is 4.

VoiceView DCE supports autobaud and baud rates greater than or equal to 9600 bps alike at a value of +FCLASS=80. Therefore, values 1, 2, and 3 should not be used, since they produce an ERROR result code if the DTE issues one of these settings while the value of +FCLASS=80.

Arguments 0–8
(default = 4)
The fixed DTE/DCE interface rate equals the argument times 2400.

Command Syntax	AT–SCD = <string of hexadecimal octets>
Description	<p>Allows the DTE to read or alter information stored in the DCE. The DCE contains information about its supported capabilities, which are used on powerup and when executing an –SIP reset or an –SIC initialize capabilities command. Using –SCD, the DTE can change the information that the DCE sends when responding to a capabilities query. The argument of this command is an octet string consists of pairs of hex numbers. Spaces between octets are ignored by the DCE. The DCE converts each hex pair into a binary octet and stores it in its capabilities information storage area. The DCE constructs the capabilities message from the octets in the order in which they have been received and stored.</p> <p>The parameter may require up to 508 hex characters to specify the capabilities information. Since only 40 characters can be transmitted in each command, this command may be repeated with new data; each use appends data to the data that is currently stored in the DCE.</p> <p>The DTE can completely specify the DCE's capabilities information by first issuing an AT–SCD = "" command (null string) to erase all capability information and then sending one or more AT–SCD = "string" commands containing the desired information.</p> <p>The DCE response for the AT–SCD = ? command is the number of bytes that the DCE can hold for capabilities information.</p> <p>Using the AT–SCD? parameter read command, the DTE can read the list of current DCE capabilities. Each octet of the capabilities information is represented by a pair of hex numbers separated by spaces. All capabilities octets are returned in a single response. If the DTE wishes to determine the inherent capabilities of the DCE, it issues the AT–SIC initialize capabilities command or the AT–SIP reset command and then reads the capabilities data (AT–SCD?). An example response to the DTE for issuing AT–SCD? for VoiceView DCE which has VoiceView data mode, no message storage, a DTE interface, and fax data mode enabled is:</p> <pre><CR><LF>05 03 44 01 02<CR><LF></pre>
Arguments	0–254 hexadecimal octets
Other	<p>–SCD=? returns the number of bytes that can be held in the DCE for the capabilities information.</p> <p>–SCD? returns a list of the current DCE capabilities.</p>

Command Syntax **AT–SDA = <argument>**

Description Causes the DCE to perform the dial function specified in TIA/EIA–602 when the ATD or ATO commands are issued with the default argument. All of the ATD command modifiers are supported as specified in TIA/EIA–602. This behavior is true across all the service classes.

Setting AT–SDA = 1 causes the DCE to interpret the ATD and ATO commands slightly differently. In this mode, when the DCE receives an originate call command such as an ATD or ATO, it sends the appropriate data mode start sequence. The interpretation depends on the current +FCLASS setting. If +FCLASS = 0, a modem data mode start sequence is started in response to the ATD and ATO originate commands. If +FCLASS = 1 or 2.0, the fax data mode start sequence is started in response to the ATD originate command. If +FCLASS = 80, the VoiceView data mode start sequence is started in response to the ATD and ATO originate commands.

When the DCE receives an AT–SDA = 1 command, it starts a 120-second timer. The DCE automatically resets the –SDA parameter to 0 after either receiving and executing an originate call command (ATD or ATO) or upon the timer expiring, whichever happens first.

Arguments 0 or 1

0 DCE dials outgoing call (default)

1 DCE originates data mode start sequence

Command Syntax **AT–SDR = <argument>**

Description The DTE sets –SDR = 0, the default setting, to have the DCE reject data mode start sequences. The DTE sets –SDR = 1 to have the DCE report incoming data mode start sequences to the DTE with either the RING event message or the –SSD event message and wait for the DTE to respond. Regardless of the setting of –SDR, the DCE reports the RING event message in the data service class and the –SSD event message in the nondata service classes, if the –SEV event suppression parameter is set to allow event message reporting.

Arguments 0 or 1

- 0 Reject incoming modem data mode start sequences (default)
- 1 Wait for DTE response to incoming modem data mode start sequences

Command Syntax **AT–SDT = <argument>**

Description Sets the DCE date in the format yymmdd where: yy is a 2-digit year with a value from 00 to 99; mm is a 2-digit month with a value from 01 to 12; and dd is a 2-digit day with value from 01 to the number of days in the particular month specified by mm. If a correct value for the date is entered, the DCE date is changed and an OK result code is returned. If an erroneous date is entered, the ERROR code is returned and the date in the DCE is unchanged. This command is mandatory for the optional message storage system.

