

Commands

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General Commands

- AT - Command Prefix
 - A - Answer
 - B - US/ITU-T Answer Sequence
 - C - Transmitter - No longer used
 - D - Dial
 - E - Echo
 - F - Duplex
 - H - Hook
 - I - Inquiry
 - L - Volume
 - M - Speaker
 - O - Online
 - P - Pulse Dial
 - Q - Quiet
 - T - Tone Dial
 - V - Result Codes
 - X - Result Code Options
 - Y - Set Default Profile
 - Z - Reset
 - A/ - Re-Execute Command
 - A> - Re-Execute Command Continuously
 - +++ - Escape Code
-

AT (Command Prefix)

Function	Prefix to modem commands. "AT" may be in lowercase or uppercase, but not mixed case.
Command Syntax	AT <Argument>
Argument	None.
Default	N/A
DTE Interface	None.
LED	None.
Aborting Events	None.

Notes

In order for the modem to accept the "AT", there must be 1 ms of inactivity preceding the command on the DTE TD line. This timing constraint is a result of rack applications, where older versions of product, experienced a situation where DTR dropped or the remote DCE disconnected during an ASCII file transfer. The ASCII file that was still being sent to the modem at a high baud rate after it disconnected contained the characters "AT". The product then went into command mode and waited for the line terminator character ([S3](#)) to follow. The host was unaware that it had sent an "AT" to the modem, but reported that the modem was unresponsive.

"AT" must precede all other commands except the [A/](#), [+++](#), and [A>](#) commands. Any characters that preceded the "AT" are ignored. Any characters that follow the "AT" are treated as commands, until the line terminator character (determined by [S3](#)) is received.

When a command prefix is entered, modem clears previous command buffer in preparation for accepting a new command line.

Related All of them.

A (Answer)

Function	Command to execute answer sequence. Modem goes off hook, waits for billing delay time, then sends answer tone and goes into handshake sequence.
Command Syntax	ATA
Argument	None.
Default	N/A
DTE Interface	DSR is asserted after modem goes off hook, if &S0=1 , and modem is not in test mode (following ITU-T V.22bis recommendation, self test section)
LED	None.
Aborting Events	<p>Any key pressed during the answer sequence will abort it and return modem to command mode.</p> <p>DTR is not asserted and &D is not equal 1; or the time stored in S7 expires.</p>
Notes	<p>The speaker is activated when the modem goes off-hook, as set by the M command.</p> <p>Any other commands that follow ANSWER (A) are ignored.</p>
Related	S0

B (US/ITU-T Answer Sequence)

Function	Select between US answer sequence (2325 Hz) and ITU-T answer sequence (2100 Hz and 2250 Hz).
Command Syntax	ATB<argument>
Argument	0 - ITU-T V.25 answer sequence. Also used to answer calls originating outside the US or Canada. 1 - Bell answer tone
Default	0
DTE Interface	None.
LED	None.
Aborting Events	None.
Notes	B0 is required to activate &G1 and &G2 commands.
Related	&G

C (Transmitter)

Function	No longer functional
Command Syntax	N/A
Argument	N/A
Default	N/A
DTE Interface	N/A
LED	N/A
Aborting Events	N/A
Notes	Command is ignored and does not generate ERROR message.
Related	N/A

D (Dial)**Function**

Modem goes off hook, enters originate mode (unless R command is used), waits the number of seconds stored in the [S6](#) register, if [X](#) command is set to 0,1,3 or 5, and dials string that follows. Call progress result codes (if any) are sent to the DTE (See the [Q](#), [V](#) and [X](#) commands). The result is that the modem establishes a data connection and goes into data mode (or command mode: see ";" argument), or fails to establish a data connection and reverts to command mode.

Command Syntax

ATD<argument>

Arguments**Argument****Description**

0-9

Numeric digits. Numbers to be dialed

#,*

Extended touch tone pad tones

,

Pause - modem delays for the number of seconds stored in the [S8](#) register before executing the following commands or arguments in dial string

;

Return to command mode after dialing is completed

!

Flash switch hook. The modem goes off hook for 0.5 sec, the goes on hook for 0.5 sec and goes offhook again. This command is primarily used to transfer calls to another extension.

T

Touch tone dialing - [S11](#) register sets duration and spacing of touch-tones.

P

Pulse dialing - modem pulse dials using [&P](#) command parameter.

@

Wait for answer - modem will dial string, detect at least one ring signal, wait for five seconds of silence at the remote end for up to the number of seconds stored in the [S7](#) register, and then execute the rest of the dial string that follows the @ command. This command is functional when the [X](#) command is set to 3,4,5 and 6.

R

Reverse frequencies - modem reverses originate and answer frequencies, so that it originates in answer mode.

Sn

Modem dials 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. Also used to indicate termination of dial string. The second quote is not required unless other commands follow the dial string.

/	Short delay - modem delays 125 ms before proceeding with dial string execution. Can also be a non-dial command.
W	Wait for second dial tone before proceeding with dial tone execution. This feature is active when result code option X3 or greater has been issued. If the modem is set to X2 or lower, the modem interprets the W as a comma (two seconds pause default value or the value of S8).
L	Causes the modem to dial the number that is stored in last dialed buffer. This buffer is reset on ATZ or power on reset. ATDL? will display the number that is in the buffer.

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

Default

N/A

DTE Interface

DSR is asserted after dialing, when the modem detects the remote modem's answer tone if [&S1](#) (DSR is always on if [&S0](#))

LED

None.

Any key pressed - When a dial string is aborted, any additional commands following the dial string are not executed.

Failure to establish data connection.

Aborting Events

No carrier sensed after time in [S7](#) register has elapsed.

Failure to detect ring signal or silence during processing of an @ command.

The modem detects a busy signal and the [X](#) parameter is set to 3, 4, 5 and 6.

The modem detects no dial tone and the [X](#) parameter is set to 2, 4 or 6.

Modem will go off hook and dial as soon as it detects dial tone, if [X](#) command is set to 2, 4 or 6 ("fast dial" mode).

Notes

The speaker is activated when modem goes off-hook, as set by the M command.

Dial string may include up to 60 characters, excluding "AT" prefix, <CR> character and spaces.

Related[X](#)

E (Echo)

Function	Enables echo of commands to DTE in command mode. Echo is initialized by DIP switch # 4 (if present). Echo is also initialized by system reset commands (see Z command).
Command Syntax	ATE<argument>
Argument	0 - Modem does not echo commands to DTE in command mode 1 - Modem echoes commands to DTE in command mode
Default	1
DTE Interface	None.
LED	None.
Aborting Events	None.
Notes	Echo is turned off when parsing a command line, and reverts to the state defined by the E command otherwise.
Related	None.

F (Duplex)

Function	Modem echoes transmitted data to DTE in on-line mode.
Command Syntax	ATF<argument>
Argument	0 - Transmitted data is echoed to DTE in on-line mode 1 - Transmitted data is not echoed to DTE in on-line mode
Default	1
DTE Interface	None.
LED	None.
Aborting Events	None.
Notes	None.
Related	None.

H (Hook)

Function	Command the modem to connect with the phone line.
Command Syntax	ATH<argument>
Argument	0 - Modem goes on hook (opens phone line relay). 1 - Modem goes off hook (closes phone line relay).
Default	N/A
DTE Interface	None.
LED	None.
Aborting Events	None.
Notes	None.
Related	None.

I (Inquiry)

Function Command returns various information screens to DTE.

Command Syntax ATI<argument>

Argument

Argument	Description
0	4 digit product code (yyyx, where x is a revision identifier and y is the maximum speed divided by 10) is sent to the DTE. (example: 1440 for Sportster)
1	Modem performs checksum operation on supervisor code and sends results to DTE
2	Modem tests RAM by writing and reading alternating Hex bytes 55h and AAh into the RAM, and returns the results by "ERROR" or "OK" result code to the DTE.
3	Modem returns Product ID string. The string contains the Company name, the Product line name and the speed of the product. Additionally, some special features like FAX and VOICE will also be listed
4	Modem sends one screen of data to the DTE indicating the present configuration of the following settings: <ol style="list-style-type: none"> 1. B, E, F, M, Q, V and X commands 2. DTE baud rate, parity, word length, dial type (pulse or tone), and H setting (On or Off Hook). 3. &A, &B, &C, &D, &G, &H, &I, &K, &M, &N, &P, &R, &S, &T, and &Y 4. S-register values from (S0 - S42) 5. LAST DIALED #:
5	Modem sends two screens of data to DTE indicating present configuration of the following commands stored in each NVRAM template: <ol style="list-style-type: none"> 1. Dial type, B, F, M, X commands. For PC Internal version, E, Q, and V commands 2. Stored default baud rate, Stored parity, Stored Word length. 3. &A, &B, &G, &H, &I, &K, &M, &N, &P, &R, &S, &T, and &Y settings. For PC Internal version &D and &C commands. 4. S-register values from S0, S2-S15, S19, S21-S23, S25, S27, S28, S29 - S36, S38 - S42. 5. Phone numbers stored in locations 0 through 3.

- 6 Modem sends diagnostic screen to DTE with the following information from the previous data connection:
1. Numbers of characters sent, received, and lost.
 2. Numbers of octets (compressed characters) sent, received.
 3. Numbers of blocks sent, received, and re-sent.
 4. Numbers of retrains requested, granted.
 5. Number of line reversals.
 6. Numbers of protocol blocks in error.
 7. Numbers of link time-outs, link "naks".
 8. Negotiated settings for data compression (on/off), equalization (long/short).
 9. Fallback enabled/disabled - (indicates whether modem negotiated a fallback during connection).
 10. Error Correcting Protocol (LAPM, MNP or NONE).
 11. DCE speed.
 12. Disconnect reason.
 13. Duration of the last call.
- 7 Product configuration. One screen of data is sent to the DTE that contains the following information:
1. Product type (External or Internal).
 2. Options
 3. Clock Frequency
 4. EPROM Size
 5. RAM Size
 6. Code date.
 7. Code revision.
- 8 Blacklist screen (International products only)
- 9 Plug and Play feature. Modem will issue the following string (text after ";" are comments):
- ```
(
1.0 ; Begin PnP
 ; Plug and Play Version 1.0
 ; *note: ASCII vs. Binary
 ; representation
USRxxxx ; EISA Manufacturer ID (xxxx is a
 ; model specific number)
SPORTSTER 33.6 FAX INT (or EXT) ;
\ ; No serial number
\MODEM ; Class ID
\ ;
\Sportster 33.6 FAX INT (or EXT) ; User Name
) ; End PnP
```
- 10 Reserved
- 11 Extended Link Diagnostics -- Modem will provide extended information to aid customer support configuration of the product

|                        |                                                                                                                                    |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Default</b>         | N/A                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                              |
| <b>LED</b>             | None.                                                                                                                              |
| <b>Aborting Events</b> | <ctrl> C or <ctrl> K - Aborts display from that point on.<br>Display of screens can be halted by <ctrl>S and restarted by any key. |
| <b>Notes</b>           | See <a href="#">I-Screen</a> for details on inquiry screen parameters.                                                             |
| <b>Related</b>         | None.                                                                                                                              |

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**L (Volume)**

|                        |                                                                                 |
|------------------------|---------------------------------------------------------------------------------|
| <b>Function</b>        | Command is used to control modem speaker volume on the PC Internal form factor. |
| <b>Command Syntax</b>  | ATL<argument>                                                                   |
| <b>Argument</b>        | 0 - Low<br>1 - Low<br>2 - Medium<br>3 - High                                    |
| <b>Default</b>         | 2                                                                               |
| <b>DTE Interface</b>   | None.                                                                           |
| <b>LED</b>             | None.                                                                           |
| <b>Aborting Events</b> | None.                                                                           |
| <b>Notes</b>           | None.                                                                           |
| <b>Related</b>         | None.                                                                           |

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**M (Speaker)**

|                        |                                                                                                                                                                                                                                                                                                                                          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command is used to control modem speaker                                                                                                                                                                                                                                                                                                 |
| <b>Command Syntax</b>  | ATM<argument>                                                                                                                                                                                                                                                                                                                            |
| <b>Argument</b>        | 0 - Turns speaker off.<br>1 - Speaker is on during dial string execution until carrier is detected or modem goes on hook.<br>2 - Speaker is on all the time.<br>3 - Speaker is turned on after last digit in dial string is dialed, and then turned off when carrier is detected or until time stored in <a href="#">S7</a> has elapsed. |
| <b>Default</b>         | 1                                                                                                                                                                                                                                                                                                                                        |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                    |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                    |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                    |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                    |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                    |

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**O (Online)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Commands modem to return to previously established connection.                                                                                                                                                                                                                                                                                                                            |
| <b>Command Syntax</b>  | ATO<argument>                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Argument</b>        | 0 - Issued when off-hook and when <a href="#">S13.7</a> = 0 for detection of escape code (on-line command mode). The modem will remain on line and return to a connected data transfer mode.<br>1 - Issued when modem is in on-line command mode. Causes modem to return to data mode and at the same time initiates a retrain. Retrain will only be initiated at speeds above 1200 baud. |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Notes</b>           | When ATO1 is issued in on-hook state result code "OK" is returned.                                                                                                                                                                                                                                                                                                                        |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                     |

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**P (Pulse Dial)**

|                        |                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command causes the modem to dial in pulse mode when dialing a dial string. This is the default setting on power up. |
| <b>Command Syntax</b>  | ATP                                                                                                                 |
| <b>Argument</b>        | None.                                                                                                               |
| <b>Default</b>         | N/A                                                                                                                 |
| <b>DTE Interface</b>   | None.                                                                                                               |
| <b>LED</b>             | None.                                                                                                               |
| <b>Aborting Events</b> | None.                                                                                                               |
| <b>Notes</b>           | None.                                                                                                               |
| <b>Related</b>         | None.                                                                                                               |

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**Q (Quiet)**

|                        |                                                                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command enables or disables display of result codes. Quiet mode is set by DIP switch # 3 (if present) on external modems (with DIP switches).  |
| <b>Command Syntax</b>  | ATQ<argument>                                                                                                                                  |
| <b>Argument</b>        | 0 - Result codes are sent to DTE.<br>1 - Result codes are not sent to DTE.<br>2 - Result codes are not sent when in Answer mode.               |
| <b>Default</b>         | 0                                                                                                                                              |
| <b>DTE Interface</b>   | None.                                                                                                                                          |
| <b>LED</b>             | None.                                                                                                                                          |
| <b>Aborting Events</b> | None.                                                                                                                                          |
| <b>Notes</b>           | Quiet mode is used in some applications such as printer-modem installations, where publishing the result code to the DTE would be undesirable. |
| <b>Related</b>         | None.                                                                                                                                          |

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**T (Tone Dial)**

|                        |                                                                          |
|------------------------|--------------------------------------------------------------------------|
| <b>Function</b>        | Command places the modem in touch-tone dialing mode for dialing strings. |
| <b>Command Syntax</b>  | ATT                                                                      |
| <b>Argument</b>        | None                                                                     |
| <b>Default</b>         | N/A                                                                      |
| <b>DTE Interface</b>   | None.                                                                    |
| <b>LED</b>             | None.                                                                    |
| <b>Aborting Events</b> | None.                                                                    |
| <b>Notes</b>           | None.                                                                    |
| <b>Related</b>         | None.                                                                    |

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**V (Result Codes)**

|                        |                                                                                                                                                                                                                                                                                                                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command instructs modem to send result codes in either verbal or numeric modes to the DTE. Verbal response mode is controlled by DIP switch # 2 on the external modem. Verbal response mode is also set from software reset.                                                                                              |
| <b>Command Syntax</b>  | ATV<argument>                                                                                                                                                                                                                                                                                                             |
| <b>Argument</b>        | 0 - Enables numeric mode for result codes. Numeric codes are followed by a terminating character ( <a href="#">S3</a> Default = <CR>, 0Dh) only.<br>1 - Enables verbal mode for result codes. Verbal codes are preceded and followed by <a href="#">S3</a> and <a href="#">S4</a> settings ( <CR> and <LF> are defaults). |
| <b>Default</b>         | 1                                                                                                                                                                                                                                                                                                                         |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                     |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                     |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                     |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                     |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                     |

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**X (Result Code Options)**

**Function** Command selects or deselects result codes and call progress options according to <argument>

**Command Syntax** ATX<argument>

Below is a chart containing the variations on the arguments for X and the result codes they enable.

|                 | Numeric       | Verbal             | X0 | X1 | X2 | X3 | X4 |
|-----------------|---------------|--------------------|----|----|----|----|----|
| <b>Argument</b> | 0             | OK                 | Y  | Y  | Y  | Y  | Y  |
|                 | 1             | CONNECT            | Y  | Y  | Y  | Y  | Y  |
|                 | 2             | RING               | Y  | Y  | Y  | Y  | Y  |
|                 | 3             | NO CARRIER         | Y  | Y  | Y  | Y  | Y  |
|                 | 4             | ERROR              | Y  | Y  | Y  | Y  | Y  |
|                 | 5             | CONNECT 1200       |    | Y  | Y  | Y  | Y  |
|                 | 6             | NO DIAL TONE       |    |    | Y  |    | Y  |
|                 | 7             | BUSY               |    |    |    | Y  | Y  |
|                 | 8             | NO ANSWER *        |    |    |    | Y  | Y  |
|                 | 9             | reserved           |    |    |    |    |    |
|                 | 10            | CONNECT 2400       |    | Y  | Y  | Y  | Y  |
|                 | 11            | RINGING            |    |    |    |    | Y  |
|                 | 13            | CONNECT 9600       |    | Y  | Y  | Y  | Y  |
|                 | .             | CONNECT 4800-56000 |    | Y  | Y  | Y  | Y  |
| 236             | CONNECT 57333 |                    | Y  | Y  | Y  | Y  |    |

Below is a table of special dialing functions. These functions are activated by the value of the X command. In the case of both Adaptive dialing and Fast dial, neither function will run if the X command is not set for it. In the case of Wait for 2nd dial tone and Wait for answer, only a fixed delay will be used if the X command is not set for them.

|                | Function                      | X0 | X1 | X2 | X3 | X4 |
|----------------|-------------------------------|----|----|----|----|----|
| <b>Default</b> | Adaptive Dialing              |    |    | Y  | Y  | Y  |
|                | Wait for second dial tone (W) |    |    |    | Y  | Y  |
|                | Wait for answer (@)           |    |    |    | Y  | Y  |
|                | Fast dial                     |    |    | Y  |    | Y  |

**Default** 4

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** \* Requires @; replaces NO CARRIER

**Related** [Result Codes](#)

**Y (Set Default Profile)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Select default system profile. This command allows one of three profiles to be chosen for use at power and upon software reset. The modem will use either of the stored NVRAM configurations or it will use the factory default settings. This parameter is stored separately within the NVRAM and is read in before any other values. The modem uses the parameter to determine its course of action during any kind of reset. If no parameter is provided, then 0 is assumed. This parameter is reset by the <a href="#">&amp;F</a> command. |
| <b>Command Syntax</b>  | ATY<argument>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Argument</b>        | 0 - Use NVRAM configuration 0<br>1 - Use NVRAM configuration 1<br>2 - Use factory configuration 0<br>3 - Use factory configuration 1<br>4 - Use factory configuration 2<br><br>6 - Same as <a href="#">I6</a><br>11 - Lists the signal strength at certain frequencies                                                                                                                                                                                                                                                                         |
| <b>Default</b>         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Notes</b>           | Sends "OK" result code to DTE before executing the command.<br>Clears command line buffer. If <a href="#">A/</a> command is entered subsequently, modem sends OK result code to DTE, but doesn't execute any command.<br>Arguments that follow in the command buffer are not executed.<br>External modems only use arguments 0,1, 6 and 11                                                                                                                                                                                                     |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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**Z (Reset)**

|                        |                                                                                                                                                                                                                                                                                                                                                      |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Software reset command. Modem resets to either factory defaults or NVRAM settings, dependent parameter issued with the command. The modem uses the parameter and changes settings accordingly. If no parameter is provided, then 0 is assumed. U.S. Robotics (Sportster) products also use DIP switch #7 to determine which configuration is loaded. |
| <b>Command Syntax</b>  | ATZ<argument>                                                                                                                                                                                                                                                                                                                                        |
| <b>Argument</b>        | 0 - Reset then load configuration indicated by <u>Y</u> setting (also DIP switch 7 on externals)<br>1 - Reset then load NVRAM configuration 0<br>2 - Reset then load NVRAM configuration 1<br>3 - Reset then load factory configuration 0<br>4 - Reset then load factory configuration 1<br>5 - Reset then load factory configuration 2              |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                  |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                |
| <b>Notes</b>           | Sends "OK" result code to DTE before executing the command.<br>Clears command line buffer.<br>Arguments that follow in the command buffer are not executed.                                                                                                                                                                                          |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                |

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**A/ (Re-Execute Command)**

|                        |                                                                                                                                                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The A/ command causes the modem to re-execute the last command that was executed one time. This command does not take the AT prefix or a carriage return. |
| <b>Command Syntax</b>  | A/                                                                                                                                                        |
| <b>Argument</b>        | None.                                                                                                                                                     |
| <b>Default</b>         | N/A                                                                                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                                                                                     |
| <b>LED</b>             | None.                                                                                                                                                     |
| <b>Aborting Events</b> | None.                                                                                                                                                     |
| <b>Notes</b>           | None.                                                                                                                                                     |
| <b>Related</b>         | None.                                                                                                                                                     |

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**A> (Re-Execute Command Continuously)**

|                        |                                                                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The A> command causes the modem to re-execute the last command that was executed continuously. The S6 register value is used as a delay between re-executions. This command does not take the AT prefix or a carriage return. |
| <b>Command Syntax</b>  | A>                                                                                                                                                                                                                            |
| <b>Argument</b>        | None.                                                                                                                                                                                                                         |
| <b>Default</b>         | N/A                                                                                                                                                                                                                           |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                                                                         |
| <b>Aborting Events</b> | Any key during the execution delay period, will terminate the operation.                                                                                                                                                      |
| <b>Notes</b>           | None.                                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                                         |

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**+++ (Escape Code)**

|                        |                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command is a three-character sequence using the character defined by <a href="#">S2</a> register [Default = "+", decimal 43]. Used when modem is in data mode to either terminate the connection or to proceed to on-line command mode, depending on the setting of <a href="#">S13</a> . This command does not take the AT prefix or a carriage return. |
| <b>Command Syntax</b>  | +++                                                                                                                                                                                                                                                                                                                                                      |
| <b>Argument</b>        | None.                                                                                                                                                                                                                                                                                                                                                    |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                      |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                    |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                    |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                    |
| <b>Notes</b>           | Escape code sequence must be preceded and followed by "guard time" found in <a href="#">S12</a> register (default is one second), to be executed.                                                                                                                                                                                                        |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                    |

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### Ampersand Commands

[&A](#) - ARQ Result Codes Enable

[&B](#) - DTE Data Rate

[&C](#) - Carrier Detect

[&D](#) - Data Terminal Ready

[&F](#) - Load Factory Defaults

[&G](#) - Guard Tone

[&H](#) - Transmit Flow Control

[&I](#) - Receive Software Flow Control

[&K](#) - Data Compression

[&M](#) - Error Control and Synchronous Operation

[&N](#) - DCE Link Rate

[&P](#) - Make/Break Ratio

[&R](#) - Receive Hardware Flow Control

[&S](#) - DSR Options

[&T](#) - Diagnostic Tests

[&U](#) - DCE Link Rate Floor

[&W](#) - Write To NVRAM

[&Y](#) - Break Handling

[&Z](#) - Write Dial String To NVRAM

**&A (ARQ Result Codes)**

|                        |                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command enables/disables display of ARQ result codes if X command argument is 1 or greater (see <a href="#">X</a> command).                                                                                                                                                                                                                                          |
| <b>Command Syntax</b>  | AT&A <Argument>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Argument</b>        | 0 - "/ARQ" connection result codes are disabled.<br>1 - "/ARQ" connection result codes are enabled.<br>2 - Additional modulation indicator (E.G. V34) in result codes for calls at or above 4800 bps.<br>3 - Protocol of call reported: LAPM, MNP, or NONE. If modem negotiated for data compression, type of compression is added to the result code: V42BIS, MNP5. |
| <b>Default</b>         | 3                                                                                                                                                                                                                                                                                                                                                                    |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                |
| <b>Related</b>         | <a href="#">X</a>                                                                                                                                                                                                                                                                                                                                                    |

---

**&B (DTE Data Rate)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command selects how DTE data rate is determined.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Command Syntax</b>  | AT&B<argument>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Argument</b>        | 0 - Modem DTE interface rate follows the DCE connection rate.<br>1 - Modem DTE interface follows DTE rate, regardless of DCE connection rate.<br>2 - Fixed for ARQ calls/variable for non-ARQ calls. Answer mode only. When the modem goes off hook and answers in ARQ mode, it shifts its serial port rate to the one written in NVRAM. In non-ARQ mode it acts as if set to &B0 when answering, and switches its serial port rate to match the call's connection rate. |
| <b>Default</b>         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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**&C (Carrier Detect)**

|                        |                                                                                                                                                                                                            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command controls the carrier detect signal from the modem to the computer. On the external form factor, carrier detect is also controlled by DIP switch # 6 (if present) upon power up and software reset. |
| <b>Command Syntax</b>  | AT&C<argument>                                                                                                                                                                                             |
| <b>Argument</b>        | 0 - Carrier Detect override (CD) is always on.<br>1 - Modem send the carrier detect signal when it connects with another modem and drops the signal when it disconnects.                                   |
| <b>Default</b>         | 1                                                                                                                                                                                                          |
| <b>DTE Interface</b>   | CD will go true if &C1 when a connection is made. CD will return to a false state after the connection is dropped.                                                                                         |
| <b>LED</b>             | CD LED toggles on state of &C.                                                                                                                                                                             |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                      |
| <b>Notes</b>           | None.                                                                                                                                                                                                      |
| <b>Related</b>         | None.                                                                                                                                                                                                      |

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**&D (Data Terminal Ready)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command controls the DTR signal from the DTE to the modem. On the eternal form factor, DTR is also controlled by DIP switch #1 (if present) at power up.                                                                                                                                                                                                                                                                         |
| <b>Command Syntax</b>  | AT&D<argument>                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Argument</b>        | 0 - DTR override, assume DTR is always on.<br>1 - On-line command mode on DTR low. Modem enters command mode on DTR transition to low state. Returns on-line when DTR returns high.<br>2 - Computer must send DTR for the modem to accept commands, and dropping DTR terminates a call.<br>3 - Host must send DTR for modem to accept commands, and dropping DTR terminates any active call and causes modem to do a soft reset. |
| <b>Default</b>         | 2                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>DTE Interface</b>   | DTR line                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>LED</b>             | DTR LED toggles on state of DTR.                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                            |

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**&F (Load Factory Defaults)**

|                        |                                                                                                                                                                |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command resets command options to factory default ROM settings to RAM.                                                                                         |
| <b>Command Syntax</b>  | AT&F<argument>                                                                                                                                                 |
| <b>Argument</b>        | 0 - Load standard factory configuration.<br>1 - Load factory configuration 1 Hardware Flow Control.<br>2 - Load factory configuration 2 Software Flow Control. |
| <b>Default</b>         | 1                                                                                                                                                              |
| <b>DTE Interface</b>   | None.                                                                                                                                                          |
| <b>LED</b>             | None.                                                                                                                                                          |
| <b>Aborting Events</b> | None.                                                                                                                                                          |
| <b>Notes</b>           | None.                                                                                                                                                          |
| <b>Related</b>         | <a href="#">Settings</a>                                                                                                                                       |

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**&G (Guard Tone)**

|                        |                                                                                                                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command results in modem sending a guard tone after 2100 Hz answer tone is sent, during connection sequence. This command applies only to overseas calls at 2400 or 1200 bps.                                                                                           |
| <b>Command Syntax</b>  | AT&G<argument>                                                                                                                                                                                                                                                          |
| <b>Argument</b>        | 0 - No guard tone sent (US/Canada).<br>1 - 550 Hz guard tone follows answer tone. To be activated requires that argument of <a href="#">B</a> command is 0.<br>2 - Enable 1800 Hz guard tone. To be activated requires that argument of <a href="#">B</a> command is 0. |
| <b>Default</b>         | 0                                                                                                                                                                                                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                   |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                   |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                   |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                   |
| <b>Related</b>         | <a href="#">B</a>                                                                                                                                                                                                                                                       |

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**&H (Transmit Flow Control)**

|                        |                                                                                                                                                                                                                                                                                                                  |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command enables/disables flow control on transmitting channel.                                                                                                                                                                                                                                                   |
| <b>Command Syntax</b>  | AT&H<argument>                                                                                                                                                                                                                                                                                                   |
| <b>Argument</b>        | 0 - Transmit data flow control disabled.<br>1 - Enables hardware flow control (CTS)<br>2 - Enables software flow control XON/XOFF, using characters stored in <a href="#">S22</a> and <a href="#">S23</a> for XON/XOFF flow control characters, respectively.<br>3 - Enables hardware and software flow control. |
| <b>Default</b>         | 1                                                                                                                                                                                                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                            |
| <b>LED</b>             | The CTS LED follows the state of the CTS signal (only).                                                                                                                                                                                                                                                          |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                            |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                            |
| <b>Related</b>         | <a href="#">&amp;I</a> , <a href="#">&amp;R</a> , <a href="#">S22</a> , <a href="#">S23</a>                                                                                                                                                                                                                      |

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**&I (Receive Software Flow Control)**

**Function** Command enables software flow control options.

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

| Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | Disable XON/XOFF flow control of received data. All ASCII characters are transparent to modem except escape sequence                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1     | Modem responds to XON/XOFF characters as defined in S-registers 22 and 23, respectively. Modem also passes the characters through to the remote DCE.                                                                                                                                                                                                                                                                                                                                                                   |
| 2     | Modem responds to XON/XOFF characters as defined in S-registers 22 and 23, respectively, but does not pass the characters to the remote DCE.                                                                                                                                                                                                                                                                                                                                                                           |
| 3     | Enables Hewlett-Packard host mode. Modem receives an ENQ (decimal 05 ASCII) character every 80 characters from the host via the RS-232 line, and returns an ACK (decimal 06 ASCII) character to the host via the RS-232 line under two conditions: <ol style="list-style-type: none"> <li>The Modem responds immediately if the transmit buffers are empty.</li> <li>The Modem will not respond with ACK if transmit buffers are 90% full, but responds with ACK when transmit buffers fall below 30% full.</li> </ol> |
| 4     | Enables Hewlett-Packard terminal mode. Modem receives an ENQ from the remote DCE and passes it to the DTE. Modem sends no further data to the DTE until it responds with an ACK.                                                                                                                                                                                                                                                                                                                                       |
| 5     | Enables special flow control as follows: <ol style="list-style-type: none"> <li>If modem is in error-correction mode, it responds the same way as if the argument were 2.</li> <li>If modem is not in error-correction mode, it responds as though the argument was 0, except that it responds to XON/XOFF characters from the remote DCE, and does not pass them to the DTE.</li> </ol>                                                                                                                               |

**Default** 0

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** None.

**Related** [&I](#), [&H](#), [S22](#), [S23](#)

**&K (Data Compression)**

**Function** Command enables MNP level 5 or V42bis data compression. Requires that an MNP or a LAPM link has been established.

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

| Value | Description                                                                                                                                                                                                                                                                                        |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | Data compression disabled                                                                                                                                                                                                                                                                          |
| 1     | Automatic selection/deselecting. Data compression is enabled if the DTE data rate is higher than the link rate (see <a href="#">&amp;B</a> and <a href="#">&amp;N</a> commands), and the remote DCE either supports MNP level 5 option in the MNP link request or V42bis in the LAPM link request. |
| 2     | Data compression enabled. The setting is used to keep the modem from disabling data compression, however for this option to work error control must be enabled ( <a href="#">&amp;M4</a> or <a href="#">&amp;M5</a> ).                                                                             |
| 3     | Selective data compression disables MNP data compression, but not MNP error correction. It allows a V42bis connection with compression or an MNP connection without compression.                                                                                                                   |

**Default** 1

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** None.

**Related** [&M](#)

**&M (Error Control)**

|                        |                                                                                                                                                                                                                                                                                                                             |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command enables error control option.                                                                                                                                                                                                                                                                                       |
| <b>Command Syntax</b>  | AT&M<argument>                                                                                                                                                                                                                                                                                                              |
| <b>Argument</b>        | 0 - No error control. MNP or V.42 link request is ignored .<br>1 - RESERVED<br>2 - RESERVED<br>3 - RESERVED<br>4 - Automatic selection between V.42, MNP error control and non-error controlled data link.<br>5 - Error controlled link. If remote DCE doesn't respond to V.42 or MNP link request, modem disconnects call. |
| <b>Default</b>         | 4                                                                                                                                                                                                                                                                                                                           |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                       |
| <b>LED</b>             | If &M is set to 4 or 5 and an error-control link is established, the ARQ LED will turn on.                                                                                                                                                                                                                                  |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                       |
| <b>Notes</b>           | If &M is set to 0, error control will be disabled.                                                                                                                                                                                                                                                                          |
| <b>Related</b>         | <a href="#">&amp;K</a>                                                                                                                                                                                                                                                                                                      |

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**&N (DCE Link Rate)**

|                        |                                                          |
|------------------------|----------------------------------------------------------|
| <b>Function</b>        | Command selects variable or fixed maximum DCE data rates |
| <b>Command Syntax</b>  | AT&N<argument>                                           |
| <b>Argument</b>        | See <a href="#">Speeds</a> for list of arguments         |
| <b>Default</b>         | 0                                                        |
| <b>DTE Interface</b>   | None.                                                    |
| <b>LED</b>             | None.                                                    |
| <b>Aborting Events</b> | None.                                                    |
| <b>Notes</b>           | None.                                                    |
| <b>Related</b>         | <a href="#">&amp;U</a>                                   |

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**&P (Make/Break Ratio)**

|                        |                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command enables one of two possible phone line relay duty cycles used during pulse dialing.                             |
| <b>Command Syntax</b>  | AT&P<argument>                                                                                                          |
| <b>Argument</b>        | 0 - US/Canada make/break ratio of 39%/61%.<br>1 - UK make/break ratio of 33%/67%.                                       |
| <b>Default</b>         | 0                                                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                                                   |
| <b>LED</b>             | None.                                                                                                                   |
| <b>Aborting Events</b> | None.                                                                                                                   |
| <b>Notes</b>           | To call or answer overseas modems at 300 bps, set the modem to <a href="#">ITU-T V.21</a> mode. See <a href="#">S27</a> |
| <b>Related</b>         | None.                                                                                                                   |

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**&R (Receive Hardware Flow Control)**

**Function** Command enables options for received data hardware flow control.

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

**Argument** 0 - Reserved.  
1 - RTS signal is ignored.  
2 - Modem sends data to DTE only if RTS is asserted.

**Default** 2

**DTE Interface** RTS, CTS

**LED** None.

**Aborting Events** None.

**Notes** If DTR and RTS are both not asserted during a data connection, and &R is set to 2, modem sends result codes to DTE. This is because in a Basic program, the only way to drop DTR is by closing the COM port, thus forcing RTS low also. In this case, modem is not allowed to send a "NO CARRIER" result code and go on hook, unless it interprets this combination of events as a warrant to send the no carrier result code.

**Related** [&I](#), [&H](#)

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**&S (DSR Options)**

|                        |                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command selects among options.                                                                                                |
| <b>Command Syntax</b>  | AT&S<argument>                                                                                                                |
| <b>Argument</b>        | 0 - DSR is always asserted.<br>1 - DSR is asserted when modem starts a data connection and not asserted when carrier is lost. |
| <b>Default</b>         | 0                                                                                                                             |
| <b>DTE Interface</b>   | DSR                                                                                                                           |
| <b>LED</b>             | None.                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                         |

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**&T (Diagnostic Tests)**

**Function** Command controls the diagnostic test modes internal to the modem.

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

| Value | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0     | Terminates current test.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1     | Initiates analog loop back test at any link rate, modulation, compression or error control. <a href="#">S16=4</a> may be set for a test pattern. Modem must be off-line without any other test in progress such as, <a href="#">S16=1</a> . From off-line it will enter test and give a "CONNECT..." message and is ready to receive loop back characters. If the test is denied for one of the above reasons an "ERROR" message is issued. If on-line when issued modem will drop call and issue a "CONNECT..." and then is ready to receive loop back character.                       |
| 2     | RESERVED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3     | Initiates digital loop back test at any link rate, modulation, compression or error control, which allows the remote end to test out their transmit and receive paths. All data received by local modem is sent back out. Modem has to be in on-line command mode, after receiving the command it starts the test and issues an "OK" terminated.                                                                                                                                                                                                                                         |
| 4     | Grant remote digital loop back: will allow the local modem to respond to a request for remote digital loop back.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5     | Deny remote digital loop back to the remote end requesting loop back.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 6     | Initiates remote digital loop back at link rates of 2400 or 1200 bps with any compression or error control. Modem must be off-hook and in on-line command mode without any other test in progress such as, <a href="#">S16=1</a> or 8. If this condition is met, and permission is granted by the remote modem, the modem then enters the state test and issues a "CONNECT..." message. When <a href="#">S16</a> is set to 4 a test pattern will be sent. If the test is denied for one of the above reasons an "ERROR" message is issued and the modem returns to on-line command mode. |

- 7 Initiates remote digital loop back with self-test at link rates of 2400 or 1200 bps, with any compression or error control. Modem must be off-hook and in on-line command mode without any other test in progress such as, [S16=4](#). Remote access permission must be granted as well. Modem enters test and issue a "OK" message. Modem then sends out a pattern of repeating "U's which can not be seen by the user as modem stays in on-line command mode. If the test is denied for one of the above reasons an "ERROR" message is issued and returned to on-line command mode.
- 8 Initiates analog loop back with self-test at any link rate, modulation, compression or error control. Modem must be off-line without any other test in progress such as, [S16=1](#). From off-line it will enter test and give a "OK" message. The modem then sends out a test pattern of repeating "U's which can not be seen by the user as the modem stays in on-line command mode. If the test is denied for one of the above reasons an "ERROR" message is issued. If on-line when issued, modem will drop call and issue a "CONNECT..." and then be ready to send loop back characters.

|                      |       |
|----------------------|-------|
| <b>Default</b>       | 5     |
| <b>DTE Interface</b> | None. |
| <b>LED</b>           | None. |

To terminate tests, you must be in on-line command mode.

1 - The test can be terminated by entering a &T0, or ATH0, lowering DTR, doing this modem will go off-line and issue a "OK" response; ATZ will end test and then reset modem; the expiration of the test timer that uses [S18](#). Also, by any key if [S16](#)=4 was set.

2 - N/A.

3 - The test can be terminated by entering a &T0, which will end test and respond with a "OK" response; or by ATH0 or lowering DTR will end test go off-line and issue a "OK" response; or by ATZ will end test, issue a "OK" response and then reset modem; or by the expiration of the test timer that uses [S18](#).

4 - N/A.

5 - N/A.

6 - The test can be terminated by entering a &T0, which will end test and respond with a "OK" response; or by either ATH0 or lowering DTR will end test go off-line and issue a "OK" response; or by ATZ will end test issue a "OK" response and then reset modem; or by the expiration of the test timer that uses [S18](#). Also if [S16](#)=4 was set any key entered will abort test.

7 - The test can be terminated by entering a &T0, which will end test, give a three digit error count, (error count of 255 is given for errors over 255) and respond with a "OK" response; or by either ATH0 or lowering DTR which will end the test, go off-line and issue a "OK" response; or by ATZ will end test, issue a "OK" response and then reset modem; or by the expiration of the test timer that uses [S18](#).

8 - The test can be terminated by entering a &T0, entering an ATH0, or by lowering DTR. After getting one of these commands, the modem will give a three-digit error count. 255 is used for errors greater then 255. The modem will then go off-line and issue a "OK" response. An ATZ will end test, issue the above error response and then reset the modem. The test timer ([S18](#)) expiration will issue a report and an "OK" response like &T0.

## Aborting Events

## Notes

None.

## Related

[S16](#), [S18](#)

**&U (DCE Link Rate Floor)**

Command sets minimum DCE connection data rates. This command work in conjunction with &N. The table below defines the interactions.

|                        |                                                  | <b>&amp;N=0</b>                                               | <b>&amp;N&gt;0</b>                                          |
|------------------------|--------------------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------|
| <b>Function</b>        | <b>&amp;U=0 or<br/>&amp;U&gt;&amp;N</b>          | Modem doesn't limit connect speed.                            | Modem connects at &N speed only.                            |
|                        | <b>&amp;U&gt;0</b>                               | Modem connects in range from maximum speed down to &U setting | Modem connects in range from &N setting down to &U setting. |
| <b>Command Syntax</b>  | AT&U<argument>                                   |                                                               |                                                             |
| <b>Argument</b>        | See <a href="#">Speeds</a> for list of arguments |                                                               |                                                             |
| <b>Default</b>         | 0                                                |                                                               |                                                             |
| <b>DTE Interface</b>   | None.                                            |                                                               |                                                             |
| <b>LED</b>             | None.                                            |                                                               |                                                             |
| <b>Aborting Events</b> | None.                                            |                                                               |                                                             |
| <b>Notes</b>           | None.                                            |                                                               |                                                             |
| <b>Related</b>         | <a href="#">&amp;N</a>                           |                                                               |                                                             |

**&W (Write to NVRAM)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command writes current modem configuration to NVRAM. The general intent of this command is that all commands and registers which are not in production test commands or <a href="#">S1</a> , are stored in NVRAM.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Command Syntax</b>  | AT&W <argument>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Argument</b>        | 0 - Store to NVRAM pattern 0.<br>1 - Store to NVRAM pattern 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Notes</b>           | The following command settings are stored in NVRAM:<br><a href="#">B</a> , <a href="#">F</a> , <a href="#">M</a> , <a href="#">X</a> , <a href="#">E</a> , <a href="#">Q</a> , <a href="#">V</a> , <a href="#">L</a> , <a href="#">&amp;A</a> , <a href="#">&amp;B</a> , <a href="#">&amp;C</a> , <a href="#">&amp;D</a> , <a href="#">&amp;G</a> , <a href="#">&amp;H</a> , <a href="#">&amp;I</a> , <a href="#">&amp;K</a> , <a href="#">&amp;M</a> , <a href="#">&amp;N</a> , <a href="#">&amp;P</a> , <a href="#">&amp;R</a> , <a href="#">&amp;S</a> , <a href="#">&amp;T</a> (stores <a href="#">&amp;T4</a> or <a href="#">&amp;T5</a> only), <a href="#">&amp;Y</a> , <a href="#">S0</a> , <a href="#">S2 to S13</a> , <a href="#">S15</a> , <a href="#">S19</a> , <a href="#">S21 to S23</a> , <a href="#">S25</a> , <a href="#">S27 to S42</a> , <a href="#">&amp;Z0</a> through <a href="#">&amp;Z3</a> dial strings, Word length and parity, Data rate |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**&Y (Break Handling)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command enables various methods of handling break sequences when a break is received from DTE or remote DC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Command Syntax</b>  | AT&Y<argument>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Argument</b>        | 0 - Destructive option. When modem receives break signal from DTE, it clears data from transmit buffer, but does not pass break to the remote DCE. Both local and remote Modems reset data compression tables.<br>1 - Expedited destructive option. When modem receives break signal from DTE, it clears data from transmit buffer and sends break to remote DCE Modem, also resets data compression tables.<br>2 - Expedited nondestructive option. When modem receives break signal from the DTE, it does not clear transmit buffer, but sends break to remote DCE out of sequence.<br>3 - Reserved |
| <b>Default</b>         | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Command writes dial string to NVRAM<br><br>First command syntax is "AT&Zn=s". This command is used to write an input dial string into NVRAM. The parameters n and s are defined as follows:<br><br>n - Save position 0 through 3 [Default = 0 if no argument for n is given].<br>s - Dial string up to 36 characters, not including <CR>, "AT" or space characters. Non-dial string commands are not allowed in the dial string.<br><br>Second command syntax is "AT&Zn=L". This command is used to write the previously input dial string to NVRAM. The parameter n is defined as follows:<br><br>n - Position 0 through 3 [Default = 0 if no argument for n is given].<br><br>Third command syntax is "AT&Zn?" This command is used to display the current dial string stored in NVRAM. The parameter n is defined as follows:<br><br>n - Position 0 through 3 [Default = 0 if no argument for n is given].<br><br>Fourth command syntax is "AT&ZL?" This command is used to display the last executed dial string. There are no parameters for this command. |
| <b>Command Syntax</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Argument</b>        | See above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Notes</b>           | Phone number is stored until a non-dial command or a line terminator ( <a href="#">S3</a> ) is encountered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**S-Registers**

|                                                         |                                                                        |
|---------------------------------------------------------|------------------------------------------------------------------------|
| <a href="#">S0</a> - Answer on Ring                     | <a href="#">S22</a> - XON Character                                    |
| <a href="#">S1</a> - Ring Counter                       | <a href="#">S23</a> - XOFF Character                                   |
| <a href="#">S2</a> - Escape Code Character              | S24 - Reserved                                                         |
| <a href="#">S3</a> - Carriage Return Character          | <a href="#">S25</a> - DTR Recognition Time                             |
| <a href="#">S4</a> - Line Feed Character                | S26 - Reserved                                                         |
| <a href="#">S5</a> - Backspace Character                | <a href="#">S27</a> - Connection Options - Bitmapped Register          |
| <a href="#">S6</a> - Dial Wait Time                     | <a href="#">S28</a> - v.32 Handshaking Time                            |
| <a href="#">S7</a> - Carrier Wait Time                  | <a href="#">S29</a> - v.21 Answer Mode Fallback Timer                  |
| <a href="#">S8</a> - Pause Wait Time                    | <a href="#">S30</a> - Deadman Timer Function                           |
| <a href="#">S9</a> - Carrier to Connect Wait Time       | <a href="#">S31</a> - TAD Audio Level Adjust                           |
| <a href="#">S10</a> - Loss Of Carrier Wait Time         | <a href="#">S32</a> - Connection Options - Bitmapped Register          |
| <a href="#">S11</a> - Touch Tone Spacing And Duration   | <a href="#">S33</a> - v.34/v.34+ Connection Setup - Bitmapped Register |
| <a href="#">S12</a> - Guard Time                        | <a href="#">S34</a> - v.34/v.34+ Connection Setup - Bitmapped Register |
| <a href="#">S13</a> - Bitmapped Register                | <a href="#">S35</a> - x2 Connection Setup - Bitmapped Register         |
| S14 - Reserved                                          | S36 - Reserved                                                         |
| <a href="#">S15</a> - ARQ Options - Bitmapped Register  | <a href="#">S37</a> - v.90 Connection Setup - Bitmapped Register       |
| <a href="#">S16</a> - Test Options - Bitmapped Register | <a href="#">S38</a> - DTR Drop Delay                                   |
| S17 - Reserved                                          | S39 - Reserved                                                         |
| <a href="#">S18</a> - Test Mode Timer                   | S40 - Reserved                                                         |
| <a href="#">S19</a> - Inactivity Timer                  | <a href="#">S41</a> - Bitmapped Register                               |
| S20 - Reserved                                          |                                                                        |
| <a href="#">S21</a> - Break Character Length            |                                                                        |