Arguments yymmdd

yy = 00 to 99

mm = 01 to 12

dd = 01 to 31

Command Syntax **AT–SEM**

Description Erases the oldest message residing in the DCE. This command is valid only when the value of +FCLASS = 80. This command usually follows the successful retrieval of a message from the DCE message storage system. The ERROR message is issued immediately if the message storage system is empty. The DCE issues the OK response once the message has been deleted.

Command Syntax**AT–SER?****Description**

Solicits an error report from the DCE. The –SER error parameter is read only. The response from the DCE is a hexadecimal representation of the –SER error parameter byte with values in the range from 21h–9FH. The three most significant bits of this byte are used to identify what type of error occurred. Bit 8 set indicates a general error, (see Table 1–32). Bit 7 set means that the error occurred in the link layer (See Table 1–33). Bit 6 set means that a time-out has occurred (see Table 1–34) The error code is valid until a request to send data command is issued, a start sequence is received from the telephone network interface, or an –SIP reset command is issued.

Table 1–32. General Error Codes

Code	Error
81h	Unrecognized command issued by the DTE
82h	Unsupported parameter received (<value>, <compound value>)
83h	Could not initiate data mode (for example, switchhook = on hook)
84h	Invalid capabilities information issued by DTE

Table 1–33. Link Layer Error Codes

Code	Error
41h	Invalid HDLC frame received
42h	DISC received as response
43h	Maximum number of retransmissions exceeded; unable to successfully send data

Table 1–34. Timing Error Codes

Code	Time-Out Error
21h	Time-out waiting for a valid mode tone in the start sequence
22h	Time-out waiting for data modulation to begin after start sequence
23h	Time-out waiting for a valid data frame (T203 expired)
24h	Time-out waiting for a transaction in auto-answer state (T100 expired)
25h	Time-out waiting for a response to a capabilities query
26h	Time-out waiting for a response to a capabilities exchange request
27h	Time-out waiting for a DTE response to an incoming data-mode start sequence event (–SSV, –SSD, –SSF, RING)

Command Syntax	AT–SEV = <argument>
Description	Enables or disables event message suppression. Suppressing start sequence event messages (–SSV, –SSD, –SSF) forces the DCE to reject incoming start sequences that do not match the current class of service. The –SIP reset command, and/or the ATZ reset command, initialize this parameter to its default setting.
Arguments	0 or 1 0 DCE issues event messages 1 DCE suppresses event messages (default)

–SFR (Fax or Data Mode Response Control) *VoiceView Commands*

Command Syntax **AT–SFR = <argument>**

Description The DTE sets –SFR=0, the default setting, so that the DCE can reject fax or data-mode start sequences.

The DTE sets –SFR=1 so that the DCE can report incoming fax or data mode start sequences to the DTE. The DCE can report with either the RING event message or the –SSF event message and wait for the DTE to respond.

Regardless of the setting of –SFR, the DCE reports the RING event message in the fax service class and the –SSF event message in the nonfax service classes (if the –SEV event suppression parameter is set to allow event message reporting).

Arguments 0 or 1

0 Reject incoming fax data mode start sequences (default)

1 Wait for DTE response to incoming fax or data mode start sequences

Command Syntax **AT–SIC**

Description The DTE issues this command to have the DCE initialize the capabilities data to the capabilities of the DCE. The DCE also sets the –SVR, –SDR, –SFR response parameters to reflect the capabilities of the DCE. The DCE issues the OK result code when all the capabilities parameters have been reset to the DCE defaults. The –SIC command is valid only if +FCLASS = 80.

–SIP (Initialize VoiceView Parameters) *VoiceView Commands*

Command Syntax **AT–SIP = <argument>**

Description Initializes the VoiceView parameters. This command is valid only if the value of +FCLASS = 80. Refer to a specific parameter description to determine what the default is for that parameter. The DCE issues the OK result code when all parameters have been reset to their defaults and the optional message storage system (if present) has been audited or deleted.