**S0 (Answer on Ring)**

|                        |                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Sets the number of rings on which to answer when modem is set to Auto Answer mode                                             |
| <b>Command Syntax</b>  | ATS0= <Argument>                                                                                                              |
| <b>Argument</b>        | 0-255                                                                                                                         |
| <b>Default</b>         | 0                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                         |
| <b>Notes</b>           | If the modem does not have DIP switches, then if DTR is asserted and S0 is not 0, the modem will answer on ring <value of S0> |
| <b>Related</b>         | <a href="#">A</a> , <a href="#">S1</a>                                                                                        |

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**S1 (Ring Counter)**

|                        |                                                                                                                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the number of rings received                                                                                                                                                                                 |
| <b>Command Syntax</b>  | ATS1= <Argument>                                                                                                                                                                                                    |
| <b>Argument</b>        | N/A                                                                                                                                                                                                                 |
| <b>Default</b>         | 0                                                                                                                                                                                                                   |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                               |
| <b>LED</b>             | None.                                                                                                                                                                                                               |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                               |
| <b>Notes</b>           | You can set S1 to a value and it will be increased when a ring comes in. Issuing ATS1? will cause the modem to return the current value of S1. Issuing ATS1=? will cause S1 to reset to zero and report that value. |
| <b>Related</b>         | <a href="#">A</a> , <a href="#">S0</a>                                                                                                                                                                              |

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**S2 (Escape Code Character)**

|                        |                                                                                       |
|------------------------|---------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the ASCII decimal code for the escape code character                           |
| <b>Command Syntax</b>  | ATS2= <Argument>                                                                      |
| <b>Argument</b>        | Decimal representation for the character. See <a href="#">ASCII</a> for more options. |
| <b>Default</b>         | 43 (decimal for +)                                                                    |
| <b>DTE Interface</b>   | None.                                                                                 |
| <b>LED</b>             | None.                                                                                 |
| <b>Aborting Events</b> | None.                                                                                 |
| <b>Notes</b>           | None.                                                                                 |
| <b>Related</b>         | None.                                                                                 |

---

**S3 (Carriage Return Character)**

|                        |                                                                                       |
|------------------------|---------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the ASCII decimal code for the carriage return character                       |
| <b>Command Syntax</b>  | ATS3= <Argument>                                                                      |
| <b>Argument</b>        | Decimal representation for the character. See <a href="#">ASCII</a> for more options. |
| <b>Default</b>         | 13 (decimal for CR)                                                                   |
| <b>DTE Interface</b>   | None.                                                                                 |
| <b>LED</b>             | None.                                                                                 |
| <b>Aborting Events</b> | None.                                                                                 |
| <b>Notes</b>           | None.                                                                                 |
| <b>Related</b>         | None.                                                                                 |

---

**S4 (Line Feed Character)**

|                        |                                                                                       |
|------------------------|---------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the ASCII decimal code for the line feed character                             |
| <b>Command Syntax</b>  | ATS4= <Argument>                                                                      |
| <b>Argument</b>        | Decimal representation for the character. See <a href="#">ASCII</a> for more options. |
| <b>Default</b>         | 10 (decimal for LF)                                                                   |
| <b>DTE Interface</b>   | None.                                                                                 |
| <b>LED</b>             | None.                                                                                 |
| <b>Aborting Events</b> | None.                                                                                 |
| <b>Notes</b>           | None.                                                                                 |
| <b>Related</b>         | None.                                                                                 |

---

**S5 (Backspace Character)**

|                        |                                                                                       |
|------------------------|---------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the ASCII decimal code for the backspace character                             |
| <b>Command Syntax</b>  | ATS5= <Argument>                                                                      |
| <b>Argument</b>        | Decimal representation for the character. See <a href="#">ASCII</a> for more options. |
| <b>Default</b>         | 8 (decimal for BS)                                                                    |
| <b>DTE Interface</b>   | None.                                                                                 |
| <b>LED</b>             | None.                                                                                 |
| <b>Aborting Events</b> | None.                                                                                 |
| <b>Notes</b>           | None.                                                                                 |
| <b>Related</b>         | None.                                                                                 |

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**S6 (Dial Wait Time)**

|                        |                                                                                                                                                                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the number of seconds that the modem will wait before executing a dial string or wait for dial tone                                                                                                                                                                                             |
| <b>Command Syntax</b>  | ATS6= <Argument>                                                                                                                                                                                                                                                                                       |
| <b>Argument</b>        | 0-255 (in seconds)                                                                                                                                                                                                                                                                                     |
| <b>Default</b>         | 2                                                                                                                                                                                                                                                                                                      |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                  |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                  |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                  |
| <b>Notes</b>           | If <a href="#">X</a> is set to 2 or 4, this counter represents the amount of time the modem will wait for a dial tone before responding with NO DIAL TONE (if none is present). If <a href="#">X</a> is set to 0,1 or 3, the counter represents the amount of time the modem will wait before dialing. |
| <b>Related</b>         | <a href="#">X</a> , <a href="#">D</a>                                                                                                                                                                                                                                                                  |

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**S7 (Carrier Wait Time)**

|                        |                                                                                                                                                                                      |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the number of seconds modem will wait for a carrier signal after executing a dial string or answer before returning on-hook and sending a "NO CARRIER" result code to the DTE |
| <b>Command Syntax</b>  | ATS7= <Argument>                                                                                                                                                                     |
| <b>Argument</b>        | 0-255 (in seconds)                                                                                                                                                                   |
| <b>Default</b>         | 60                                                                                                                                                                                   |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                |
| <b>LED</b>             | None.                                                                                                                                                                                |
| <b>Aborting Events</b> | None.                                                                                                                                                                                |
| <b>Notes</b>           | None.                                                                                                                                                                                |
| <b>Related</b>         | <a href="#">D</a>                                                                                                                                                                    |

---

**S8 (Pause Wait Time)**

|                        |                                                                        |
|------------------------|------------------------------------------------------------------------|
| <b>Function</b>        | Stores the number of seconds for pause option (,) in the Dial command. |
| <b>Command Syntax</b>  | ATS8= <Argument>                                                       |
| <b>Argument</b>        | 0-255 (in seconds)                                                     |
| <b>Default</b>         | 2                                                                      |
| <b>DTE Interface</b>   | None.                                                                  |
| <b>LED</b>             | None.                                                                  |
| <b>Aborting Events</b> | None.                                                                  |
| <b>Notes</b>           | None.                                                                  |
| <b>Related</b>         | <a href="#">D</a>                                                      |

---

**S9 (Carrier to Connect Wait Time)**

|                        |                                                                                                                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the number of tenths of a second that modem will receive carrier signal before recognizing a valid connection. Modem ignores setting above 2400 bps due to length of handshaking sequences |
| <b>Command Syntax</b>  | ATS9= <Argument>                                                                                                                                                                                  |
| <b>Argument</b>        | 0-255 (in 1/10 seconds)                                                                                                                                                                           |
| <b>Default</b>         | 6                                                                                                                                                                                                 |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                             |
| <b>LED</b>             | None.                                                                                                                                                                                             |
| <b>Aborting Events</b> | None.                                                                                                                                                                                             |
| <b>Notes</b>           | None.                                                                                                                                                                                             |
| <b>Related</b>         | None.                                                                                                                                                                                             |

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**S10 (Loss of Carrier Wait Time)**

|                        |                                                                                                          |
|------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the number of tenths of a second that modem will wait after loss of carrier before disconnecting. |
| <b>Command Syntax</b>  | ATS10= <Argument>                                                                                        |
| <b>Argument</b>        | 0-255 (in 1/10 seconds)                                                                                  |
| <b>Default</b>         | 14                                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                                    |
| <b>LED</b>             | None.                                                                                                    |
| <b>Aborting Events</b> | None.                                                                                                    |
| <b>Notes</b>           | None.                                                                                                    |
| <b>Related</b>         | None.                                                                                                    |

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**S11 (Touch Tone Spacing and Duration)**

|                        |                                                                         |
|------------------------|-------------------------------------------------------------------------|
| <b>Function</b>        | Stores the duration and spacing, in milliseconds, of dialed touch tones |
| <b>Command Syntax</b>  | ATS11= <Argument>                                                       |
| <b>Argument</b>        | 0-255 (in milliseconds)                                                 |
| <b>Default</b>         | 70                                                                      |
| <b>DTE Interface</b>   | None.                                                                   |
| <b>LED</b>             | None.                                                                   |
| <b>Aborting Events</b> | None.                                                                   |
| <b>Notes</b>           | None.                                                                   |
| <b>Related</b>         | None.                                                                   |

---

**S12 (Guard Time)**

|                        |                                                                                           |
|------------------------|-------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the duration, in fiftieths of a second, for the guard time of the escape sequence. |
| <b>Command Syntax</b>  | ATS12= <Argument>                                                                         |
| <b>Argument</b>        | 0-255 (in 1/50 seconds)                                                                   |
| <b>Default</b>         | 50                                                                                        |
| <b>DTE Interface</b>   | None.                                                                                     |
| <b>LED</b>             | None.                                                                                     |
| <b>Aborting Events</b> | None.                                                                                     |
| <b>Notes</b>           | None.                                                                                     |
| <b>Related</b>         | <a href="#">+++</a>                                                                       |

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**S13 (Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS13= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                        | <b>Value</b> | <b>Description</b>                                                                              |
|------------------------|--------------|-------------------------------------------------------------------------------------------------|
|                        | 1            | Reset modem when DTR is dropped                                                                 |
|                        | 2            | Reset non-MNP transmit buffer from 1.5K bytes to 128 bytes.                                     |
|                        | 4            | Set backspace key to delete.                                                                    |
| <b>Argument</b>        | 8            | Autodial the number stored in NVRAM location 0 when DTR is asserted.                            |
|                        | 16           | Autodial the number stored in NVRAM location 0 upon software reset or when modem is powered up. |
|                        | 32           | Disable V.32bis ASL mode.                                                                       |
|                        | 64           | Disable Quick Retrains                                                                          |
|                        | 128          | Disconnect on escape code.                                                                      |
| <b>Default</b>         | 0            |                                                                                                 |
| <b>DTE Interface</b>   | None.        |                                                                                                 |
| <b>LED</b>             | None.        |                                                                                                 |
| <b>Aborting Events</b> | None.        |                                                                                                 |
| <b>Notes</b>           | None.        |                                                                                                 |
| <b>Related</b>         | None.        |                                                                                                 |

**S15 (Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS15= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                 | <b>Value</b> | <b>Description</b>                         |
|-----------------|--------------|--------------------------------------------|
|                 | 1            | Disable ARQ/MNP for V.22                   |
|                 | 2            | Disable ARQ/MNP for V.22bis                |
|                 | 4            | Disable ARQ/MNP for V.32/V.32bis/V.32terbo |
|                 | 8            | Disable MNP handshake.                     |
|                 | 16           | Disable MNP level 4.                       |
|                 | 32           | Disable MNP level 3.                       |
| <b>Argument</b> | 64           | MNP incompatibility.                       |
|                 | 128          | Disable V.42 operation.                    |

Special settings - 136 (128 + 8) - Disable V.42 detection phase

Notes for S15=64 setting:

- Increases time allowed to establish connection by one second for compatibility with some modem manufacturer's products.
- Changes MNP link identifier from a USR standard to "generic" for compatibility with some modem manufacturer's products.
- Eliminates remote end echo, so no one will connect to themselves if the remote DCE echoes the MNP link request.
- Changes the delay of some control characters, for compatibility with some modem manufacturer's products.

**Default** 0

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** None.

**Related** None.

**S16 (Test Options - Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS16= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                        | <b>Value</b> | <b>Description</b>                                                                                                                                                                |
|------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                        | 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. |
| <b>Argument</b>        | 4            | Test pattern generation - A test pattern is generated by the Modem and sent out over the phone link. A key press abort will terminate this function.                              |
|                        | 8            | Reserved.                                                                                                                                                                         |
|                        | 16           | Reserved.                                                                                                                                                                         |
|                        | 32           | Reserved.                                                                                                                                                                         |
|                        | 64           | Reserved.                                                                                                                                                                         |
|                        | 128          | Reserved.                                                                                                                                                                         |
| <b>Default</b>         | 0            |                                                                                                                                                                                   |
| <b>DTE Interface</b>   | None.        |                                                                                                                                                                                   |
| <b>LED</b>             | None.        |                                                                                                                                                                                   |
| <b>Aborting Events</b> | None.        |                                                                                                                                                                                   |
| <b>Notes</b>           | None.        |                                                                                                                                                                                   |
| <b>Related</b>         | None.        |                                                                                                                                                                                   |

**S18 (Test Mode Timer)**

|                        |                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the time for the diagnostics test mode <a href="#">&amp;T</a> . A value of 0 disables timer. |
| <b>Command Syntax</b>  | ATS18= <Argument>                                                                                   |
| <b>Argument</b>        | 0-255 (in seconds)                                                                                  |
| <b>Default</b>         | 0                                                                                                   |
| <b>DTE Interface</b>   | None.                                                                                               |
| <b>LED</b>             | None.                                                                                               |
| <b>Aborting Events</b> | None.                                                                                               |
| <b>Notes</b>           | None.                                                                                               |
| <b>Related</b>         | <a href="#">&amp;T</a>                                                                              |

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**S19 (Inactivity Timer)**

|                        |                                                                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the duration for the inactivity timer. If modem senses no data transmission for a time exceeding the non-zero value in this register, it will disconnect the call. A value of 0 disables the function. Any value other than 0 enables it. |
| <b>Command Syntax</b>  | ATS19= <Argument>                                                                                                                                                                                                                                |
| <b>Argument</b>        | 0-255 (in seconds)                                                                                                                                                                                                                               |
| <b>Default</b>         | 0                                                                                                                                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                                                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                            |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                            |
| <b>Related</b>         | None.                                                                                                                                                                                                                                            |

---

**S21 (Break Character Length)**

|                        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the lengths of break characters sent from modem to DTE. For use in MNP or V.42 mode only. |
| <b>Command Syntax</b>  | ATS21= <Argument>                                                                                |
| <b>Argument</b>        | 0-255 (in 1/100 seconds)                                                                         |
| <b>Default</b>         | 10                                                                                               |
| <b>DTE Interface</b>   | None.                                                                                            |
| <b>LED</b>             | None.                                                                                            |
| <b>Aborting Events</b> | None.                                                                                            |
| <b>Notes</b>           | None.                                                                                            |
| <b>Related</b>         | None.                                                                                            |

---

**S22 (XON Character)**

|                        |                                                                                       |
|------------------------|---------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the ASCII decimal code for the XON character                                   |
| <b>Command Syntax</b>  | ATS22= <Argument>                                                                     |
| <b>Argument</b>        | Decimal representation for the character. See <a href="#">ASCII</a> for more options. |
| <b>Default</b>         | 17 (decimal for DC1)                                                                  |
| <b>DTE Interface</b>   | None.                                                                                 |
| <b>LED</b>             | None.                                                                                 |
| <b>Aborting Events</b> | None.                                                                                 |
| <b>Notes</b>           | None.                                                                                 |
| <b>Related</b>         | <a href="#">&amp;I</a>                                                                |

---

**S23 (XOFF Character)**

|                        |                                                                                       |
|------------------------|---------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the ASCII decimal code for the XOFF character                                  |
| <b>Command Syntax</b>  | ATS23= <Argument>                                                                     |
| <b>Argument</b>        | Decimal representation for the character. See <a href="#">ASCII</a> for more options. |
| <b>Default</b>         | 19 (decimal for DC3)                                                                  |
| <b>DTE Interface</b>   | None.                                                                                 |
| <b>LED</b>             | None.                                                                                 |
| <b>Aborting Events</b> | None.                                                                                 |
| <b>Notes</b>           | None.                                                                                 |
| <b>Related</b>         | <a href="#">&amp;I</a>                                                                |

---

**S25 (DTR Recognition Time)**

|                        |                           |
|------------------------|---------------------------|
| <b>Function</b>        | Sets DTR recognition time |
| <b>Command Syntax</b>  | ATS25= <Argument>         |
| <b>Argument</b>        | 0-255 (in 1/100 seconds)  |
| <b>Default</b>         | 20                        |
| <b>DTE Interface</b>   | None.                     |
| <b>LED</b>             | None.                     |
| <b>Aborting Events</b> | None.                     |
| <b>Notes</b>           | None.                     |
| <b>Related</b>         | None.                     |

---

**S27 (Test Options - Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS27= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                        | <b>Value</b> | <b>Description</b>                                                                                            |
|------------------------|--------------|---------------------------------------------------------------------------------------------------------------|
| <b>Argument</b>        | 1            | V.21/ Bell 103 mode select (V.21 if set, Bell 103 if not)                                                     |
|                        | 2            | Enable unencoded modulation in V.32 mode.                                                                     |
|                        | 4            | Disable V.32 modulation.                                                                                      |
|                        | 8            | Disable 2100 Hz answer tone.                                                                                  |
|                        | 16           | Enable V.23 fallback mode                                                                                     |
|                        | 32           | Used to disable V.32bis mode                                                                                  |
|                        | 64           | Disable V.42 Selective Reject                                                                                 |
|                        | 128          | Software compatibility mode. All connect messages above or equal to 9600 bps are expressed as "CONNECT 9600". |
| <b>Default</b>         | 0            |                                                                                                               |
| <b>DTE Interface</b>   | None.        |                                                                                                               |
| <b>LED</b>             | None.        |                                                                                                               |
| <b>Aborting Events</b> | None.        |                                                                                                               |
| <b>Notes</b>           | None.        |                                                                                                               |
| <b>Related</b>         | None.        |                                                                                                               |

**S28 (V.32 Handshaking Time)**

|                        |                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Specifies how long the handshaking occurs with v.32                                                                                                                           |
| <b>Command Syntax</b>  | ATS28= <Argument><br>0-255 (in 1/10 seconds)                                                                                                                                  |
| <b>Argument</b>        | If S28 is set to 0, there will be no v.32 answer tones. This will produce a faster connection.<br>If S28 is set to 255, it will disable all connections except v.32 9600 bps. |
| <b>Default</b>         | 8                                                                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                         |

---

**S29 (V.21 Answer Mode Fallback Timer)**

|                        |                                 |
|------------------------|---------------------------------|
| <b>Function</b>        | v.21 Answer Mode Fallback Timer |
| <b>Command Syntax</b>  | ATS29= <Argument>               |
| <b>Argument</b>        | 0-255 (in 1/10 seconds)         |
| <b>Default</b>         | 20                              |
| <b>DTE Interface</b>   | None.                           |
| <b>LED</b>             | None.                           |
| <b>Aborting Events</b> | None.                           |
| <b>Notes</b>           | None.                           |
| <b>Related</b>         | None.                           |

---

**S30 (Deadman Timer)**

|                        |                      |
|------------------------|----------------------|
| <b>Function</b>        | Deadman timer        |
| <b>Command Syntax</b>  | ATS30= <Argument>    |
| <b>Argument</b>        | 0-255 (in seconds)   |
| <b>Default</b>         | 0                    |
| <b>DTE Interface</b>   | None.                |
| <b>LED</b>             | None.                |
| <b>Aborting Events</b> | None.                |
| <b>Notes</b>           | None.                |
| <b>Related</b>         | <a href="#">#BDR</a> |

---

**S31 (TAD Audio Level Adjust)**

|                        |                                         |
|------------------------|-----------------------------------------|
| <b>Function</b>        | Adjusts the volume for TAD applications |
| <b>Command Syntax</b>  | ATS31= <Argument>                       |
| <b>Argument</b>        | 0-255                                   |
| <b>Default</b>         | 128                                     |
| <b>DTE Interface</b>   | None.                                   |
| <b>LED</b>             | None.                                   |
| <b>Aborting Events</b> | None.                                   |
| <b>Notes</b>           | None.                                   |
| <b>Related</b>         | None.                                   |

---

**S32 (Connection Options - Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS32= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                 | <b>Value</b> | <b>Description</b>        |
|-----------------|--------------|---------------------------|
| <b>Argument</b> | 1            | V.8 Call Indicate enable. |
|                 | 2            | Enable V.8 mode.          |
|                 | 4            | Disable V.FC modulation.  |
|                 | 8            | Disable V.34 modulation.  |
|                 | 16           | Disable V.34+ modulation. |
|                 | 32           | Disable x2 modulation.    |
|                 | 64           | Disable V90 modulation.   |
|                 | 128          | Reserved.                 |

**Default** 2

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** None.