Arguments 0–2

- 0 DCE resets VoiceView parameters to their defaults (default)
- 1 DCE resets VoiceView parameters to their defaults and audits the message storage system
- 2 DCE resets VoiceView parameters to their defaults and erases the message storage system

Command Syntax	AT–SKA=<argument>
Description	Defines the period during which the keep-alive character (<ACK>) is transmitted to the DTE during VoiceView data transfers. The <ACK> character is transmitted even if the DTE is controlled by flow (XOFF). The DCE issues the <ACK> character to inform the DTE that the transaction is progressing correctly. This period value is measured in seconds. A value of 0 means that this parameter is disabled. This command also defines the period for the <CAN> character and the –SVM VoiceView 'message is present' message. The DCE issues the <CAN> character to the DTE to have the DTE immediately terminate the data transaction. The DCE issues the –SVM message when the DCE has a message in its storage system for the DTE to retrieve.
Arguments	0–255 seconds (default = 5)

–SMT (Telephone Handset Mute Control) *VoiceView Commands*

Command Syntax **AT–SMT**<argument>

Description The telephone automatically mutes during the data modes initiated with the VoiceView start sequence. The DCE issues the OK response once the local telephone interface is in the desired state. AT–SMT is valid only when the value of +FCLASS=80.

Arguments 0 or 1

0 DCE unmutes the local telephone interface (default)

1 DCE mutes the local telephone interface

Command Syntax **AT–SOR = <argument>**

Description Defines whether the DCE rejects or overflows the message buffers of the optional message storage system. If the DCE implements the message storage system option, it may run out of memory while receiving data and need to overflow the system (make room) or reject the receiving data. If this parameter is 0 (default), any data received when the DCE is full is rejected with a DISC link layer message. If this parameter is 1, the DCE erases one or more of the oldest messages in the message storage system to ensure enough storage for the new message. It continues to erase the oldest messages in the message storage system until no more room is needed.

Arguments 0 or 1

0 Reject incoming VoiceView data on overflow (default)

1 Overflow incoming VoiceView data on overflow

–SQR (Capabilities Query Response Control) *VoiceView Commands*

Command Syntax **AT–SQR = <argument>**

Description The DTE sets –SQR = 1 to have the DCE request (polled response) an originating DCE's capability information when it transmits its own capabilities information in response to a capabilities query.

If the DTE sets –SQR = 0, the DCE does not request the capability information from the originating DCE. The DCE behaves as if this parameter is set to 0 when the capabilities query is received in non-VoiceView service classes. Additionally, the DTE is not able to receive the capabilities data in those service classes.

The DCE always responds to a capabilities query with a capabilities response message regardless of the setting of the –SQR query response parameter or the service class +FCLASS.

Arguments 0 or 1

- 0 Provide one-way response to capabilities query (default)
- 1 Request two-way response to capabilities query

Command Syntax **AT–SRG = <argument>**

Description The DTE sets –SRG= to the maximum number of RING event messages generated by the DCE when the DCE detects a modem data mode start sequence with a value of +FCLASS = 0, or a fax data mode start sequence with a value of +FCLASS = 1 or 2.0. The RING event message is issued by the DCE every six seconds until either the DTE responds or the maximum ring count is reached. If the maximum ring count is reached, the DCE returns to voice mode. The default number of RING event messages is 3.

Arguments 0–255
(default = 3)

–SRJ (Reject Data Mode Request) *VoiceView Commands*

Command Syntax **AT–SRJ**

Description The DTE issues –SRJ so that the DCE can reject the remote data mode request. This command is issued by the DTE in response to the RING, –SSD, –SSF, –SSV event messages. The DCE issues the OK response once the data mode request has been rejected and the DCE has returned to voice mode.

Command Syntax**AT–SRM****Description**

Retrieves the oldest message residing in the message storage system of the DCE. This command is valid only when the value of +FCLASS=80. The DCE immediately issues the ERROR message if the message storage system is empty when a message is present. The DCE returns the message data. This data may be terminated in three ways:

- ☐ The <DLE><EOT> characters followed by the OK response are positive ends of message marker.
- ☐ The <DLE><CAN> characters followed by the OK response are end-of-message markers that indicate the far-end aborted the data transmission.
- ☐ The <DLE><CAN> characters followed by the ERROR response are end-of-message markers that indicate that the local DCE detected an error in the data reception.

–SSP (Set VoiceView Transmission Speeds) *VoiceView Commands*

Command Syntax **AT–SSP = <argument>**

Description Allows the DTE to specify the data modulation schemes that are associated with the VoiceView mode tones. The <argument> is comprised of three fields. The first field represents the VoiceView burst speed. The second field represents the VoiceView recovery speed. The third field represents the VoiceView priority speed. The default settings for these fields are 0, 1, and 2, respectively. Other modulation schemes and transmission speeds are reserved.