**Related** None.

**S33 (V.34/V.34+ Connection Options - Bitmapped)****Function** Multiple Functions. See Arguments.**Command Syntax** ATS33= <Argument>0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                 | <b>Value</b> | <b>Description</b>        |
|-----------------|--------------|---------------------------|
| <b>Argument</b> | 1            | Disable 2400 Symbol rate. |
|                 | 2            | Disable 2743 Symbol rate. |
|                 | 4            | Disable 2800 Symbol rate. |
|                 | 8            | Disable 3000 Symbol rate. |
|                 | 16           | Disable 3200 Symbol rate. |
|                 | 32           | Disable 3429 Symbol rate. |
|                 | 64           | Reserved                  |
|                 | 128          | Disable Shaping.          |

**Default** 0**DTE Interface** None.**LED** None.**Aborting Events** None.**Notes** None.**Related** None.

**S34 (V.34/V.34+ Connection Options - Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS34= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                        | <b>Value</b> | <b>Description</b>               |
|------------------------|--------------|----------------------------------|
| <b>Argument</b>        | 1            | Disable 8S-2D trellis encoding.  |
|                        | 2            | Disable 16S-4D trellis encoding. |
|                        | 4            | Disable 32S-2D trellis encoding. |
|                        | 8            | Disable 64S-4D trellis encoding. |
|                        | 16           | Disable Non linear coding.       |
|                        | 32           | Disable TX level deviation       |
|                        | 64           | Disable Pre-emphasis.            |
|                        | 128          | Disable Pre-coding.              |
| <b>Default</b>         | 0            |                                  |
| <b>DTE Interface</b>   | None.        |                                  |
| <b>LED</b>             | None.        |                                  |
| <b>Aborting Events</b> | None.        |                                  |
| <b>Notes</b>           | None.        |                                  |
| <b>Related</b>         | None.        |                                  |

**S35 (x2 Connection Options - Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS35= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers. This register is a little different in that the values between 0 and 7 represent 8 different variations on one setting, whereas normally, 0-7 would encompass two variations (on and off) for three values (1, 2, 4). To set this S-Register, it would be best to use the second method of adding the values up. So, in this example, to set the back channel rate to a max of 24000 and disable A/m law detection, you would issue ATS35=35.

|                 | <b>Value/Setting</b>   | <b>Description</b>                                                                                                                                                                                                                          |  |
|-----------------|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Argument</b> | 0-7                    | Bit field Limit x2 back channel operation.<br>0 -- No back channel limit<br>1 -- 28800 Max rate.<br>2 -- 26400 Max rate.<br>3 -- 24000 Max rate<br>4 -- 21600 Max rate<br>5 -- 19200 Max rate<br>6 -- 16800 Max rate<br>7 -- 14400 Max rate |  |
|                 | 8                      | Enable x2 server operation.                                                                                                                                                                                                                 |  |
|                 | 16                     | Enable x2 A law operation.                                                                                                                                                                                                                  |  |
|                 | 32                     | Disable automatic A/m law detection.                                                                                                                                                                                                        |  |
|                 | 64                     | Disable reduced power.                                                                                                                                                                                                                      |  |
|                 | 128                    | Reserved.                                                                                                                                                                                                                                   |  |
|                 | <b>Default</b>         | 0                                                                                                                                                                                                                                           |  |
|                 | <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                       |  |
|                 | <b>LED</b>             | None.                                                                                                                                                                                                                                       |  |
|                 | <b>Aborting Events</b> | None.                                                                                                                                                                                                                                       |  |
| <b>Notes</b>    | None.                  |                                                                                                                                                                                                                                             |  |
| <b>Related</b>  | None.                  |                                                                                                                                                                                                                                             |  |

**S37 (V.90 Connection Options - Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS37= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers. This register is a little different in that the values between 0 and 15 represent 16 different variations on one setting, whereas normally, 0-15 would encompass two variations (on and off) for four values (1, 2, 4, 8). To set this S-Register, it would be best to use the second method of adding the values up. So, in this example, to set the back channel rate to a max of 24000 and disable A/mu law detection, you would issue ATS35=20.

|                 | <b>Value</b>           | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                     |  |
|-----------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Argument</b> | 0-15                   | Bit field: Limit V90 back channel operation.<br>0 - No Back Channel limit<br>1 - 31200 Max rate.<br>2 - 28800 Max rate.<br>3 - 26400 Max rate.<br>4 - 24000 Max rate.<br>5 - 21600 Max rate.<br>6 - 19200 Max rate.<br>7 - 16800 Max rate.<br>8 - 14400 Max rate.<br>9 - 12000 Max rate.<br>10 - 9600 Max rate.<br>11 - 7200 Max rate.<br>12 - 4800 Max rate.<br>13 - Undefined.<br>14 - Undefined.<br>15 - Undefined. |  |
|                 | 16                     | Disable automatic A/mu law detection.                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                 | 32                     | Force A law operation.                                                                                                                                                                                                                                                                                                                                                                                                 |  |
|                 | 64                     | Reserved.                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|                 | 128                    | Reserved.                                                                                                                                                                                                                                                                                                                                                                                                              |  |
|                 | <b>Default</b>         | 0                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
|                 | <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                 | <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                 | <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                 | <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|                 | <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                  |  |

**S38 (DTR Drop Delay)**

|                        |                                                                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Sets an optional delay before a forced hang-up and clearing of the Transmit buffer when DTR drops during an ARQ call. This allows time for a remote modem to acknowledge receipt of all transmit data before it is disconnected. |
| <b>Command Syntax</b>  | ATS38= <Argument>                                                                                                                                                                                                                |
| <b>Argument</b>        | 0-255 (in seconds)                                                                                                                                                                                                               |
| <b>Default</b>         | 0 (Modem immediately hangs up when DTR drops)                                                                                                                                                                                    |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                            |
| <b>Notes</b>           | None.                                                                                                                                                                                                                            |
| <b>Related</b>         | None.                                                                                                                                                                                                                            |

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**S41 (Bitmapped)**

**Function** Multiple Functions. See Arguments.

**Command Syntax** ATS41= <Argument>

0-255 - See [Bitmaps](#) for details on how to set bitmapped registers.

|                 | <b>Value</b> | <b>Description</b>                                                                                                 |
|-----------------|--------------|--------------------------------------------------------------------------------------------------------------------|
|                 | 1            | Distinctive Ring Enable                                                                                            |
|                 | 2            | Speakerphone connect message override<br>Off = Full-Duplex SpeakerPhone Mode<br>On = Half-Duplex SpeakerPhone Mode |
| <b>Argument</b> | 4            | Digital Line Guard Disable                                                                                         |
|                 | 8            | Reserved.                                                                                                          |
|                 | 16           | Reserved.                                                                                                          |
|                 | 32           | Reserved.                                                                                                          |
|                 | 64           | Reserved.                                                                                                          |
|                 | 128          | Reserved.                                                                                                          |

**Default** 0

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** None.

**Related** [Distinctive Ring](#)



## Technical Ref.

Commands used by both Fax Class 1 and Fax Class 2.0

[+FCLASS](#) - Set Fax Class/Query Fax Class

[+FTS](#) - Stop Transmission and Pause

[+FRS](#) - Wait For Silence

[+FTM](#) - Transmit Data with Carrier

[+FRM](#) - Receive Data with Carrier

[+FTH](#) - Transmit HDLC Data with Carrier

[+FRH](#) - Receive HDLC Data with Carrier

[+FATX](#) - Asynchronous Transmit

[+FARX](#) - Asynchronous Receive

**+FCLASS (Set Fax Class)**

|                        |                                                                                                                                                                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Sets the current FCLASS to <argument>.                                                                                                                                                                                                        |
| <b>Command Syntax</b>  | AT+FCLASS=<argument>                                                                                                                                                                                                                          |
| <b>Argument</b>        | 0 - Data Mode<br>1 - Group 3 Facsimile Service Class 1 mode<br>2.0 - Group 3 Facsimile Service Class 2.0 mode<br><br>+FCLASS=? Returns the current +FCLASS setting, either 0,1, or 2.0<br><br>+FCLASS? Returns the possible values of +FCLASS |
| <b>Default</b>         | 0                                                                                                                                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                         |
| <b>LED</b>             | The ARQ/FAX LED flashes when +FCLASS is set to 1 or 2.0.                                                                                                                                                                                      |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                                                         |

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**+FTS (Stop Transmission and Pause)**

|                        |                                                                                                                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command causes the modem to stop any transmission. The modem then waits for the specified amount of time, and then sends the OK result code to the DTE. The value <time> is in 10 millisecond intervals. |
| <b>Command Syntax</b>  | AT+FTS=<argument>                                                                                                                                                                                             |
| <b>Argument</b>        | 0-255                                                                                                                                                                                                         |
| <b>Default</b>         | 0                                                                                                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                         |

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**+FRS (Wait for Silence)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Causes the modem to listen, and to report back an OK result code when silence has been present on the line for the amount of time specified. The value <time> is in 10 millisecond intervals. The command will terminate when the required amount of silence on the line is detected or the DTE sends the modem another character, which is discarded. In either event, the OK result code will be returned to the DTE. |
| <b>Command Syntax</b>  | AT+FRS=<argument>                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Argument</b>        | 0-255                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Default</b>         | 0                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Aborting Events</b> | Any character sent from the DTE to the modem will abort the wait. The modem will then return an OK result code to the DTE.                                                                                                                                                                                                                                                                                              |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                   |

**+FTM (Transmit Data with Carrier)**

Causes the modem to transmit data using the modulation selected with the argument. [Modulation](#) lists all possible values and what they do for the arguments.

|                        |                                                                                                                                                                              |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The modem returns the CONNECT result code and transmits the proper training sequence in the selected mode, followed by constant 1 bits, until data is received from the DTE. |
| <b>Command Syntax</b>  | AT+FTM=<argument>                                                                                                                                                            |
| <b>Argument</b>        | 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, 146                                                                                                                                |
| <b>Default</b>         | 0                                                                                                                                                                            |
| <b>DTE Interface</b>   | The modem will filter transparent commands, <DLE><char>, as specified in EIA/TIA-578                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                        |
| <b>Aborting Events</b> | The modem will abort when it receives a <DLE><ETX> character from the DTE.                                                                                                   |
| <b>Notes</b>           | None.                                                                                                                                                                        |
| <b>Related</b>         | None.                                                                                                                                                                        |

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**+FRM (Receive Data with Carrier)**

Causes the modem to enter receive mode using the modulation specified in [Modulation](#).

|                        |                                                                                                                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | When the selected carrier is detected, the modem will send the CONNECT result code to the DTE. If a different signal is detected, the modem shall send a +FCERROR (Connect Error) result code to the DTE, and return to command state. |
| <b>Command Syntax</b>  | AT+FRM=<argument>                                                                                                                                                                                                                      |
| <b>Argument</b>        | 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, 146                                                                                                                                                                                          |
| <b>Default</b>         | 0                                                                                                                                                                                                                                      |
| <b>DTE Interface</b>   | The modem will filter transparent commands, <DLE><char>, as specified in EIA/TIA-578                                                                                                                                                   |
| <b>LED</b>             | None.                                                                                                                                                                                                                                  |
| <b>Aborting Events</b> | Loss of carrier will abort +FRM and cause the modem to return a NO CARRIER result code.                                                                                                                                                |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                  |
| <b>Related</b>         | None.                                                                                                                                                                                                                                  |

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**+FTH (Transmit HDLC Data with Carrier)**

Causes the modem to transmit data framed in HDLC protocol using the modulation mode selected. The values for the <mod> parameter are listed in [Modulation](#).

|                        |                                                                                                                                                                                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The modem will send the CONNECT result code to the DTE, and transmit signal converter training (if required) followed by flags until the first byte of data is sent by the DTE. |
| <b>Command Syntax</b>  | AT+FTH=<argument>                                                                                                                                                               |
| <b>Argument</b>        | 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, 146                                                                                                                                   |
| <b>Default</b>         | 0                                                                                                                                                                               |
| <b>DTE Interface</b>   | The modem-DTE interface is specified in EIA/TIA-578.                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                                                                           |
| <b>Aborting Events</b> | None.                                                                                                                                                                           |
| <b>Notes</b>           | None.                                                                                                                                                                           |
| <b>Related</b>         | None.                                                                                                                                                                           |

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**+FRH (Receive HDLC Data with Carrier)**

Causes the modem to receive HDLC framed data using the modulation specified by <argument> and delivers the next frame to the DTE. Values for <modulation> are specified in [Modulation](#)

|                        |                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | If the modem detects the selected carrier with an HDLC flag, the modem shall send the CONNECT result code to the DTE. If a different signal is detected, the modem shall send +FCERROR (Connect Error) result code to the DTE and return to command state. The modem will return to command state upon loss of carrier, sending the NO CARRIER result code to the DTE. |
| <b>Command Syntax</b>  | AT+FRH=<argument>                                                                                                                                                                                                                                                                                                                                                      |
| <b>Argument</b>        | 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, 146                                                                                                                                                                                                                                                                                                                          |
| <b>Default</b>         | 0                                                                                                                                                                                                                                                                                                                                                                      |
| <b>DTE Interface</b>   | The modem-DTE interface is specified in EIA/TIA-578.                                                                                                                                                                                                                                                                                                                   |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                  |

---

**+FATX (Asynchronous Transmit)**

|                        |                                                                                                                                                                              |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The +FTH command causes the modem to transmit asynchronously using the modulation specified by <argument>. Values for <argument> are specified in <a href="#">Modulation</a> |
| <b>Command Syntax</b>  | AT+FATX=<argument>                                                                                                                                                           |
| <b>Argument</b>        | 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, 146                                                                                                                                |
| <b>Default</b>         | 0                                                                                                                                                                            |
| <b>DTE Interface</b>   | The modem-DTE interface is specified in EIA/TIA-578.                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                        |
| <b>Aborting Events</b> | None.                                                                                                                                                                        |
| <b>Notes</b>           | None.                                                                                                                                                                        |
| <b>Related</b>         | None.                                                                                                                                                                        |

---

**+FARX (Asynchronous Receive)**

|                        |                                                                                                                                                                             |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The +FTH command causes the modem to receive asynchronously using the modulation specified by <argument>. Values for <argument> are specified in <a href="#">Modulation</a> |
| <b>Command Syntax</b>  | AT+FARX=<argument>                                                                                                                                                          |
| <b>Argument</b>        | 3, 24, 48, 72, 96, 97, 98, 121, 122, 145, 146                                                                                                                               |
| <b>Default</b>         | 0                                                                                                                                                                           |
| <b>DTE Interface</b>   | The modem-DTE interface is specified in EIA/TIA-578.                                                                                                                        |
| <b>LED</b>             | None.                                                                                                                                                                       |
| <b>Aborting Events</b> | None.                                                                                                                                                                       |
| <b>Notes</b>           | None.                                                                                                                                                                       |
| <b>Related</b>         | None.                                                                                                                                                                       |

---

## Commands used by Fax Class 2.0 only

|                                                             |                                                              |
|-------------------------------------------------------------|--------------------------------------------------------------|
| <b>General</b>                                              | +FBU - HDLC Frame Reporting Parameter - <b>NOT SUPPORTED</b> |
| <a href="#">+FDT</a> - Data Transmission                    |                                                              |
| <a href="#">+FDR</a> - Data Reception                       | <a href="#">+FNR</a> - Negotiations Message Reporting        |
| <a href="#">+FKS</a> - Session Termination                  | <b>T.30 Procedure Control Parameters</b>                     |
| <a href="#">+FIP</a> - Initialize Fax Parameters            | <a href="#">+FPS</a> - Post Status                           |
| <b>Class 2.0 Parameters</b>                                 | <a href="#">+FCQ</a> - Copy Quality Checking                 |
| <a href="#">+FMI</a> - Request Manufacturer ID              | +FRQ - Receive Quality Thresholds - <b>NOT SUPPORTED</b>     |
| <a href="#">+FMM</a> - Request Model ID                     | <a href="#">+FAA</a> - Adaptive Answer                       |
| <a href="#">+FMR</a> - Request Model Revision               | <a href="#">+FCT</a> - DTE Phase C Timeout                   |
| <b>T.30 Session Parameters</b>                              | <a href="#">+FHS</a> - Call Termination Status               |
| <a href="#">+FCC</a> - Modem Capabilities                   | +FRY - ECM Retry Value - <b>NOT SUPPORTED</b>                |
| <a href="#">+FIS</a> - Current Session Negotiating Position | <a href="#">+FMS</a> - Minimum Phase C Speed                 |
| <a href="#">+FCS</a> - Current Session Parameters           | <b>DTE-DCE Interface Parameters</b>                          |
| <a href="#">+FLI</a> - Local ID                             | <a href="#">+FLO</a> - Flow Control Selection                |
| <a href="#">+FNS</a> - Non-standard Frame FIF Parameter     | <a href="#">+FPR</a> - Serial Port Rate Selection            |
| <b>Polling</b>                                              | <a href="#">+FPP</a> - Packet Protocol Selection             |
| <a href="#">+FPI</a> - Local Polling ID                     | <a href="#">+FBO</a> - Data Bit Order                        |
| <a href="#">+FLP</a> - Indicate Document To Poll            | <a href="#">+FEA</a> - Phase C Received EOL Alignment        |
| <a href="#">+FSP</a> - Request To Poll                      | +FFC - Format Conversion - <b>NOT SUPPORTED</b>              |
| <a href="#">+FCR</a> - Capability To Receive                | <a href="#">+FBS</a> - Buffer Size                           |

**+FDT (Data Transmission)**

|                        |                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The +FDT command requests the modem to transmit a page. It is issued at the beginning of a page either in Phase B or in Phase D. |
| <b>Command Syntax</b>  | AT+FDT                                                                                                                           |
| <b>Argument</b>        | None.                                                                                                                            |
| <b>Default</b>         | None.                                                                                                                            |
| <b>DTE Interface</b>   | None.                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                                            |
| <b>Notes</b>           | None.                                                                                                                            |
| <b>Related</b>         | None.                                                                                                                            |

---

**+FDR (Data Reception)**

Initiates data reception. This command may be issued after:

**Function** 1) Answering  
2) Dialing  
3) Receiving a document  
4) Receiving a page.

**Command Syntax** AT+FDR

**Argument** None.

**Default** None.

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** None.

**Related** None.

**+FKS (Session Termination)**

|                        |                                                    |
|------------------------|----------------------------------------------------|
| <b>Function</b>        | Initiates an orderly termination to a fax session. |
| <b>Command Syntax</b>  | AT+FKS                                             |
| <b>Argument</b>        | None.                                              |
| <b>Default</b>         | None.                                              |
| <b>DTE Interface</b>   | None.                                              |
| <b>LED</b>             | None.                                              |
| <b>Aborting Events</b> | None.                                              |
| <b>Notes</b>           | None.                                              |
| <b>Related</b>         | None.                                              |

---

**+FIP (Initialize Fax Parameters)**

|                        |                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Initializes the Class 2.0 parameters to their default values. This command does not change the setting of <a href="#">+FCLASS</a> . |
| <b>Command Syntax</b>  | AT+FIP                                                                                                                              |
| <b>Argument</b>        | None.                                                                                                                               |
| <b>Default</b>         | None.                                                                                                                               |
| <b>DTE Interface</b>   | None.                                                                                                                               |
| <b>LED</b>             | None.                                                                                                                               |
| <b>Aborting Events</b> | None.                                                                                                                               |
| <b>Notes</b>           | None.                                                                                                                               |
| <b>Related</b>         | None.                                                                                                                               |

---

**+FMI (Request Manufacturer ID)**

|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Function</b>        | Returns the manufacturers identification string. |
| <b>Command Syntax</b>  | AT+FMI                                           |
| <b>Argument</b>        | None.                                            |
| <b>Default</b>         | None.                                            |
| <b>DTE Interface</b>   | None.                                            |
| <b>LED</b>             | None.                                            |
| <b>Aborting Events</b> | None.                                            |
| <b>Notes</b>           | Read-only.                                       |
| <b>Related</b>         | None.                                            |

---

**+FMM (Request Model ID)**

|                        |                                           |
|------------------------|-------------------------------------------|
| <b>Function</b>        | Returns the models identification string. |
| <b>Command Syntax</b>  | AT+FMM                                    |
| <b>Argument</b>        | None.                                     |
| <b>Default</b>         | None.                                     |
| <b>DTE Interface</b>   | None.                                     |
| <b>LED</b>             | None.                                     |
| <b>Aborting Events</b> | None.                                     |
| <b>Notes</b>           | Read-only.                                |
| <b>Related</b>         | None.                                     |

---

**+FMR (Request Modem Revision)**

|                        |                                   |
|------------------------|-----------------------------------|
| <b>Function</b>        | Returns the modems revision dates |
| <b>Command Syntax</b>  | AT+FMR                            |
| <b>Argument</b>        | None.                             |
| <b>Default</b>         | None.                             |
| <b>DTE Interface</b>   | None.                             |
| <b>LED</b>             | None.                             |
| <b>Aborting Events</b> | None.                             |
| <b>Notes</b>           | Read-only.                        |
| <b>Related</b>         | None.                             |

---

**+FCC (Modem Capabilities)**

|                        |                                                                                                                                                                                      |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | The +FCC parameters are used to constrain the modem's capabilities for all sessions. Any modification to +FCC will also cause the +FCC values to be copied into <a href="#">+FIS</a> |
| <b>Command Syntax</b>  | AT+FCC=<arguments>                                                                                                                                                                   |
| <b>Argument</b>        | VR, BR, WD, LN, DF, EC, BF, ST                                                                                                                                                       |
| <b>Default</b>         | 0,0,0,2,0,0,0,0                                                                                                                                                                      |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                |
| <b>LED</b>             | None.                                                                                                                                                                                |
| <b>Aborting Events</b> | None.                                                                                                                                                                                |
| <b>Notes</b>           | Possible values shown in <a href="#">Subparameters</a>                                                                                                                               |
| <b>Related</b>         | None.                                                                                                                                                                                |

---

**+FIS (Current Session Negotiating Position)**

The +FIS parameters are used to constrain the modem's capabilities for the current session. +FIS is set to the values stored in [+FCC](#) after:

|                        |                                                                                                                                                                                              |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | 1) modem initialization<br>2) execution of a <a href="#">+FIP</a> , initialize parameters, command<br>3) modification of the <a href="#">+FCC</a> parameters<br>4) termination of a session. |
| <b>Command Syntax</b>  | AT+FIS=<arguments>                                                                                                                                                                           |
| <b>Argument</b>        | VR, BR, WD, LN, DF, EC, BF, ST                                                                                                                                                               |
| <b>Default</b>         | 0,0,0,2,0,0,0,0                                                                                                                                                                              |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                        |
| <b>LED</b>             | None.                                                                                                                                                                                        |
| <b>Aborting Events</b> | None.                                                                                                                                                                                        |
| <b>Notes</b>           | Possible values shown in <a href="#">Subparameters</a>                                                                                                                                       |
| <b>Related</b>         | None.                                                                                                                                                                                        |

---

**+FCS (Current Session Parameters)**

Returns the current session capabilities as negotiated by both stations.

+FCS is set to the default values after:

**Function**

- 1) Modem initialization
- 2) Execution of a [+FIP](#), initialize parameters, command
- 3) Termination of a session.

**Command Syntax**

AT+FCS

**Argument**

N/A

**Default**

N/A

**DTE Interface**

None.

**LED**

None.

**Aborting Events**

None.

**Notes**

Read-only. Values shown in [Subparameters](#)

**Related**

None.