Arguments 0–5

- 0 V.21 300bps FSK (frequency shift keying)
- 1 V.27ter 4800 DPSK (differential phase shift keying)
- 2 V.29 9600bps QAM (quadrature amplitude modulation)
- 3 V.29 4800bps QAM (quadrature amplitude modulation)
- 4 V.17 7200bps TCM (trellis code modulation)
- 5 V.17 14400bps TCM (trellis code modulation)

Command Syntax **AT–SSQ**

Description Initiates the transmission of the capabilities query start sequence. This command is valid only when the value of +FCLASS = 80. The DCE issues the ERROR response if this command is issued in a service class other than +FCLASS = 80. The DCE issues the OK response once the DCE has completed the query and returned to voice mode.

Command Syntax **AT–STM = <hhmm>**

Description Sets the DCE time. The parameter hh is a 2-digit hour that can have any value from 00 to 23 where 00 represents 12:00 midnight and 23 represents 11:00 PM. The mm parameter is a two-digit minute that can have any value from 00 to 59. If a correct value for the time is entered, the DCE time is changed and an OK result code is returned. If an erroneous time is entered, the DCE time is not changed and an ERROR result code is returned. This command is mandatory for the optional message-storage system.

Arguments hhmm

hh = 00 to 23

mm = 00 to 59

Command Syntax **AT–STT = <argument>**

Description Defines whether or not the DCE plays the transaction tone to the telephone handset while data is being transmitted between the DCEs. If the setting is 1 (default), then the tone is played during the data transaction. If the setting is 0, then the tone is not played during the transaction.

Arguments 0 or 1

0 Disables the handset tone during data transfer

1 Enables the handset tone during data transfer (default)

–SVR (VoiceView Data Mode Response) *VoiceView Commands*

Command Syntax **AT–SVR = <argument>**

Description Rejects VoiceView data-mode start sequences when AT–SVR = 0 . The DTE sets –SVR = 1 to have the DCE report incoming VoiceView data mode start sequences to the DTE. This is done with either the RING event message or the –SSV event message. Regardless of the setting of –SVR, the DCE reports the RING event message in the VoiceView service class and the –SSV event message in the non-VoiceView service classes. This is, of course, if the –SEV event suppression parameter is set to allow event message reporting.

Arguments 0 or 1

- 0 Reject incoming VoiceView start sequences (default)
- 1 Wait for DTE response to incoming VoiceView start sequences

1.15 Event Message

Event messages are used by several processes for communicating their status to the DTE. The following sections detail event messages and what notification they provide to the DTE.

1.15.1 VoiceView Data-Mode Event Message

Read Syntax: –SSV

The VoiceView data mode event message notifies the DTE when a VoiceView data-mode start sequence is received by the DCE. If the DCE is not in the VoiceView service class, the DTE responds to the –SSV event message with either the +FCLASS = 80;A command line, or the –SRJ reject command. This message can be suppressed by setting the –SEV event suppression parameter. If the –SSV message is suppressed, then incoming VoiceView data-mode start sequences that are detected when the modem is in a non-VoiceView service class are rejected.

1.15.2 Modem Data Mode Event Message

Read Syntax: –SSD

The modem data-mode event message notifies the DTE when a modem data-mode start sequence is received by the DCE. If the DCE is not in the data service class, the DTE responds to the –SSD event message with either the +FCLASS=0;A command line or the –SRJ reject command. This message can be suppressed by setting the –SEV event suppression parameter. If the –SSD message is suppressed, then incoming modem data-mode start sequences that are detected in non-data service class are rejected.

1.15.3 Fax Data Mode Event Message

Read Syntax: –SSF

The fax data-mode event message notifies the DTE when a fax data mode start sequence is received by the DCE. If the DCE is not in a fax service class, the DTE is expected to respond to the –SSF event message with either the +FCLASS=1 or 2.0;A command line or the AT–SRJ reject command. This message can be suppressed by setting the –SEV event suppression parameter. If the –SSF message is suppressed, then incoming fax data mode start sequences that are detected in a nonfax service class are rejected.

1.15.4 ADSI Response Message

Read Syntax: –SRA

The ADSI response message notifies the DTE when the DCE has received the DTMF A tone response to a capabilities query. The answering DCE is an ADSI CPE device. This message can be suppressed by setting the –SEV event-suppression parameter.

1.15.5 Capabilities Query Event Message

Read Syntax: –SRQ

The DCE issues the capabilities query event message to notify the DTE when a capabilities query or a two-way capabilities exchange request has been received by the DCE. This message can be suppressed by setting the –SEV event-suppression parameter.