**+FLI (Local ID)**

|                        |                                                                                        |
|------------------------|----------------------------------------------------------------------------------------|
| <b>Function</b>        | The Local ID string is used by the remote station to identify the originating station. |
| <b>Command Syntax</b>  | AT+FLI=<argument>                                                                      |
| <b>Argument</b>        | Up to 20 printable ASCII characters                                                    |
| <b>Default</b>         | null string                                                                            |
| <b>DTE Interface</b>   | None.                                                                                  |
| <b>LED</b>             | None.                                                                                  |
| <b>Aborting Events</b> | None.                                                                                  |
| <b>Notes</b>           | None.                                                                                  |
| <b>Related</b>         | None.                                                                                  |

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**+FNS (Non-Standard Frame FIF Parameter)**

|                        |                                                                                                                                                                                                                                   |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores a non-standard 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 will be initialized to null and the previous octets will be deleted. |
| <b>Command Syntax</b>  | AT+FNS=<argument>                                                                                                                                                                                                                 |
| <b>Argument</b>        | String of hex offsets to a maximum of 90                                                                                                                                                                                          |
| <b>Default</b>         | null string                                                                                                                                                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                             |
| <b>LED</b>             | None.                                                                                                                                                                                                                             |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                             |
| <b>Notes</b>           | None.                                                                                                                                                                                                                             |
| <b>Related</b>         | None.                                                                                                                                                                                                                             |

---

**+FPI (Local Polling ID)**

|                        |                                                                                          |
|------------------------|------------------------------------------------------------------------------------------|
| <b>Function</b>        | The polling ID string is used by the remote station to identify the originating station. |
| <b>Command Syntax</b>  | AT+FPI=<argument>                                                                        |
| <b>Argument</b>        | Up to 20 printable ASCII characters.                                                     |
| <b>Default</b>         | null string                                                                              |
| <b>DTE Interface</b>   | None.                                                                                    |
| <b>LED</b>             | None.                                                                                    |
| <b>Aborting Events</b> | None.                                                                                    |
| <b>Notes</b>           | None.                                                                                    |
| <b>Related</b>         | None.                                                                                    |

---

**+FLP (Indicate Document to Poll)**

|                        |                                                                     |
|------------------------|---------------------------------------------------------------------|
| <b>Function</b>        | Indicates whether or not a document to poll exists.                 |
| <b>Command Syntax</b>  | AT+FLP=<argument>                                                   |
| <b>Argument</b>        | 0 - No document to poll<br>1 - There is a document to poll          |
| <b>Default</b>         | 0                                                                   |
| <b>DTE Interface</b>   | None.                                                               |
| <b>LED</b>             | None.                                                               |
| <b>Aborting Events</b> | None.                                                               |
| <b>Notes</b>           | The parameter will be reset to 0 after the polled document is sent. |
| <b>Related</b>         | None.                                                               |

---

**+FSP (Request to Poll)**

|                        |                                                                                                                                                                                               |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Indicates whether or not the originating station wishes to poll (and receive a document) or not.                                                                                              |
| <b>Command Syntax</b>  | AT+FSP=<argument>                                                                                                                                                                             |
| <b>Argument</b>        | 0 - No document to poll<br>1 - Can receive a polled document                                                                                                                                  |
| <b>Default</b>         | 0                                                                                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                                         |
| <b>Notes</b>           | The parameter will be reset to 0 after the polled document is sent. In order for a station to receive a polled document, Capability to Receive, <a href="#">+FCR</a> , must also be set to 1. |
| <b>Related</b>         | None.                                                                                                                                                                                         |

---

**+FCR (Capability to Receive)**

|                        |                                   |
|------------------------|-----------------------------------|
| <b>Function</b>        | Enables or disables fax reception |
| <b>Command Syntax</b>  | AT+FCR=<argument>                 |
| <b>Argument</b>        | 0 - Disable<br>1 - Enable         |
| <b>Default</b>         | 1                                 |
| <b>DTE Interface</b>   | None.                             |
| <b>LED</b>             | None.                             |
| <b>Aborting Events</b> | None.                             |
| <b>Notes</b>           | None.                             |
| <b>Related</b>         | None.                             |

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**+FNR (Negotiations Message Reporting)**

|                        |                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Enables or disables reporting of various messages. A value of 0 disables reporting. A value of 1 enables reporting. |
| <b>Command Syntax</b>  | AT+FNR=<arguments>                                                                                                  |
| <b>Argument</b>        | RPR, TPR, IDR, NSR                                                                                                  |
| <b>Default</b>         | 0,0,0,0                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                               |
| <b>LED</b>             | None.                                                                                                               |
| <b>Aborting Events</b> | None.                                                                                                               |
| <b>Notes</b>           | Values for arguments are in <a href="#">Subparameters</a>                                                           |
| <b>Related</b>         | None.                                                                                                               |

---

**+FPS (Post Status)**

|                        |                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Stores the post page message from the last data transfer. The page status is determined by the receiving station. If copy quality checking is disabled ( <a href="#">+FCQ</a> = 0), then +FPS=1. |
| <b>Command Syntax</b>  | AT+FPS=<arguments>                                                                                                                                                                               |
| <b>Argument</b>        | 1-5                                                                                                                                                                                              |
| <b>Default</b>         | 1                                                                                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                                                                                                            |
| <b>Notes</b>           | Values for arguments are in <a href="#">Subparameters</a>                                                                                                                                        |
| <b>Related</b>         | None.                                                                                                                                                                                            |

---

**+FCQ (Copy Quality Checking)**

|                        |                                                                                           |
|------------------------|-------------------------------------------------------------------------------------------|
| <b>Function</b>        | Controls the detection and correction of data errors for both transmitting and receiving. |
| <b>Command Syntax</b>  | AT+FCQ=<arguments>                                                                        |
| <b>Argument</b>        | RQ, TQ                                                                                    |
| <b>Default</b>         | 1,0                                                                                       |
| <b>DTE Interface</b>   | None.                                                                                     |
| <b>LED</b>             | None.                                                                                     |
| <b>Aborting Events</b> | None.                                                                                     |
| <b>Notes</b>           | Values for arguments are in <a href="#">Subparameters</a>                                 |
| <b>Related</b>         | None.                                                                                     |

---

**+FAA (Adaptive Answer)**

|                        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Controls the mode that the modem will answer in and whether automatic mode switching is enabled. |
| <b>Command Syntax</b>  | AT+FAA=<arguments>                                                                               |
| <b>Argument</b>        | 0 - Fax only<br>1 - Data detection, choose appropriate mode                                      |
| <b>Default</b>         | 0                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                            |
| <b>LED</b>             | None.                                                                                            |
| <b>Aborting Events</b> | None.                                                                                            |
| <b>Notes</b>           | None.                                                                                            |
| <b>Related</b>         | None.                                                                                            |

---

**+FCT (DTE Phase C Timeout)**

|                        |                                                                                                                                                                                                        |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Determines how long the modem will wait for a command after transmitting all available Phase C data. If the time-out is reached, the modem will issue an orderly abort command, <a href="#">+FKS</a> . |
| <b>Command Syntax</b>  | AT+FCT=<arguments>                                                                                                                                                                                     |
| <b>Argument</b>        | 0-255                                                                                                                                                                                                  |
| <b>Default</b>         | 30                                                                                                                                                                                                     |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                  |
| <b>LED</b>             | None.                                                                                                                                                                                                  |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                  |
| <b>Notes</b>           | None.                                                                                                                                                                                                  |
| <b>Related</b>         | None.                                                                                                                                                                                                  |

---

**+FHS (Call Termination Status)**

|                        |                                                              |
|------------------------|--------------------------------------------------------------|
| <b>Function</b>        | Indicates the cause of the most recent hang-up.              |
| <b>Command Syntax</b>  | AT+FHS                                                       |
| <b>Argument</b>        | 0-FFh                                                        |
| <b>Default</b>         | 0                                                            |
| <b>DTE Interface</b>   | None.                                                        |
| <b>LED</b>             | None.                                                        |
| <b>Aborting Events</b> | None.                                                        |
| <b>Notes</b>           | Read only. Values available in <a href="#">Subparameters</a> |
| <b>Related</b>         | None.                                                        |

---

**+FMS (Minimum Phase C Speed)**

|                        |                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Sets the minimum data rate for data transmission. This parameter can be used to limit the data transfer time and cost. |
| <b>Command Syntax</b>  | AT+FMS=<arguments>                                                                                                     |
| <b>Argument</b>        | 0-5                                                                                                                    |
| <b>Default</b>         | 0                                                                                                                      |
| <b>DTE Interface</b>   | None.                                                                                                                  |
| <b>LED</b>             | None.                                                                                                                  |
| <b>Aborting Events</b> | None.                                                                                                                  |
| <b>Notes</b>           | None.                                                                                                                  |
| <b>Related</b>         | None.                                                                                                                  |

---

**+FLO (Flow Control Selection)**

|                        |                                                                                                 |
|------------------------|-------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Selects the method of flow control used in data transfer between the modem and the serial port. |
| <b>Command Syntax</b>  | AT+FLO=<arguments>                                                                              |
| <b>Argument</b>        | 0 - Flow control disabled<br>1 - XON/XOFF flow control<br>2 - Hardware flow control             |
| <b>Default</b>         | 1                                                                                               |
| <b>DTE Interface</b>   | None.                                                                                           |
| <b>LED</b>             | None.                                                                                           |
| <b>Aborting Events</b> | None.                                                                                           |
| <b>Notes</b>           | None.                                                                                           |
| <b>Related</b>         | None.                                                                                           |

---

**+FPR (Serial Port Rate Selection)**

|                        |                                                                                                                     |
|------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Selects the serial port rate used by the modem. A value of 0 selects the modem to autobaud with the remote station. |
| <b>Command Syntax</b>  | AT+FPR=<arguments>                                                                                                  |
| <b>Argument</b>        | 0,1,2,4,8,16,24                                                                                                     |
| <b>Default</b>         | 0                                                                                                                   |
| <b>DTE Interface</b>   | None.                                                                                                               |
| <b>LED</b>             | None.                                                                                                               |
| <b>Aborting Events</b> | None.                                                                                                               |
| <b>Notes</b>           | Values available in <a href="#">Subparameters</a>                                                                   |
| <b>Related</b>         | None.                                                                                                               |

---

**+FPP (Packet Protocol Selection)**

|                        |                                             |
|------------------------|---------------------------------------------|
| <b>Function</b>        | Enables or disables DTE-DCE packet protocol |
| <b>Command Syntax</b>  | AT+FPP=<arguments>                          |
| <b>Argument</b>        | 0 - Disable<br>1 - Enable                   |
| <b>Default</b>         | 0                                           |
| <b>DTE Interface</b>   | None.                                       |
| <b>LED</b>             | None.                                       |
| <b>Aborting Events</b> | None.                                       |
| <b>Notes</b>           | None.                                       |
| <b>Related</b>         | None.                                       |

---

**+FBO (Data Bit Order)**

|                        |                                                                                                                                 |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | Controls the bit order for Phase C data transfers. The bit order for Phase B and Phase D data transfers is always direct order. |
| <b>Command Syntax</b>  | AT+FBO=<arguments>                                                                                                              |
| <b>Argument</b>        | 0 - Direct<br>1 - Reversed                                                                                                      |
| <b>Default</b>         | 0                                                                                                                               |
| <b>DTE Interface</b>   | None.                                                                                                                           |
| <b>LED</b>             | None.                                                                                                                           |
| <b>Aborting Events</b> | None.                                                                                                                           |
| <b>Notes</b>           | None.                                                                                                                           |
| <b>Related</b>         | None.                                                                                                                           |

---

**+FEA (Phase C Received EOL Alignment)**

|                        |                                                                       |
|------------------------|-----------------------------------------------------------------------|
| <b>Function</b>        | Enables or disables byte-alignment of EOL markers in the data stream. |
| <b>Command Syntax</b>  | AT+FEA=<arguments>                                                    |
| <b>Argument</b>        | 0 - Disable<br>1 - Enable                                             |
| <b>Default</b>         | 0                                                                     |
| <b>DTE Interface</b>   | None.                                                                 |
| <b>LED</b>             | None.                                                                 |
| <b>Aborting Events</b> | None.                                                                 |
| <b>Notes</b>           | None.                                                                 |
| <b>Related</b>         | None.                                                                 |

---

**+FBS (Buffer Size)**

|                        |                                                                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | 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. |
| <b>Command Syntax</b>  | AT+FBS=<arguments>                                                                                                                                  |
| <b>Argument</b>        | TBS, RBS                                                                                                                                            |
| <b>Default</b>         | 1800,4000                                                                                                                                           |
| <b>DTE Interface</b>   | None.                                                                                                                                               |
| <b>LED</b>             | None.                                                                                                                                               |
| <b>Aborting Events</b> | None.                                                                                                                                               |
| <b>Notes</b>           | Read only.                                                                                                                                          |
| <b>Related</b>         | None.                                                                                                                                               |

---

## Voice Commands

|                                                     |                                                     |
|-----------------------------------------------------|-----------------------------------------------------|
| <a href="#">#BDR</a> - Select DTE Port Rate         | <a href="#">#MDL</a> - Identify Model               |
| <a href="#">#CID</a> - Caller ID                    | <a href="#">#MFR</a> - Identify Manufacturer        |
| <a href="#">#CLS</a> - Select Data/Fax/Voice        | <a href="#">#REV</a> - Identify Revision Level      |
| <b>Commands Available In Voice Mode (#CLS=8)</b>    |                                                     |
| <a href="#">#VBQ</a> - Query Buffer Size            | <a href="#">#VSD</a> - Silence Deletion             |
| <a href="#">#VBS</a> - Bits Per Sample              | <a href="#">#VSK</a> - Buffer Skid Setting          |
| <a href="#">#VBT</a> - Beep Tone Timer              | <a href="#">#VSM</a> - Compression Method Selection |
| <a href="#">#VCI</a> - Identify Compression Methods | <a href="#">#VSP</a> - Silence Detection Period     |
| <a href="#">#VGR</a> - Voice Receive Gain           | <a href="#">#VSR</a> - Sampling Rate Selection      |
| <a href="#">#VGT</a> - Voice Transmit Gain          | <a href="#">#VSS</a> - Silence Detection Tuner      |
| <a href="#">#VLS</a> - Voice Line Select            | <a href="#">#VTD</a> - DTMF Tone Reporting          |
| <a href="#">#VRA</a> - Ringback Goes Away Timer     | <a href="#">#VTM</a> - Enable Timing Mark Placement |
| <a href="#">#VRN</a> - Ringback Never Came Timer    | <a href="#">#VTS</a> - Generate Tone Signals        |
| <a href="#">#VRX</a> - Voice Receive                | <a href="#">#VTX</a> - Voice Transmit               |

**#BDR (Select DTE Port Rate)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command forces the modem to select a specific DTE/modem port rate without further speed sensing on the interface. When a valid #BDR=n command is entered, the OK result code is sent at the current assumed speed. After the OK has been sent, the modem switches to the speed indicated by the #BDR=n command it has just received. When in Online Voice Command Mode and the #BDR setting is nonzero (no auto detect 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 in Online Voice Command Mode and the #BDR setting is zero (auto detect selected), shielded code reporting to the DTE is disabled. [Note that when #BDR has been set nonzero, the modem employs the <a href="#">S30</a> Deadman Timer, and this timer starts at the point where #BDR is set nonzero. If this period expires (nominally 60 seconds) with no activity on the DTE interface, the modem reverts to #BDR=0 and <a href="#">#CLS=0</a> .] |
| <b>Command Syntax</b>  | <p>AT#BDR= &lt;Argument&gt;</p> <p>AT#BDR? - Returns the current setting of the #BDR command as an ASCII decimal value in result code format.</p> <p>AT#BDR=? - Returns a message indicating the speeds that are supported.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Argument</b>        | 0-48 (port rate = <argument>*2400 bps)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>         | 0 (Auto detect)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Notes</b>           | When #BDR is set to a non-zero value, the modem will return OK at the current speed, then switch to the new speed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Related</b>         | <a href="#">S30</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**#CID (Caller ID)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command selects or disables Caller ID recognition and reporting in any mode.<br><br>AT#CID= <Argument>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Command Syntax</b>  | AT#CID? - Returns the current setting (0,1 or 2) of the #CID command as an ASCII decimal value in result code format.<br><br>AT#CID=? - Returns "0,1,2".<br><br>0 - Caller ID Detection disabled<br><br>1 - Enables formatted Caller ID reporting of ICLID SDM (Single Data Message) and MDM (Multiple Data Message) packets.<br><br>Example:<br>DATE=1234<br>TIME=1234<br>NMBR=1234567890<br>NAME=ABCDEFGF                                                                                                                                                                                                                                                                                                      |
| <b>Argument</b>        | 2 - Enables unformatted Caller ID reporting of any ICLID packet received after the first RING cycle including SDM, MDM, or call waiting packets. The DCE shall present all data items and packet control information, found in the Single Messages Format, contained in the Single Data Message (SDM) and in the Multiple Data Message (MDM) packets. The DCE shall present the entire Caller ID packet in ASCII hex as printable numbers. The characters in the ASCII hex message shall be in the bit order presented to the DCE. The DCE shall not insert spaces, <CR>, <LF> ASCII codes, for formatting, between the characters of the packet.<br><br>Example: MESSG=0412303332313134303539313435353132333435 |
| <b>Default</b>         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Notes</b>           | Caller ID can not be detected when in voice mode. The reason is that the CID information is presented at 7200 samples per second and both voice modes (GSM and IMA ADPCM) supported by our voice modems are at 8000 samples per second. So, Caller ID information must be detected in data mode.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Related</b>         | <a href="#">Caller ID</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

**#CLS (Select Data/Fax/Voice)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command selects data, fax or voice mode operation.<br><br>AT#CLS= <Argument>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Command Syntax</b>  | AT#CLS? - Returns the current setting (0,1,2.0, or 8) of the #CLS command as an ASCII decimal value in result code format.<br><br>AT#CLS=? - Returns "0,1,2.0,8".<br><br>0 - Data. This is similar to setting <a href="#">+FCLASS=0</a> , 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 non-autodetect 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.<br><br>1 - Class 1 fax. This is similar to setting <a href="#">+FCLASS=1</a> , and instructs the modem to be a Class 1 fax modem. Once this is set, the <a href="#">+FAA</a> command can be used to force subsequent answers to be Class 1 adaptive answers.<br><br>2.0 - Class 2.0 fax. This is similar to setting <a href="#">+FCLASS=2.0</a> , and instructs the modem to be a Class 2.0 fax modem. Once this is set, the <a href="#">+FAA</a> command can be used to force subsequent answers to be Class 2.0 adaptive answers.<br><br>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 result (after answer or successful call progress) in the modem going into Online Voice Command Mode. |
| <b>Argument</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Default</b>         | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>LED</b>             | If #CLS=1 or =2.0 is sent, the ARQ/Fax LED will start blinking.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Notes</b>           | If the modem is in voice mode (#CLS=8) and <a href="#">+FCLASS=1</a> or =2.0 is issued, the modem will treat it as if #CLS=1 or =2 (respectively) were issued.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**#MDL (Identify Model)**

|                        |                                                              |
|------------------------|--------------------------------------------------------------|
| <b>Function</b>        | This command requests the model number or name of the modem. |
| <b>Command Syntax</b>  | AT#MDL?                                                      |
| <b>Argument</b>        | None.                                                        |
| <b>Default</b>         | N/A                                                          |
| <b>DTE Interface</b>   | None.                                                        |
| <b>LED</b>             | None.                                                        |
| <b>Aborting Events</b> | None.                                                        |
| <b>Notes</b>           | Output should be the same as <a href="#">AT13</a>            |
| <b>Related</b>         | None.                                                        |

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**#MFR (Identify Manufacturer)**

|                        |                                                  |
|------------------------|--------------------------------------------------|
| <b>Function</b>        | This command requests the modem manufacturer.    |
| <b>Command Syntax</b>  | AT#MFR?                                          |
| <b>Argument</b>        | None.                                            |
| <b>Default</b>         | N/A                                              |
| <b>DTE Interface</b>   | None.                                            |
| <b>LED</b>             | None.                                            |
| <b>Aborting Events</b> | None.                                            |
| <b>Notes</b>           | Output should be either USRobotics or 3Com Corp. |
| <b>Related</b>         | None.                                            |

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**#REV (Identify Revision Level)**

|                        |                                                                             |
|------------------------|-----------------------------------------------------------------------------|
| <b>Function</b>        | This command requests the revision level of the modem code.                 |
| <b>Command Syntax</b>  | AT#REV?                                                                     |
| <b>Argument</b>        | None.                                                                       |
| <b>Default</b>         | N/A                                                                         |
| <b>DTE Interface</b>   | None.                                                                       |
| <b>LED</b>             | None.                                                                       |
| <b>Aborting Events</b> | None.                                                                       |
| <b>Notes</b>           | Output should match EPROM Revision and EPROM Date in <a href="#">ATIZ</a> . |
| <b>Related</b>         | None.                                                                       |

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**#VBQ (Query Buffer Size)**

|                        |                                                                                                                                                    |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This query-only command returns the size of the modem's voice transmit and voice receive buffers in ASCII decimal, followed by the OK result code. |
| <b>Command Syntax</b>  | AT#VBQ?                                                                                                                                            |
| <b>Argument</b>        | None.                                                                                                                                              |
| <b>Default</b>         | N/A                                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                                              |
| <b>LED</b>             | None.                                                                                                                                              |
| <b>Aborting Events</b> | None.                                                                                                                                              |
|                        | Output should be similar to:                                                                                                                       |
| <b>Notes</b>           | TX BUF = 1280<br>RX BUF = 1280                                                                                                                     |
| <b>Related</b>         | None.                                                                                                                                              |

**#VBS (Bits Per Sample)**

|                        |                                                                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command selects the degree of ADPCM voice compression to be used. It has no effect if GSM compression is being used.                  |
| <b>Command Syntax</b>  | AT#VBS=<argument>                                                                                                                          |
| <b>Argument</b>        | 2 - 2 bits per sample<br>3 - 3 bits per sample<br>4 - 4 bits per sample<br><br>#VBS=? returns "2,3,4"<br>#VBS? returns the current setting |
| <b>Default</b>         | 4                                                                                                                                          |
| <b>DTE Interface</b>   | None.                                                                                                                                      |
| <b>LED</b>             | None.                                                                                                                                      |
| <b>Aborting Events</b> | None.                                                                                                                                      |
| <b>Notes</b>           | None.                                                                                                                                      |
| <b>Related</b>         | <a href="#">#VCI</a>                                                                                                                       |

---

**#VBT (Beep Tone Timer)**

|                        |                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command defines the time period which is used by the modem as the DTMF or fixed tone duration for generating tones via the D command while in Online Voice Command Mode. |
| <b>Command Syntax</b>  | AT#VBT=<argument><br><br>0-40 (in 1/10 seconds)                                                                                                                               |
| <b>Argument</b>        | 0 will disable tone generation capability<br><br>#VBT=? returns "0-40"<br>#VBT? returns the current setting                                                                   |
| <b>Default</b>         | 10                                                                                                                                                                            |
| <b>DTE Interface</b>   | None.                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                         |

---

**#VCI (Identify Compression Methods)**

|                        |                                                                                                                                                                                                                                                                                                                                  |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command queries the modem as to its compression method and raw bits-per-sample capability.                                                                                                                                                                                                                                  |
| <b>Command Syntax</b>  | AT#VCI?                                                                                                                                                                                                                                                                                                                          |
| <b>Argument</b>        | None.                                                                                                                                                                                                                                                                                                                            |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                              |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                            |
|                        | Output will be similar to:                                                                                                                                                                                                                                                                                                       |
|                        | USRobotics;GSM-B;8<br>USRobotics;G.721 ADPCM;4<br>USRobotics;IMA ADPCM;4                                                                                                                                                                                                                                                         |
| <b>Notes</b>           | <OP0C0>;<D> pairs, separated by <LF0>s. Within each line, the <O> is left justified, and is separated from the <D> by the semicolon character and separated from the bits-per-sample string by another semicolon.<F255P255C255>. F is the author of compression. P is the method of compression. C is number of bits per sample. |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                            |

**#VGR (Voice Receive Gain)**

|                        |                                                                                                                                                                                                                                                                                |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command sets the speaker volume (for the receive channel) when the modem is in speakerphone mode.                                                                                                                                                                         |
| <b>Command Syntax</b>  | AT#VGR=<argument>                                                                                                                                                                                                                                                              |
| <b>Argument</b>        | 0-255                                                                                                                                                                                                                                                                          |
| <b>Default</b>         | 128                                                                                                                                                                                                                                                                            |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                          |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                          |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                          |
| <b>Notes</b>           | Based on this parameter the threshold for the AGC is set inside the DCE. The number otherwise has no meaning. The value of zero mutes the speaker. The values larger than 128 indicate a larger gain than nominal and values less than 128 indicate smaller gain than nominal. |
| <b>Related</b>         | <a href="#">#VGT</a>                                                                                                                                                                                                                                                           |

**#VGT (Voice Transmit Gain)**

|                        |                                                                                                                                                                                                                                                                                   |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command sets the microphone volume (for the transmit channel) when the modem is in speakerphone mode.                                                                                                                                                                        |
| <b>Command Syntax</b>  | AT#VGT=<argument>                                                                                                                                                                                                                                                                 |
| <b>Argument</b>        | 0-255                                                                                                                                                                                                                                                                             |
| <b>Default</b>         | 128                                                                                                                                                                                                                                                                               |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                             |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                             |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                             |
| <b>Notes</b>           | Based on this parameter the threshold for the AGC is set inside the DCE. The number otherwise has no meaning. The value of zero mutes the microphone. The values larger than 128 indicate a larger gain than nominal and values less than 128 indicate smaller gain than nominal. |
| <b>Related</b>         | <a href="#">#VGR</a>                                                                                                                                                                                                                                                              |

**#VLS (Voice Line Select)**

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>       | This action command can be used to select which devices are routed through the modem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Command Syntax</b> | AT#VLS=<argument>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                       | <p>0 - This command instructs the modem that when entering any of the three voice operating submodes (Online Command, Transmit, or Receive), that 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). Result Codes: OK</p> <p>1 - This command instructs the modem to route only the handset through the modem. This setting can be chosen before recording a greeting message. Result Codes: VCON</p> <p>2 - This command instructs the modem to route only the speaker through the modem. This setting can be chosen 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 of consequence can happen until the DTE sends the <a href="#">#VTX</a> command. Result Codes: VCON</p> <p>3 - This command instructs the modem that only the auxiliary input device (microphone) should be routed through the modem. This setting can be chosen before recording a greeting message. Result Codes: VCON</p> <p>4 - This command is the same as #VLS =0, except that the modem enables the external speaker as well as the telephone line/handset circuit. Result Codes: OK</p> <p>6 - This command instructs the modem that both the microphone and speaker should be routed through the modem. This setting can be chosen for Full duplex AEC speakerphone operation. Result Codes: VCON</p> <p>#VLS? This query returns the current setting of the #VLS command as an ASCII decimal value in result code format.</p> <p>#VLS=? This query 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. Currently, device position numbers do happen to correspond to device type numbers, but this correlation is not required (i.e., 0's could be placed in the first few device position number locations to correspond to multiple telephone line connections).</p> |
| <b>Argument</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Default</b>        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>DTE Interface</b>  | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>LED</b>            | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



## Technical Ref.

**Aborting Events**      None.

**Notes**                      None.

**Related**                     None.



**#VRA (Ringback Goes Away Timer)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command can be used, when originating a voice call ( <a href="#">#CLS=8</a> ) to set the "Ringback Goes Away" timer value, i.e., an amount of time 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. |
| <b>Command Syntax</b>  | AT#VRA=<argument><br><br>0-255 (in 1/10 seconds)                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Argument</b>        | 0 - Turns off the "ringback goes away timer." After one ringback, the dialing modem sends VCON and enters Online Voice Command Mode immediately.<br><br>#VRA? Returns the current setting of the #VRA command as an ASCII decimal value in result code format.<br><br>#VRA=? Returns the message, "0-255".                                                                                                                             |
| <b>Default</b>         | 70                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Notes</b>           | If in Speakerphone mode ( <a href="#">#VLS=6</a> ) the modem will be detecting ringback, busy and dial tone before the timer expires. It will also route the incoming signal to the external speaker.                                                                                                                                                                                                                                  |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                  |

**#VRN (Ringback Never Came Timer)**

|                        |                                                                                                                                                                                                                                                                                                                                             |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command can be used when originating a voice call ( <a href="#">#CLS=8</a> ) to set the "Ringback Never Came" timer value, i.e., an amount of time 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. |
| <b>Command Syntax</b>  | AT#VRN=<argument><br><br>0-255 (in 1/10 seconds)                                                                                                                                                                                                                                                                                            |
| <b>Argument</b>        | 0 - Turns off the "ringback goes away timer." After dialing, the dialing modem sends VCON and enters Online Voice Command Mode immediately.<br><br>#VRN? Returns the current setting of the #VRN command as an ASCII decimal value in result code format.<br><br>#VRN=? Returns the message, "0-255".                                       |
| <b>Default</b>         | 100                                                                                                                                                                                                                                                                                                                                         |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                       |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                       |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                       |
| <b>Notes</b>           | If in Speakerphone mode ( <a href="#">#VLS=6</a> ) the modem will be detecting ringback, busy and dial tone before the timer expires. It will also route the incoming signal to the external speaker.                                                                                                                                       |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                       |

---

**#VRX (Voice Receive)**

|                        |                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This action command is only valid if the modem is in the Online Voice Command Mode (indicated previously with the VCON message), and is the switch to the Voice Receive Mode. This command is used when a voice file is to be received from the line, microphone, or handset. The <a href="#">#VLS</a> command should have been previously issued to select the input source. |
| <b>Command Syntax</b>  | AT#VRX                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Argument</b>        | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                           |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                         |

---

**#VSD (Silence Detection)**

|                        |                                                                                          |
|------------------------|------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command provides no function but will respond correctly for compatibility purposes. |
| <b>Command Syntax</b>  | AT#VSD=<argument>                                                                        |
| <b>Argument</b>        | 0,1                                                                                      |
| <b>Default</b>         | 0                                                                                        |
| <b>DTE Interface</b>   | None.                                                                                    |
| <b>LED</b>             | None.                                                                                    |
| <b>Aborting Events</b> | None.                                                                                    |
| <b>Notes</b>           | None.                                                                                    |
| <b>Related</b>         | None.                                                                                    |

---

**#VSK (Buffer Skid Setting)**

|                        |                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command queries and sets the number of bytes of spare space, after the XOFF threshold is reached, in the modem's buffer during Voice Transmit Mode. This equates to the "skid" spare buffer space, or 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. |
| <b>Command Syntax</b>  | AT#VSK=<argument><br><br>0-255 (in bytes)                                                                                                                                                                                                                                                                                                                        |
| <b>Argument</b>        | This number defines the 255 unused bytes remaining in the modem voice transmit buffer after an XOFF is sent to the DTE.<br><br>#VSK? Returns the current setting of the #VSK command as an ASCII decimal value in result code format.<br><br>#VSK=? Returns the message, "255".                                                                                  |
| <b>Default</b>         | 255                                                                                                                                                                                                                                                                                                                                                              |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                            |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                            |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                            |

---

**#VSM (Compression Method Selection)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command selects the method of compression and the sampling rate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Command Syntax</b>  | AT#VSM=<arguments><br><br><cml>,<vsr><br><br><cml> : DTE uses this parameter to select the compression method. This subparameter is the means to select the compression method, and has the form of a numerical constant. The DTE can obtain the label and an identifier using the #VSM=? command.<br><br><vsr> : The DTE selects the DCE Voice sampling rate from among those supported; listed in the response of the #VSM=? command. The units are samples for second. This value overwrites the <a href="#">#VSR</a> command.<br><br>#VSM=?<br>The response for this command will be <cml>, <cmid>, <vsr> <cr><lf><cml><cr><lf><br><cml>: this sub parameter is a numerical label of the compression method.<br><cmid>: This sub parameter is a string describing the Compression method.<br><vsr>: This sub parameter is a range of values that contains the DCE supported range of voice samples per second of the analog signal.<br><br>Example:<br>128,GSM/USR,8000<br>129,G.721 ADPCM/USR,8000<br>130,IMA ADPCM/USR,8000<br><br>#VSM?<br><br>The response for this command should be the current compression method and the sampling rate. Example: "128,8000" |
| <b>Argument</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>         | 128,8000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**#VSP (Silence Detection Period)**

This command sets the Voice Receive Mode silence detection period (inactivity timer) value. The parameter can be used when receiving voice data. This is an amount of time, which if elapsed without receiving any ADPCM data, causes the modem to send the <DLE>s or <DLE>q codes after insuring that the buffer is empty. There are two cases:

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | <ol style="list-style-type: none"><li>1. With the modem's silence deletion feature enabled, the #VSP setting is in effect an inactivity timer. The modem must reset this non-silent data timer on every byte of voice data received.</li><li>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 &lt;DLE&gt;q or &lt;DLE&gt;s shielded code to the DTE.</li></ol> |
| <b>Command Syntax</b>  | AT#VSP=<arguments><br><br>0-255 (in 1/10 seconds)<br><br>#VSP=0 Turns off the silence period detection timer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Argument</b>        | #VSP? Returns the current setting of the #VSP command as an ASCII decimal value in result code format.<br><br>#VSP=? Returns the message, "0-255".                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>         | 55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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**#VSR (Sampling Rate Selection)**

|                        |                                                                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This parameter, along with the bits per sample ( <a href="#">#VBS</a> ) command, determines the necessary DTE interface speed to transmit and receive in the Voice Mode. |
| <b>Command Syntax</b>  | AT#VSR=<argument><br><br>8000                                                                                                                                            |
| <b>Argument</b>        | #VSR? Returns the current setting of the #VSR command as an ASCII decimal value in result code format.<br><br>#VSR=? Returns the message "8000"                          |
| <b>Default</b>         | 8000                                                                                                                                                                     |
| <b>DTE Interface</b>   | None.                                                                                                                                                                    |
| <b>LED</b>             | None.                                                                                                                                                                    |
| <b>Aborting Events</b> | None.                                                                                                                                                                    |
| <b>Notes</b>           | None.                                                                                                                                                                    |
| <b>Related</b>         | None.                                                                                                                                                                    |

---

**#VSS (Silence Detection Tuner)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command enables or disables the Voice Receive mode silence detection, and controls the sensitivity employed by the modem in compressing periods of silence.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Command Syntax</b>  | AT#VSS=<argument><br><br>0 - Disables silence detection by the modem when in Voice Receive Mode.<br><br>1 - Least sensitive setting. When this command is received by the modem, the system is configured to a state which is least likely to detect and compress periods of silence, but still able to do so if the line is really quiet.<br><br>2 - Midrange setting. When this command is received by the modem, the system is configured to a state that is likely to be the best overall compromise on normal telephone lines.<br><br>3 - Most sensitive setting. When this command is received by the modem, the system is configured to a state that is most likely to detect and compress periods of silence.<br><br>#VSS? Returns the current setting of the #VSS command as an ASCII decimal value in result code format.<br><br>#VSS=? Returns the message, "0-3". |
| <b>Argument</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>         | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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**#VTD (DTMF Tone Reporting)**

**Function** This command 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.

**Command Syntax** AT#VTD=<arguments>

i,j,k

i = Voice Transmit Mode, j = Voice Receive Mode, k = Online Voice Command Mode

| Bit | Value | Variables                                                             |
|-----|-------|-----------------------------------------------------------------------|
| 0   | 0     | 0 - Disable DTMF tone capability                                      |
|     | 1     | 1 - Enable DTMF tone capability                                       |
| 1   | 0     | 0 - Disable V.25 1300 Hz Calling tone capability                      |
|     | 2     | 1 = Enable V.25 1300 Hz Calling tone capability                       |
| 2   | 0     | 0 = Disable T.30 1100 Hz Facsimile Calling tone capability            |
|     | 4     | 1 = Enable T.30 1100 Hz Facsimile Calling tone capability             |
| 3   | 0     | 0 = Disable V.25/T.30 2100 Hz Answer tone capability                  |
|     | 8     | 1 = Enable V.25/T.30 2100 Hz Answer tone capability                   |
| 4   | 0     | 0 = Disable Bell 2225 Hz Answer tone capability                       |
|     | 16    | 1 = Enable Bell 2225 Hz Answer tone capability                        |
| 5   | 0     | 0 = Disable call progress tone and cadence (e.a.. busv and dial tone) |
|     | 32    | 1 = Enable call progress tone and cadence (e.a.. busv and dial tone)  |
| 6-7 | 0     | Reserved                                                              |

**Argument**

The arguments are specified by taking the desired bitmapped characteristics, summing them to a decimal value, then getting the hexadecimal equivalent (see [ASCII](#) for translation table). Each of the three arguments is set this way.

#VTD? Returns the current setting of the #VTD command as an ASCII decimal value in result code format.

#VTD=? Returns the message "3F,3F,3F".

**Default** 3F,3F,3F

**DTE Interface** None.

**LED** None.

**Aborting Events** None.

**Notes** Right now, the only supported setting for this command is 3F,3F,3F.

**Related** None.

**#VTM (Timing Mark Placement)**

|                        |                                                                                                                  |
|------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This command provides no function other than command response compatibility when used on USRobotics based modem. |
| <b>Command Syntax</b>  | AT#VTM=<argument>                                                                                                |
| <b>Argument</b>        | None.                                                                                                            |
| <b>Default</b>         | N/A                                                                                                              |
| <b>DTE Interface</b>   | None.                                                                                                            |
| <b>LED</b>             | None.                                                                                                            |
| <b>Aborting Events</b> | None.                                                                                                            |
| <b>Notes</b>           | None.                                                                                                            |
| <b>Related</b>         | None.                                                                                                            |

---

**#VTS (Generate Tone Signals)**

|                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This action command can be issued to play one of more DTMF or other tones (such as a "beep") if and only 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Command Syntax</b>  | AT#VTS=<arguments><br><br>The arguments can take three forms:<br><br>Dual or Single Tones: These are represented by a substring [x,y,z] enclosed in square brackets ("[]") within the parameter. Each such substring consists of three sub-elements corresponding to two frequencies in Hz (0, or 200-3000) and a duration (ASCII decimal in units of 100 ms).<br><br>Example:<br><br>#VTS=[1700,2200,1] would send a dual tone of 1700Hz/2200Hz for 100ms<br><br>Varying DTMF Digits: This is 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.<br><br>Example:<br><br>#VTS={0,20} would send the DTMF tone "0" for 2 seconds.<br><br>DTMF digits, with duration defined by <a href="#">#VBT</a> . This is represented by a value x (non-bracketed) corresponding to a DTMF digit (0-9,A-D,*,#) in the parameter field.<br><br>Example:<br><br>#VTS=0 would send the DTMF tone "0" |
| <b>Argument</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

**#VTX (Voice Transmit)**

|                        |                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Function</b>        | This action command can be issued if and only if the modem is in the Online Voice Command Mode (indicated previously with the VCON message), and is the switch to Voice Transmit Mode. #VTX is used when a voice file is to be transmitted to the line, speaker, or handset. The <a href="#">#VLS</a> command should have been previously issued to select the output source. |
| <b>Command Syntax</b>  | AT#VTX                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Argument</b>        | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Default</b>         | N/A                                                                                                                                                                                                                                                                                                                                                                           |
| <b>DTE Interface</b>   | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>LED</b>             | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Aborting Events</b> | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Notes</b>           | None.                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Related</b>         | None.                                                                                                                                                                                                                                                                                                                                                                         |

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## Appendix A - Result Codes

Below is a table listing result codes in both their numeric (V0) and verbal forms (V1).

| <b>Numeric</b> | <b>Verbal</b>         | <b>Numeric</b> | <b>Verbal</b>         |
|----------------|-----------------------|----------------|-----------------------|
| 0              | OK                    | 85             | CONNECT 19200         |
| 1              | CONNECT               | 88             | CONNECT 19200/ARQ     |
| 2              | RING                  | 91             | CONNECT 21600         |
| 3              | NO CARRIER            | 94             | CONNECT 21600/ARQ     |
| 4              | ERROR                 | 97             | CONNECT 21600/VFC     |
| 5              | CONNECT 1200          | 98             | CONNECT 21600/ARQ/VFC |
| 6              | NO DIAL TONE          | 99             | CONNECT 24000         |
| 7              | BUSY                  | 100            | CONNECT 24000/ARQ     |
| 8              | NO ANSWER             | 101            | CONNECT 24000/VFC     |
| 9              | reserved              | 102            | CONNECT 24000/ARQ/VFC |
| 10             | CONNECT 2400          | 103            | CONNECT 26400         |
| 11             | RINGING               | 104            | CONNECT 26400/ARQ     |
| 13             | CONNECT 9600          | 105            | CONNECT 26400/VFC     |
| 14             | CONNECT/ARQ           | 106            | CONNECT 26400/ARQ/VFC |
| 15             | CONNECT 1200/ARQ      | 107            | CONNECT 28800         |
| 16             | CONNECT 2400/ARQ      | 108            | CONNECT 28800/ARQ     |
| 17             | CONNECT 9600/ARQ      | 109            | CONNECT 28800/VFC     |
| 18             | CONNECT 4800          | 110            | CONNECT 28800/ARQ/VFC |
| 19             | CONNECT 4800/ARQ      | 111            | CONNECT 21600/V34     |
| 20             | CONNECT 7200          | 112            | CONNECT 21600/ARQ/V34 |
| 21             | CONNECT 12000         | 113            | CONNECT 24000/V34     |
| 22             | CONNECT 12000/ARQ     | 114            | CONNECT 24000/ARQ/V34 |
| 24             | CONNECT 7200/ARQ      | 115            | CONNECT 26400/V34     |
| 25             | CONNECT 14400         | 116            | CONNECT 26400/ARQ/V34 |
| 26             | CONNECT 14400/ARQ     | 117            | CONNECT 28800/V34     |
| 33             | CONNECT 9600/V32      | 118            | CONNECT 28800/ARQ/V34 |
| 37             | CONNECT 9600/ARQ/V32  | 120            | CONNECT 2400/V34      |
| 38             | CONNECT 4800/V32      | 122            | CONNECT 2400/ARQ/V34  |
| 39             | CONNECT 4800/ARQ/V32  | 124            | CONNECT 4800/V34      |
| 40             | CONNECT 7200/V32      | 126            | CONNECT 4800/ARQ/V34  |
| 41             | CONNECT 12000/V32     | 128            | CONNECT 7200/V34      |
| 42             | CONNECT 12000/ARQ/V32 | 130            | CONNECT 7200/ARQ/V34  |
| 43             | CONNECT 16800         | 132            | CONNECT 9600/V34      |
| 44             | CONNECT 7200/ARQ/V32  | 134            | CONNECT 9600/ARQ/V34  |
| 45             | CONNECT 14400/V32     | 136            | CONNECT 12000/V34     |
| 46             | CONNECT 14400/ARQ/V32 | 138            | CONNECT 12000/ARQ/V34 |
| 47             | CONNECT 16800/ARQ     | 139            | CONNECT 14400/VFC     |

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# Technical Ref.

| <b>Numeric</b> | <b>Verbal</b>         | <b>Numeric</b> | <b>Verbal</b>        |
|----------------|-----------------------|----------------|----------------------|
| 140            | CONNECT 14400/V34     | 201            | CONNECT 45333/ARQ    |
| 141            | CONNECT 14400/ARQ/VFC | 202            | CONNECT 45333/x2     |
| 142            | CONNECT 14400/ARQ/V34 | 203            | CONNECT 45333/ARQ/x2 |
| 143            | CONNECT 16800/VFC     | 204            | CONNECT 46666        |
| 144            | CONNECT 16800/V34     | 205            | CONNECT 46666/ARQ    |
| 145            | CONNECT 16800/ARQ/VFC | 206            | CONNECT 46666/x2     |
| 146            | CONNECT 16800/ARQ/V34 | 207            | CONNECT 46666/ARQ/x2 |
| 147            | CONNECT 19200/VFC     | 208            | CONNECT 48000        |
| 148            | CONNECT 19200/V34     | 209            | CONNECT 48000/ARQ    |
| 149            | CONNECT 19200/ARQ/VFC | 210            | CONNECT 48000/x2     |
| 150            | CONNECT 19200/ARQ/V34 | 211            | CONNECT 48000/ARQ/x2 |
| 151            | CONNECT 31200         | 212            | CONNECT 49333        |
| 152            | CONNECT 31200/ARQ     | 213            | CONNECT 49333/ARQ    |
| 153            | CONNECT 31200/V34     | 214            | CONNECT 49333/x2     |
| 154            | CONNECT 31200/ARQ/V34 | 215            | CONNECT 49333/ARQ/x2 |
| 155            | CONNECT 33600         | 216            | CONNECT 50666        |
| 156            | CONNECT 33600/ARQ     | 217            | CONNECT 50666/ARQ    |
| 157            | CONNECT 33600/V34     | 218            | CONNECT 50666/x2     |
| 158            | CONNECT 33600/ARQ/V34 | 219            | CONNECT 50666/ARQ/x2 |
| 180            | CONNECT 33333         | 220            | CONNECT 52000        |
| 181            | CONNECT 33333/ARQ     | 221            | CONNECT 52000/ARQ    |
| 182            | CONNECT 33333/x2      | 222            | CONNECT 52000/x2     |
| 183            | CONNECT 33333/ARQ/x2  | 223            | CONNECT 52000/ARQ/x2 |
| 184            | CONNECT 37333         | 224            | CONNECT 53333        |
| 185            | CONNECT 37333/ARQ     | 225            | CONNECT 53333/ARQ    |
| 186            | CONNECT 37333/x2      | 226            | CONNECT 53333/x2     |
| 187            | CONNECT 37333/ARQ/x2  | 227            | CONNECT 53333/ARQ/x2 |
| 188            | CONNECT 41333         | 228            | CONNECT 54666        |
| 189            | CONNECT 41333/ARQ     | 229            | CONNECT 54666/ARQ    |
| 190            | CONNECT 41333/x2      | 230            | CONNECT 54666/x2     |
| 191            | CONNECT 41333/ARQ/x2  | 231            | CONNECT 54666/ARQ/x2 |
| 192            | CONNECT 42666         | 232            | CONNECT 56000        |
| 193            | CONNECT 42666/ARQ     | 233            | CONNECT 56000/ARQ    |
| 194            | CONNECT 42666/x2      | 234            | CONNECT 56000/x2     |
| 195            | CONNECT 42666/ARQ/x2  | 235            | CONNECT 56000/ARQ/x2 |
| 196            | CONNECT 44000         | 236            | CONNECT 57333        |
| 197            | CONNECT 44000/ARQ     | 237            | CONNECT 57333/ARQ    |
| 198            | CONNECT 44000/x2      | 238            | CONNECT 57333/x2     |
| 199            | CONNECT 44000/ARQ/x2  | 239            | CONNECT 57333/ARQ/x2 |
| 200            | CONNECT 45333         | 256            | CONNECT 28000        |