Suppressing this message does not prevent the DCE from transmitting its capabilities; it does prevent the DCE from requesting an exchange of capabilities, if so configured.

If a two-way capabilities exchange request is received in response to a capabilities query, the –SRQ event report is reported to the DTE following the –SRC:<capabilities octets> message.

1.15.6 Capabilities Response

Read Syntax: –SRC:<capabilities octets>

This event message reports the capabilities information received from the fax-end DCE to the DTE. Octets of the capabilities information consist of pairs of hex numbers separated by spaces. All capabilities octets are returned in a single response.

1.15.7 Talk Off Event Message

Read Syntax: –STO

The DCE issues the talk off event message when the DCE detects the Voice-View start tone but not the flag sequence or the ADSI CAS tone. This message is for information, and may be used by the DTE. This message can be suppressed by setting the –SEV event suppression parameter.

1.15.8 VoiceView Message Present Event Message

Read Syntax: –SVM

The DCE issues a VoiceView message indicating that there is a message present when the DCE has correctly received the first frame in its message storage system. The DCE issues the –SVM message periodically until the DTE deletes all messages with the –SEMerase message command. The period of the –SVM message is defined by the –SKA keep-alive timer. The DCE issues the –SVM message as long as it has at least one message in its message storage system.

1.16 Help Commands

This section lists the commands that will take you to specific help screens when you need assistance with the AT commands.

Command Syntax

AT\$

Description

Displays a help screen to the DTE describing each of the AT single-letter commands:

&\$	A/	AT	A	B	D	DL
DSn	D\$	En	Fn	Hn	In	Ln
Mn	On	P	Qn	Sr=n	Sr?	S\$
T	Vn	Xn	Yn	Zn	+++	\$

Arguments

None

Aborting Events

Entering <Ctrl>C interrupts the command. Entering <Ctrl>S stops the command and interrupts the display. Entering <Ctrl>S or <any key> from the DTE restarts the display.

Command Syntax	AT&\$																					
Description	<p>Displays a help screen to the DTE describing each of the extended commands.</p> <table><tr><td>&A</td><td>&B</td><td>&C</td><td>&D</td><td>&F</td><td>&G</td><td>&H</td></tr><tr><td>&I</td><td>&K</td><td>&M</td><td>&N</td><td>&P</td><td>&R</td><td>&S</td></tr><tr><td>&T</td><td>&Y</td><td>&W</td><td>&Zn=s</td><td>&Zn?</td><td></td><td></td></tr></table>	&A	&B	&C	&D	&F	&G	&H	&I	&K	&M	&N	&P	&R	&S	&T	&Y	&W	&Zn=s	&Zn?		
&A	&B	&C	&D	&F	&G	&H																
&I	&K	&M	&N	&P	&R	&S																
&T	&Y	&W	&Zn=s	&Zn?																		
Arguments	None																					
Aborting Events	Entering <Ctrl>C or <Ctrl>K from the DTE interrupts the command. Entering <Ctrl>S from the DTE interrupts the display. Entering <Ctrl>S or <any key> from the DTE restarts the display.																					

Command Syntax

ATD\$

Description

Displays a help screen to the DTE describing each of the dial commands.

- ☐ Digits used in dial string
- ☐ Auxiliary touch-tone-pad digits
- ☐ Tone-dialing command
- ☐ Pulse-dialing command
- ☐ Reverse frequencies
- ☐ Pause
- ☐ Return-to-command mode
- ☐ Quote mode
- ☐ Wait-for-second dial tone
- ☐ Wait for answer
- ☐ Flash switchhook

Arguments

None

Aborting Events

Entering <Ctrl>C or <Ctrl>K from the DTE interrupts this command. Entering <Ctrl>S from the DTE interrupts the display. Entering <Ctrl>S or <any key> from the DTE restarts the display.

Command Syntax	ATSn?
Description	Displays the contents of a command or S register when a ? character is entered after the command character or S register name.
Arguments	None
Aborting Events	None

S\$ (S Register Decription) *Help Commands*

Command Syntax	ATS\$
Description	<p>Displays a help screen to the DTE describing each of the following S registers: S0–S13, S15, S16, S18, S19, S21–S23, S25, S27–S34, and S38.</p> <p>The remaining registers are reserved and are not described in a help screen.</p>
Arguments	None
Aborting Events	Entering <Ctrl>C interrupts the command. Entering <Ctrl>S holds the command. Entering <Ctrl>S or <any key> restarts the command.