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|     |                       |     |                       |
|-----|-----------------------|-----|-----------------------|
| 257 | CONNECT 28000/ARQ     | 287 | CONNECT 40000/ARQ/V90 |
| 258 | CONNECT 28000/V90     | 288 | CONNECT 33333/V90     |
| 259 | CONNECT 28000/ARQ/V90 | 289 | CONNECT 33333/ARQ/V90 |
| 260 | CONNECT 29333         | 290 | CONNECT 37333/V90     |
| 261 | CONNECT 29333/ARQ     | 291 | CONNECT 37333/ARQ/V90 |
| 262 | CONNECT 29333/V90     | 292 | CONNECT 41333/V90     |
| 263 | CONNECT 29333/ARQ/V90 | 293 | CONNECT 41333/ARQ/V90 |
| 264 | CONNECT 30666         | 294 | CONNECT 42666/V90     |
| 265 | CONNECT 30666/ARQ     | 295 | CONNECT 42666/ARQ/V90 |
| 266 | CONNECT 30666/V90     | 296 | CONNECT 44000/V90     |
| 267 | CONNECT 30666/ARQ/V90 | 297 | CONNECT 44000/ARQ/V90 |
| 268 | CONNECT 32000         | 298 | CONNECT 45333/V90     |
| 269 | CONNECT 32000/ARQ     | 299 | CONNECT 45333/ARQ/V90 |
| 270 | CONNECT 32000/V90     | 300 | CONNECT 46666/V90     |
| 271 | CONNECT 32000/ARQ/V90 | 301 | CONNECT 46666/ARQ/V90 |
| 272 | CONNECT 34666         | 302 | CONNECT 48000/V90     |
| 273 | CONNECT 34666/ARQ     | 303 | CONNECT 48000/ARQ/V90 |
| 274 | CONNECT 34666/V90     | 304 | CONNECT 49333/V90     |
| 275 | CONNECT 34666/ARQ/V90 | 305 | CONNECT 49333/ARQ/V90 |
| 276 | CONNECT 36000         | 306 | CONNECT 50666/V90     |
| 277 | CONNECT 36000/ARQ     | 307 | CONNECT 50666/ARQ/V90 |
| 278 | CONNECT 36000/V90     | 308 | CONNECT 52000/V90     |
| 279 | CONNECT 36000/ARQ/V90 | 309 | CONNECT 52000/ARQ/V90 |
| 280 | CONNECT 38666         | 310 | CONNECT 53333/V90     |
| 281 | CONNECT 38666/ARQ     | 311 | CONNECT 53333/ARQ/V90 |
| 282 | CONNECT 38666/V90     | 312 | CONNECT 54666/V90     |
| 283 | CONNECT 38666/ARQ/V90 | 313 | CONNECT 54666/ARQ/V90 |
| 284 | CONNECT 40000         | 314 | CONNECT 56000/V90     |
| 285 | CONNECT 40000/ARQ     | 315 | CONNECT 56000/ARQ/V90 |
| 286 | CONNECT 40000/V90     |     |                       |

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**Appendix B - Fax Class 1 Result Codes**

The below table lists the response codes for the modem in Fax Class 1 mode.

| <b>Numeric</b> | <b>Verbose</b> | <b>Description</b>                                                                                              |
|----------------|----------------|-----------------------------------------------------------------------------------------------------------------|
| 0              | OK             | The previous command has been processed successfully.                                                           |
| 1              | CONNECT        | The DCE is has just connected to another fax modem.                                                             |
| 2              | RING           | (Optional) Reports the receipt of a network altering ring.                                                      |
| 3              | NO CARRIER     | No carrier is being received from the DCE.                                                                      |
| 4              | ERROR          | The previous command line has not been recognized or was completed abnormally.                                  |
| 5              | NO DIAL TONE   | (Optional) Dial tone was not received within the timeout period.                                                |
| 6              | BUSY           | (Optional) A busy signal was detected.                                                                          |
| 3              | NO CARRIER     | (Optional) DCE sends this response if a connection cannot be established (see EIA/TIA-578 sec. 8.4).            |
| 51             | CONNECT/FAX    | (Optional) The DCE has established a fax connection. This response is used only when fax/data mode is selected. |

## Appendix C - Fax Class 2.0 Result Codes

### Phase A Responses

#### +FCO Fax Connection

The +FCO message indicates a connection has been made to a Group 3 fax station.

#### +FDM Transition to Data Modem

The +FDM message 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](#).

### Phase B Responses

#### +FCS DCS Frame Information

syntax: +FCS: VR, BR, WD, LN, DF, EC, BF, ST (see [Subparameters](#))

Reports the current session parameters. This message is sent after a [+FDT](#) or [+FDR](#) command is executed and new DCS frames are sent.

#### +FIS DIS Frame Information

syntax: +FIS: VR, BR, WD, LN, DF, EC, BF, ST (see [Subparameters](#))

Reports the remote station's capabilities. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### +FTC DTC Frame Information

syntax: +FTC: VR, BR, WD, LN, DF, EC, BF, ST (see [Subparameters](#))

Reports the remote station's capabilities. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### +FPO Remote Polling Indication

Indicates that the remote station has a document to poll. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### +FTI Report Remote ID, TSI

Reports the remote TSI ID string. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### +FCI Report Remote ID, CSI

Reports the remote CSI ID string. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### **+FPI Report Remote ID, CIG**

Reports the remote CIG ID string. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### **+FNF Report NSF Frame**

Reports a Non-Standard Facilities Frame. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### **+FNS Report NSS Frame**

Reports a Non-Standard Setup Frame. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

#### **+FNC Report NSC Frame**

Reports a Non-Standard Commands Frame. [ATD](#), [ATA](#), [+FDT](#) or [+FDR](#) commands may generate this message.

### **Phase C Responses**

#### **+FPS T.30 Phase C Page Reception**

syntax: PPR, LC, BLC, CBLC, LBC (see below)

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

PPR reports the post page response according to the table below:

Table 1: Post Page Response, PPR

| VALUE | LABEL | RESULT CODE | DESCRIPTION                                         |
|-------|-------|-------------|-----------------------------------------------------|
| 1     | MCF   | OK          | page good                                           |
| 2     | RTN   | ERROR       | page bad, retrain requested                         |
| 3     | RTP   | OK          | page good, retrain requested                        |
| 4     | PIP   | OK          | page good, remote request for a procedure interrupt |
| 5     | PIN   | ERROR       | page bad, remote request for a procedure interrupt  |

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.

### Phase D Responses

#### +FET Post Page Message

The Post Page Message indicates whether or not the transmitting station has more data or not.

| PPM CODE | T.30 MNEMONIC | DESCRIPTION                 |
|----------|---------------|-----------------------------|
| 0        | MPS           | another page, same document |
| 1        | EOM           | another document            |
| 2        | EOP           | no more data                |

---

## Appendix D - Shielded <DLE> Commands from the DCE

### <DLE>0 - <DLE>9, <DLE>\*, <DLE>#, <DLE>A -<DLE>D

DTMF Digits 0 through 9, \*, #, or A through D detected by the modem, i.e., user has pressed a key on a local or remote telephone. The modem sends only one <DLE> code per DTMF button pushed.

### <DLE>a (currently not supported)

Answer Tone (CCITT). Sent to the DTE when the [V.25/T.30](#) 2100 Hz Answer Tone (Data or Fax) is detected. If the DTE fails to react to the code, and the modem continues to detect Answer tone, the code is repeated as often as once every half second.

### <DLE>b

Busy. Sent in Voice Receive Mode when the busy cadence is detected, after any remaining data in the voice receive buffer. The modem sends the busy <DLE>b code every 4 seconds if busy continues to be detected and the DTE does not react. This allows the DTE the flexibility of ignoring what could be a false busy detection.

### <DLE>c

Calling Tone. Sent when the [T.30](#) 1100 Hz Calling Tone (Fax Modem) is detected in any of the voice operating modes. The modem assumes that the calling tone is valid and sends this code only after 4 seconds of proper cadence has been detected. If the DTE does not react to the <DLE>c, and calling tone continues, the code is sent again as often as once every 4 seconds.

### <DLE>d

Dialtone. Sent in Voice Receive Mode when dial tone is detected after any remaining data in the voice receive buffer. The modem sends the <DLE>d code every 4 seconds if dial tone continues to be detected and the DTE does not react. This allows the DTE the flexibility of ignoring what could be false dial tone detection.

### <DLE>e (currently not supported)

European Data Modem Calling Tone. Sent when the [V.25](#) 1300 Hz Calling Tone (Data Modem) is detected in a voice submode. The modem assumes that the calling tone is valid, and sends this code only after 4 seconds of proper cadence has been detected. If the DTE does not react to the <DLE>e and calling tone continues, the code is sent again as often as once every 4 seconds.

### <DLE>f (currently not supported)

Bell Answer Tone. Sent when Bell 2225 Hz Answer Tone (Data) is detected. If the DTE fails to react to the code and the modem continues to detect Answer tone, the code is repeated as often as every 1/2 second.

**<DLE>\***

Call Indicator signal (CI). Sent when the [V.8](#) CI is detected in any of the voice operating modes initiating a session of data transmission. RapidCommVoice is currently using "\*" as an indicator for data transmission.

**<DLE>h**

Hung Up Handset. Sent immediately when the modem detects that the local handset has hung-up (i.e., has transitioned from off-hook to on-hook) while in any of the three voice submodes.

**<DLE>o (currently not supported)**

Overflow. Sent in Voice Receive Mode if the voice receive data buffer overflows, in which case, the latest data is lost in favor of retaining the oldest data in the buffer. (The DTE may not have been reading data from the modem lately.) The modem inserts the <DLE>o at the end of the buffer, thus marking the location where data was lost by the DTE. The modem does not append <E> <D><DLE>o codes to the buffer contiguously. If more than one data byte is lost before the DTE begins reading again, there is only one <DLE>o code in the data stream. However, if the DTE resumes reading, and then once again allows the buffer to overflow, a new <DLE>o is appended to the data by the modem. Thus, the <E><D><DLE>o does not indicate how many bytes of contiguous data has been lost, but may report multiple gaps of lost data in the data stream.

**<DLE>q**

Quiet. Sent in Voice Receive Mode following any remaining data in the receive voice buffer when the silence detection timer ([#VSP](#)) expires and there has been voice data passed to the DTE. Note that with [#VSS=0](#), the Quiet message never occurs. But with silence deletion turned on, [#VSS](#) may not in itself be sufficient since "cracks and pops" for a short duration directly after a connection should not be considered voice. In general, <DLE>q is sent if first there was sound, and now there is no sound, and means that somebody has stopped talking, and according to the criteria selected in the [#VSP](#) and [#VSS](#) settings, is probably not going to start again. If the DTE ignores the <DLE>q code, the modem automatically resets its timer and sends the code again if the [#VSP](#) time period again expires. This allows the DTE time to react to what may be false silence detection.

**<DLE>R (currently not supported)**

Ring. Sent in online voice command mode and a valid ring is detected. This command is currently not supported.

**<DLE>r (currently not supported)**

Ringback. Sent after dialing and the timers [#VRA](#) or [#VRN](#) does not expire and a valid ringback has been detected. This command is currently not supported.

**<DLE>s**

Silence. Sent in Voice Receive Mode after the silence detection timer ([#VSP](#)) expires and if valid voice has not been detected ([#VSS](#)). In general, <DLE>s is sent if no sound was detected at all. This differs slightly from Quiet (<DLE>q) in that it can be used by the DTE in its discrimination algorithms as a means of determining if anything at all is coming from the remote station. If the DTE ignores the <DLE>s code, the modem automatically resets its timer and sends the code again if the [#VSP](#) time period a gain expires. This allows the DTE time to react to what may be a false detection of silence.

**<DLE>t**

Handset Off-Hook. Sent one time when the local handset transition from on-hook to off-hook is detected in any of the three voice submodes.

**<DLE>u (currently not supported)**

Underrun. Sent in Voice Transmit Mode when the voice transmit buffer becomes empty without receiving a <DLE><ETX> or <DLE><CAN> command first. The modem remains in transmit mode, but issues the <DLE>u to indicate that silence is being generated. When the DTE resumes sending bytes, the modem allows a small number of bytes to build up in the buffer before re-enabling the transmitter to avoid repeated underruns. However, with the underrun condition, the modem does not wait for the XOFF threshold (or timer) to be met before resuming, as it does on an initial transmit or resume operation because the remote listener may be unaware of the underrun, and keeping the silence short may serve to mask the underrun altogether.

**<DLE><ETX>**

End of Stream. <DLE><ETX> is sent to denote the end of a voice data stream, similar to fax Class 1 and 2. This occurs in Voice Receive Mode only after the DTE issues the key abort.

**Shielded <DLE> Commands from the DTE**

Most commands issued for voice are implemented as extensions to the AT command set, and are accepted only if the modem is in a valid command mode, such as Online Voice Command Mode. However, there are some operations that are available to the DTE without necessitating a switch to Online Voice Command Mode. The most obvious of these is the <DLE><ETX> which the DTE issues during Voice Transmit Mode to terminate an output message. Table 3-2 lists shielded <DLE> commands recognized by the modem.

**<DLE><ETX>**

Terminate. Sent during Voice Transmit Mode to indicate that the DTE has finished transmitting a voice message. The modem completes transmission of any remaining data in the voice transmit buffer before responding with the VCON message and entering Online Voice Command Mode. (This command is ignored by the modem when not in Voice Transmit Mode.)

**<DLE><CAN>**

Cancel. Sent during Voice Transmit Mode to indicate that the DTE has finished transmitting a voice message and wants the modem to discard any remaining data in the voice transmit buffer. The modem immediately purges its buffer and then responds with the VCON message entering Online Voice Command Mode. (This command is ignored by the modem when not in Voice Transmit Mode.)

**<DLE>p (currently not supported)**

Pause. Sent during Voice Transmit Mode to force the modem to suspend sending voice data to the selected output device(s). Any data currently in the voice transmit buffer is saved until either a resume (<DLE>r), or cancel <DLE><CAN>, is received, in which case the data is lost. If a <DLE><ETX> is received during the paused state, the modem processes it normally, and also automatically resumes transmission of the data left in the buffer (appended with <DLE><ETX>). Any other data received from the DTE while in this paused state is placed in the transmit buffer according to available space, with flow control active. (This command is ignored in other voice submodes.)

**<DLE>r (currently not supported)**

Resume. Sent during Voice Transmit Mode to force the modem to resume sending voice data to the selected output device(s). Any data currently in the voice transmit buffer is now played. (This command is ignored in other voice modes.) The pause and resume commands are different than a simple suspension of data; data in the buffer is "frozen" and not played when the DTE pauses.

*Appendix E - &F Settings*

| <b>Setting</b> | <b>&amp;F0</b> | <b>&amp;F1</b> | <b>&amp;F2</b> |
|----------------|----------------|----------------|----------------|
| B              | 0              | 0              | 0              |
| E              | 1              | 1              | 1              |
| F              | 1              | 1              | 1              |
| L              | 2              | 2              | 2              |
| M              | 1              | 1              | 1              |
| Q              | 0              | 0              | 0              |
| V              | 1              | 1              | 1              |
| X              | 1              | 4              | 4              |
| Y              | 0              | 0              | 0              |
| &A             | 1              | 3              | 3              |
| &B             | 0              | 1              | 1              |
| &C             | 1              | 1              | 1              |
| &D             | 2              | 2              | 2              |
| &G             | 0              | 0              | 0              |
| &H             | 0              | 1              | 2              |
| &I             | 0              | 0              | 2              |
| &K             | 1              | 1              | 1              |
| &M             | 4              | 4              | 4              |
| &N             | 0              | 0              | 0              |
| &P             | 0              | 0              | 0              |
| &R             | 1              | 2              | 1              |
| &S             | 0              | 0              | 0              |
| &T             | 5              | 5              | 5              |
| &U             | 0              | 0              | 0              |
| &Y             | 1              | 1              | 1              |

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# Technical Ref.

|     |    |    |    |
|-----|----|----|----|
| S0  | 0  | 0  | 0  |
| S1  | 0  | 0  | 0  |
| S2  | 43 | 43 | 43 |
| S3  | 13 | 13 | 13 |
| S4  | 10 | 10 | 10 |
| S5  | 8  | 8  | 8  |
| S6  | 2  | 2  | 2  |
| S7  | 60 | 60 | 60 |
| S8  | 2  | 2  | 2  |
| S9  | 6  | 6  | 6  |
| S10 | 14 | 14 | 14 |
| S11 | 70 | 70 | 70 |
| S12 | 50 | 50 | 50 |
| S13 | 0  | 0  | 0  |
| S15 | 0  | 0  | 0  |
| S16 | 0  | 0  | 0  |
| S18 | 0  | 0  | 0  |
| S19 | 0  | 0  | 0  |
| S21 | 10 | 10 | 10 |
| S22 | 17 | 17 | 17 |
| S23 | 19 | 19 | 19 |
| S25 | 5  | 5  | 5  |
| S27 | 0  | 0  | 0  |
| S28 | 8  | 8  | 8  |
| S29 | 20 | 20 | 20 |
| S30 | 0  | 0  | 0  |

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|     |     |     |     |
|-----|-----|-----|-----|
| S31 | 128 | 128 | 128 |
| S32 | 2   | 2   | 2   |
| S33 | 0   | 0   | 0   |
| S34 | 0   | 0   | 0   |
| S35 | 0   | 0   | 0   |
| S36 | 14  | 14  | 14  |
| S38 | 0   | 0   | 0   |
| S39 | 0   | 0   | 0   |
| S40 | 1   | 1   | 1   |
| S41 | 0   | 0   | 0   |
| S42 | 0   | 0   | 0   |

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**Appendix F - &N&U Settings**

| <b>Value</b> | <b>Speed</b> | <b>Value</b> | <b>Speed</b> |
|--------------|--------------|--------------|--------------|
| 0            | Variable     | 20           | 32000        |
| 1            | 300          | 21           | 33333        |
| 2            | 1200         | 22           | 34666        |
| 3            | 2400         | 23           | 36000        |
| 4            | 4800         | 24           | 37333        |
| 5            | 7200         | 25           | 38666        |
| 6            | 9600         | 26           | 40000        |
| 7            | 12000        | 27           | 41333        |
| 8            | 14400        | 28           | 42666        |
| 9            | 16800        | 29           | 44000        |
| 10           | 19200        | 30           | 45333        |
| 11           | 21600        | 31           | 46666        |
| 12           | 24000        | 32           | 48000        |
| 13           | 26400        | 33           | 49333        |
| 14           | 28800        | 34           | 50666        |
| 15           | 31200        | 35           | 52000        |
| 16           | 33600        | 36           | 53333        |
| 17           | 28000        | 37           | 54666        |
| 18           | 29333        | 38           | 56000        |
| 19           | 30666        | 39           | 57333        |

---

### **Appendix G - Setting Bitmapped S-Registers**

Bitmapped registers are an easy way to store multiple logical switches in one setting. The bitmapped registers, like regular ones, store the setting in 8 bits. That means 256 possibilities ( $2 \times 2 = 256$  or 0-255). However, the bitmapped registers can have each bit be assigned to a different logical setting.

Let's take S34 as an example. Below is a listing of the variables for S34.

| <b>Bit</b> | <b>Value</b> | <b>Description</b>              |
|------------|--------------|---------------------------------|
| 0          | 1            | Disable 8S-2D trellis encoding  |
| 1          | 2            | Disable 16S-4D trellis encoding |
| 2          | 4            | Disable 32S-2D trellis encoding |
| 3          | 8            | Disable 64S-4D trellis encoding |
| 4          | 16           | Disable Non linear coding       |
| 5          | 32           | Disable TX level deviation      |
| 6          | 64           | Disable Pre-emphasis            |
| 7          | 128          | Disable Pre-coding              |

To set bitmapped registers, you can do one of two things.

#### 1) Specify the bit

You can specify the bit to enable or disable by using the format  $ATS_n.b=x$  where  $n$  is the S Register,  $b$  is the bit (0-7) and  $x$  (0 or 1) is the setting. Along the line of the above example, you would set TX Level Deviation to disabled by issuing  $ATS_{34}.5=1$ . The disadvantage of this is that you have to issue multiple commands to set multiple variables in one bitmapped register.

#### 2) Construct the settings

You can also set all the bitmapped settings in one command. You do this by adding up all the values that you want to set. In the above example, if you wanted to set TX Level Deviation (32) and Pre-coding (128) to disabled, you would issue  $ATS_{34}=160$ .

**Appendix H - +FARX, +FATX, +FRH, +FRM, +FTH, +FTM Settings**

| <b>Value</b> | <b>Data Rate</b> | <b>Modulation Type</b>   |
|--------------|------------------|--------------------------|
| 3            | 300              | v.21 channel 2           |
| 24           | 2400             | v.27ter                  |
| 48           | 4800             | v.27ter                  |
| 72           | 7200             | v.29                     |
| 73           | 7200             | v.17                     |
| 74           | 7200             | v.17 with short training |
| 96           | 9600             | v.29                     |
| 97           | 9600             | v.17                     |
| 98           | 9600             | v.27 with short training |
| 121          | 12000            | v.17                     |
| 122          | 12000            | v.17 with short training |
| 145          | 14400            | v.17                     |
| 146          | 14400            | v.17 with short training |

---

**Appendix I - Subparameters****+FCC, +FCS, and +FIS**

| Label | Function                | Values | Description                     |        |
|-------|-------------------------|--------|---------------------------------|--------|
| VR    | Vertical Resolution     | 0      | Normal. 98 lines per inch (lpi) |        |
|       |                         | 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                |        |
| 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  |                                 |        |

**+FNR**

| Label | Reports Affected                                                                            |
|-------|---------------------------------------------------------------------------------------------|
| RPR   | Receiver parameters, <a href="#">+FIS</a> and <a href="#">+FTC</a>                          |
| TPR   | Transmitter parameters, <a href="#">+FCS</a>                                                |
| IDR   | ID strings, <a href="#">+FTI</a> , <a href="#">+FCI</a> , and <a href="#">+FPI</a>          |
| NSR   | Non-Standard frames, <a href="#">+FNF</a> , <a href="#">+FNS</a> , and <a href="#">+FNC</a> |

**+FPS**

| Value | T.30 Mnemonic | Description                    |
|-------|---------------|--------------------------------|
| 1     | MCF           | Page good                      |
| 2     | RTN           | Page bad, retrain requested    |
| 3     | RTP           | Page good, retrain requested   |
| 4     | PIN           | Page bad, interrupt requested  |
| 5     | PIP           | Page good, interrupt requested |

**+FCQ**

| Label | Value | Description                                                           |
|-------|-------|-----------------------------------------------------------------------|
| RQ    | 0     | Receive checking disabled. <a href="#">+FPS</a> will be set to 1      |
|       | 1     | Receive checking enabled                                              |
|       | 2     | Receive checking enabled. Modem will detect and correct errors        |
| TQ    | 0     | Transmit checking disabled                                            |
|       | 1     | Transmit checking enabled. Modem will send <CAN> following any errors |
|       | 2     | Transmit checking enabled. Modem will detect and correct errors       |

**+FHS**

| Value (hex)  | Description                                      |
|--------------|--------------------------------------------------|
| <i>00-0F</i> | <i>Call Placement and Termination</i>            |
| 00           | Normal and proper end of connection              |
| 01           | Ring detect without successful handshake         |
| 02           | Call aborted from <a href="#">+FKS</a> or <CAN>  |
| 03           | No loop current                                  |
| 04           | Ringback detected. no answer                     |
| 05           | Ringback detected. answer without CED            |
| <i>10-1F</i> | <i>Transmit Phase A and Miscellaneous Errors</i> |
| 10           | Unspecified Phase A error                        |
| 11           | No answer                                        |
| <i>20-3F</i> | <i>Transmit Phase B Handup Codes</i>             |
| 20           | Unspecified transmit Phase B error               |

|       |                                              |
|-------|----------------------------------------------|
| 21    | Remote cannot receive or send                |
| 22    | COMREC 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 bit/s or +FMS value |
| 28    | RSPREC invalid response received             |
| 40-4F | <i>Transmit Phase C Hand-up Codes</i>        |
| 40    | Unspecified transmit Phase C error           |
| 41    | Unspecified image format error               |
| 42    | Image conversion error                       |
| 43    | DTE to DCE underflow                         |
| 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 | <i>Transmit Phase D Hand-up Codes</i>        |
| 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 | <i>Receive Phase B Hand-up Codes</i>         |
| 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 | <i>Receive Phase C Hand-up Codes</i>         |
| 90    | Unspecified Receive Phase C error            |
| 91    | Missing EOL                                  |
| 93    | DCE to DTE buffer overflow                   |
| A0-BF | <i>Receive Phase D Hand-up Codes</i>         |
| A0    | Unspecified Receive Phase D errors           |
| A1    | RSPREC invalid response                      |
| A2    | COMREC invalid response                      |



# Technical Ref.

A3  
C0-DF  
E0-EF

Unable to continue after PIN or PIP  
*reserved for future standardization*  
*reserved for manufacturer use*

## +FPR

| Value | Port Rate |
|-------|-----------|
| 0     | Autobaud  |
| 1     | 2400      |
| 2     | 4800      |
| 4     | 9600      |
| 8     | 19200     |
| 16    | 38400     |
| 24    | 57600     |

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### ***Appendix J - Caller ID***

Here's the structure for Caller ID (CID) information in the USA, as specified by Bellcore. To enable it on the modem, set [#CID](#) to either 1 or 2. If you want to skip past the technical details, you can jump down to [How To Use Caller ID](#).

Caller ID comes in two forms, Calling Number Delivery (CND) and Calling Name Delivery (CNAM). They are commonly known as Caller ID and Caller ID With Name, respectively. The method for presenting the data comes in two forms, Single Data Message Format (SDMF) and Multiple Data Message Format (MDMF). CNAM is always presented in MDMF and CND can be presented using SDMF (USA seems to use this exclusively for CND) or MDMF (Canada seems to use this for CND on DMS switches). In the future, all Caller ID information may be sent in MDMF.

Both SDMF and MDMF have the same basic parameters:

| <b>Parameter</b>    | <b>Value</b>                                     |
|---------------------|--------------------------------------------------|
| Link Type           | Simplex, two-wire                                |
| Transmission Scheme | Analog, Phase-coherent<br>Frequency Shift Keying |
| Logical 1 (Mark)    | 1200 +/- 12 Hz                                   |
| Logical 0 (Space)   | 2200 +/- 22 Hz                                   |
| Transmission Rate   | 1200 bps                                         |
| Transmission Level  | -13.5 +/- 1 dBm                                  |
| Data Application    | Serial/Binary/Asynchronous                       |

See the below table for the sequences of a normal transmission using either SDMF or MDMF.

| Stage | SDMF                  | SDMF Value      | MDMF                    | MDMF Value      |
|-------|-----------------------|-----------------|-------------------------|-----------------|
| 1     | First Ring            | N/A             | First Ring              | N/A             |
| 2     | Guard Time            | >/= ~500ms      | Guard Time              | >/= ~500ms      |
| 3     | Channel Seizure       | 30 bytes of 55h | Channel Seizure         | 30 bytes of 55h |
| 4     | Carrier               | 150ms of Mark   | Carrier                 | 150ms of Mark   |
| 5     | Message Type          | 04h             | Message Type            | 80h             |
| 6     | Message Length        | variable        | Message Length          | variable        |
| 7     | Month                 | variable        | Parameter Type - Time   | 01h             |
| 8     | Day                   | variable        | Parameter Length        | 08h             |
| 9     | Hour                  | variable        | Month                   | variable        |
| 10    | Minute                | variable        | Day                     | variable        |
| 11    | <phone number digits> | variable        | Hour                    | variable        |
| 12    | Checksum              | variable        | Minute                  | variable        |
| 13    | Guard Time            | >/= ~450ms      | Parameter Type - Number | 02h             |
| 14    | Second Ring           | N/A             | Parameter Length        | variable        |
| 15    |                       |                 | <phone number digits>   | variable        |
| 16    |                       |                 | Parameter Type - Name   | 07h             |
| 17    |                       |                 | Parameter Length        | variable        |
| 18    |                       |                 | <name>                  | variable        |
| 19    |                       |                 | Checksum                | variable        |
| 20    |                       |                 | Guard Time              | >/= ~450ms      |
| 21    |                       |                 | Second Ring             | N/A             |

In the above example, if MDMF is used to send CND information, then stages 16 through 18 are not present.

Also, if the caller number is marked as Private or Out Of Area/Unavailable, then SDMF will send "P" (50h - Private) or "O" (49h - Out Of Area/Unavailable) in stage 11. MDMF will send 04h in stage 13, 01h in stage 14 and "P" (50h) or "O" (49h) in stage 15.





**Appendix K - Distinctive Ring**

The original USRobotics Sportster Voice modems (models 1171 and 1172) and most newer voice and non-voice modems support distinctive ring as provided by a majority of the North American telecommunication providers polled in conjunction with the [Bellcore](#) documented standards. The command to enable DRING is [S41=1](#). Once enabled, the modem will respond with "RING A|RING B|RING C|RING D" depending on the ring cadence observed from the telephone line. Please note that the complete ring cadence is separated from the next ring cadence by a period of 4 seconds without ring voltage.

|               |          |           |          |           |          |        |
|---------------|----------|-----------|----------|-----------|----------|--------|
| <b>RING A</b> | 2s ON    | 4s OFF    |          |           |          |        |
| <b>RING B</b> | 800ms ON | 400ms OFF | 800ms ON | 4s OFF    |          |        |
| <b>RING C</b> | 200ms ON | 400ms OFF | 200ms ON | 400ms OFF | 800ms ON | 4s OFF |
| <b>RING D</b> | 200ms ON | 400ms OFF | 800ms ON | 400ms OFF | 200ms ON | 4s OFF |

### **Appendix L - GSM Information**

GSM (Groupe Speciale Mobile) is a couple of things. It is an organization devoted to making mobile communications easier, by having one standard. While that may not seem to be very related to our voice modems, but it is. GSM created a specification for compressing audio signals to save space when transmitting over the airwaves. USR adopted this standard for use in our voice modems (we support GSM 6.10) because it would suit the same purpose. With it, we could take a voice signal from the phone line and compress it enough to be able to transmit it over the serial link at acceptable speeds. Now, on to the technical details.

GSM is a frame based speech coder, that is, it processes one frame at a time. `gsm_coder` will compress 160 PCM samples into a 17 word (16 bit) or 33 bytes GSM frame. `gsm_decoder` will decompress a gsm frame into 160 PCM samples. The gross bit rate is 13 kbps.

#### **General I/O format for GSM**

PCM Input for `gsm_coder`:

- Sample is at 4 bits/8kHz
- Input anti-aliasing filter
- 16 bits signed format. Linear PCM directly from linear AIC.
- The bit format is s.v.v.v.v.v.v.v.v.v.v.v.v.v.x.x. where S is the sign bit, v a valid bit, and x a "don't care" bit.
- 160 sample buffer size.

Output from `gsm_decoder`:

- 160 sample buffer size
- 16 bits signed format. Linear PCM with 3 '0' LSBs.
- The bit format is s.v.v.v.v.v.v.v.v.v.v.v.v.v.0.0.0. where s is the sign bit, v is a valid bit.

## GSM bit frame format

The following table details the GSM bit frame format. In a GSM frame, gsm\_head is defined by the application to identify the frame, e.g. the frame index. Please note that the 8 LSBs of the last (17th) word are not used by GSM. Those bits can be used by the applications, or simply be stripped away for the byte mode to reduce the bit rate. GSM frame size is either 17 words or 33 bytes.

| Index | Byte1                                      | Byte2                                      | Index | Byte1                                     | Byte2                                      |
|-------|--------------------------------------------|--------------------------------------------|-------|-------------------------------------------|--------------------------------------------|
| 1     | Head(4)<br>LAR1(4)                         | LAR1(2)<br>LAR2(6)                         | 10    | X210(2)<br>X211(3)<br>X212(3)             | N3(7)<br>B3(1/2)                           |
| 2     | LAR3(5)<br>LAR4(3/5)                       | LAR4(2/5)<br>LAR5(4)<br>LAR6(2/4)          | 11    | B3(1/2)<br>M3(2)<br>XMAX3(5/6)            | XMAX3(1/6)<br>X30(3)<br>X31(3)<br>X32(1/3) |
| 3     | LAR6(2/4)<br>LAR7(3)<br>LAR8(3)            | N1(7)<br>B1(1/2)                           | 12    | X32(2/3)<br>X33(3)<br>X34(3)              | X35(3)<br>X36(3)<br>X37(2/3)               |
| 4     | B1(1)<br>M1(2)<br>XMAX1(5/6)               | XMAX1(1/6)<br>X10(3)<br>X11(3)<br>X12(1/3) | 13    | X37(1/3)<br>X38(3)<br>X39(3)<br>X310(1/3) | X310(2/3)<br>X311(3)<br>X312(3)            |
| 5     | X12(2/3)<br>X13(3)<br>X14(3)               | X15(3)<br>X16(3)<br>X17(2/3)               | 14    | N4(7)<br>B4(1/2)                          | B4(1/2)<br>M4(2)<br>XMAX4(5/6)             |
| 6     | X17(1/3)<br>X18(3)<br>X19(3)<br>X110(1/3)  | X110(2/3)<br>X111(3)<br>X112(3)            | 15    | XMAX4(1)<br>X40(3)<br>X41(3)<br>X42(1/3)  | X42(2/3)<br>X43(3)<br>X44(3)               |
| 7     | N2(7)<br>B2(1/2)                           | B2(1/2)<br>M2(2)<br>XMAX2(5/6)             | 16    | X45(3)<br>X46(3)<br>X47(2/3)              | X47(1/3)<br>X48(3)<br>X49(3)<br>X410(1/3)  |
| 8     | XMAX2(1/5)<br>X20(3)<br>X21(3)<br>X22(1/3) | X22(2/3)<br>X23(3)<br>X24(3)               | 17    | X410(2/3)<br>X411(3)<br>X412(3)           |                                            |
| 9     | X25(3)<br>X26(3)<br>X27(2/3)               | X27(1/3)<br>X28(3)<br>X29(3)<br>X210(1)    |       |                                           |                                            |

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### Application I/O format for GSM

The 17 word GSM frame is encapsulated. The "begin frame word" is 0xFEFE and the "end frame word" is 0xA5A5. Occasionally, the "begin" word will be 0xB6B6. This indicates that the volume is below the silence threshold defined by the DSP. The 34th byte is always 0x00. A total of 19 words is used to transmit a GSM voice frame across the serial device.

As of the release of the x2 based voice modems, the option to enable UN-encapsulated GSM is now available. [S41](#) (Voice Options Bitmap) defines the how this is accomplished. During playback to the modem, it will always auto-detect encapsulated GSM, un-encapsulated GSM, or ADPCM data. During record from the modem, [S41](#) will determine the format of the GSM data if [#VSM](#) has selected GSM as the audio data format.

---

### **Appendix M - Determination Methods**

Here are ways to determine whether or not a particular modem has a certain feature:

#### **Data Options:**

V.90 or x2 or V.34 or v.FC: Issue [AT \$\mathcal{I}\$](#)  and look for the line beginning with Options. The space from there until the CR/LF pair will list the data modulations, V.32bis and above. Note that if the modem supports the 33.6 extensions of V.34, it will list "V.34+". If just 28.8 V.34, then it will say "V.34"

#### **Fax Options:**

To determine the fax classes supported, you can do one of two things. First, you can issue [AT \$\mathcal{I}\$](#)  and look for "Class 1" or "Class 2.0" on the line beginning "Fax Options". Second, you can issue [AT+FCLASS](#) with the fax class for which you wish to check.

#### **Line Options:**

To determine whether or not a modem supports Caller ID, the easiest way is to issue [AT#CID=1](#). If the modem responds "OK", then it's supported. To determine whether or not a modem support Distinctive Ring, you can either issue [ATS41=1](#) and check for "OK" or issue [AT \$\mathcal{I}\$](#)  and look at the Line Options line. Just search for "Distinctive Ring". This will also work for Caller ID if you check for "Caller ID".

#### **Voice Codecs:**

The best way to determine what voice codecs a modem supports is to issue [#VCI?](#) and check the output. Each codec will be on a separate line listing the code manufacturer, the codec type and the number of bits per sample, each separated by a semi-colon. If the modem responds with ERROR, then it's not a voice modem.

#### **V.80**

The way to tell whether or not a modem supports V.80 is to issue a [AT+ESA=?](#). If the modem returns ERROR, then the modem does not support V.80.

**Appendix N - Voice Samples****Originating Speakerphone**

| DTE/Application | DCE/Modem | Description                                                                                                                                                                                                            |
|-----------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AT#CLS=8        | OK        | Modem enters voice mode.                                                                                                                                                                                               |
| AT#VLS=6        | VCON      | Modems selects speakerphone mode                                                                                                                                                                                       |
| AT#VRN=0        | OK        | Don't wait for ringback                                                                                                                                                                                                |
| ATDT<number>    | CONNECT   | Modem enters CALL PROGRESS state. It dials any DTMF digits that follow. The DTMF digits being dialed out are echoed to the local speaker.<br>Once the CONNECT message is sent, transmission is two way. Start talking. |

**Answering Speakerphone**

| DTE/Application | DCE/Modem | Description                                                                                                        |
|-----------------|-----------|--------------------------------------------------------------------------------------------------------------------|
|                 |           | First ring                                                                                                         |
|                 | RING      | If Caller ID and/or Distinctive Ring are enabled, the modem and application perform whatever actions are necessary |
|                 | RING      | Second ring                                                                                                        |
| AT#CLS=8        | OK        | Modem enters voice mode.                                                                                           |
| AT#VLS=6        | VCON      | Modems selects speakerphone mode                                                                                   |
| ATA             | CONNECT   | Start talking                                                                                                      |

**Hanging Up**

| DTE/Application | DCE/Modem | Description                                   |
|-----------------|-----------|-----------------------------------------------|
| ATH             | OK        | Modem hangs up the line                       |
| AT#VLS=0        | OK        | Telephone line interface routed through modem |
| AT#CLS=0        | OK        | Data mode                                     |

**Switching Call Waiting Lines**

| DTE/Application            | DCE/Modem | Description                                                                                 |
|----------------------------|-----------|---------------------------------------------------------------------------------------------|
|                            |           | Modem in speakerphone mode, conversation taking place when Call Waiting beep/click is heard |
| AT# <a href="#">VTS</a> =! | OK        | Switches to other "line".                                                                   |
| AT# <a href="#">VTS</a> =! | OK        | Switches back to first "line".                                                              |

**Switching from Speakerphone to Handset**

| DTE/Application            | DCE/Modem | Description                                                                 |
|----------------------------|-----------|-----------------------------------------------------------------------------|
|                            | <dle>t    | Modem in speakerphone mode, detects handset connected to modem is off hook. |
| AT# <a href="#">VGR</a> =0 | OK        | Mutes the speaker                                                           |
| AT# <a href="#">VGT</a> =0 | OK        | Mutes the microphone                                                        |

**Switching from Handset to Speakerphone**

| DTE/Application            | DCE/Modem | Description                                                                                                                           |
|----------------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|
|                            |           | Modem in handset mode, user presses Mute/Hold on handset. If the modem is not in speakerphone mode already, switch to it (see above). |
| AT# <a href="#">VGR</a> =n | OK        | Set speaker gain to desired level (n)                                                                                                 |
| AT# <a href="#">VGT</a> =n | OK        | Set microphone gain to desired level (n)                                                                                              |

### **Appendix O - Glossary**

Please note that the definitions below will be updated and made clearer as time goes on.

**ASCII** - American Standard Code for Information Interchange. A code established by [ANSI](#) (American National Standards Institute) to translate 128 characters into 7 bit binary language.

**Baud Rate** - The number of changes in the carrier wave per second. Not the same as bits per second, as there can be multiple bits per baud, resulting in a bit rate much higher than the baud rate. See [Symbol Rate](#)

**Bit** - Binary digit. A logical value (mark or space, on or off, yes or no) used by computers to represent information.

**Bits per second (bps)** - Also known as bit rate. The speed at which data is transferred between two systems. Not the same as baud rate.

**Blers** - From ATi6, block Errors. Number of errors found in data and protocol blocks.

**Blocks Received** - From ATi6, v.42 blocks received from remote modem.

**Blocks Resent** - From ATi6, v.42 blocks resent to remote modem due to block errors (Blers).

**Blocks Sent** - From ATi6, v.42 blocks sent to remote modem.

**Byte** - A unit of information, comprised of a number of bits. 7 bit and 8 bit bytes are the most common.

**Carrier** - A signal wave used for data transmission. To transmit information, characteristics of the carrier can be modified, such as amplitude and frequency.

**CCITT** - Consultative Committee for International Telephone and Telegraph (English translation). A group set up to establish standards related to the telephone and telegraph infrastructure. In 1992, their function was moved to a sector of the [ITU](#) and they were dissolved.

**Carrier Frequency** - 1) The number of times per second the carrier wave will completely alternate. 2) From ATi11, the frequency of the carrier wave on the receive/transmit channels (respectively).

**Carrier Offset** - From ATi11, the amount, in Hz, that the local modem needs to compensate to allow a successful carrier signal with the remote modem and its timing source.

**Chars Lost** - From ATi6, number of characters lost in transit.

**Chars Received** - From ATi6, number of characters received by the local modem from the remote modem.

**Chars Sent** - From ATi6, number of characters sent from the local modem to the remote modem.

**Clock Freq.** - From ATi7, the "speed" of the internal clock used by the modem.

**Data Compression** - 1) A method of taking data, finding repetitive sequences, and replacing them with representative markers, thereby reducing the number of bytes being transmitted from modem to modem (but not DTE to DTE). The two data compression technologies supported by our modems are v.42bis and MNP 5. 2) In the AT16 screen, this indicates the compression protocol, dictionary size/max. string length

**DSP Date** - From AT17, the DSP code date. Concerns code related to DSP functions.

**DSP Revision** - From AT17, the DSP code revision.

**EPROM** - 1) Erasable Programmable Read Only Memory 2) From AT17, the size of the EPROM in the modem

**Equalization** - From AT16, a legacy field from the Courier. Applicable for HST calls only.

**Fallback** - From AT16, whether or not the modem can speed shift. Only active when online and using a high speed protocol (> 2400).

**Far Echo Loss** - The amount of signal strength lost due to echo, calculated at a far point in the circuit. From AT111, the signal amount lost.

**Fax Options** - From AT17, a list of the major fax modulations supported by the modem.

**FLASH Date** - From AT17, the supervisor code date. This is the primary method for determining which code is in the modem. AKA EPROM Date, Code Date

**FLASH Rev** - From AT17, the revision level of the supervisor code.

**ITU** - [International Telecommunications Union](#). A standards committee set up to establish guidelines for the telecommunications and radiocommunications sectors.

**Last Call** - From AT16, length (hh:mm:ss) of the last or current call.

**Line Options** - From AT17, a list of the major phone line interface options supported by the modem.

**Line Reversals** - From AT16, a legacy field from the Courier. This is the number of the times the channels on an HST connection reversed to allow the bandwidth to be used more effectively.

**Link NAKs** - From AT16, Negative ACKnowledgements on the link.

**Link Timeouts** - From AT16, number of instances where communications ceased unexpectedly.

**Modem** - Acronym for MOdulator/DEModulator. A device that, on one channel, takes serial data from the [UART](#), converts it from digital signals to analog form suitable for transfer over phone lines. On the other channel, it does the reverse, converting the analog signal from the phone line, converting it back to digital and sending it on to the [UART](#).

**Modulation** - 1) A method of altering the carrier to represent bits being transmitted. 2) In AT111, the modulation used in the current/last connection.

**Near Echo Loss** - The amount of signal strength lost due to echo, calculated at a close point in the circuit. From AT111, the signal amount lost.

**Nonlinear Encoding** - From AT111, a method for improving distortion immunity near the perimeter of a signal constellation by introducing a non-uniform two-dimensional (2D) signal point spacing.

**Octets Lost** - From AT16, number of compressed characters lost.

**Octets Received** - From AT16, number of compressed characters received from remote modem. If this number is greater than the [Chars Received](#), then the modems are using MNP5 on an already compressed file.

**Octets Sent** - From AT16, number of compressed characters sent to remote modem. If this number is greater than the [Chars Sent](#), then the modems are using MNP5 on an already compressed file.

**Options** - From AT17, a list of the major speed modulations supported by the modem.

**Precoding** - From AT111, A non-linear equalization method for reducing equalizer noise enhancement caused by amplitude distortion. Equalization is performed at the transmitter using precoding coefficients provided by the remote modem.

**Preemphasis** - From AT111, amount of the signal increase on the receive/transmit channels (respectively).

**Product ID** - From AT17, the model number

**Product Type** - From AT17, the country for which the device was manufactured and the form factor.

**Protocol** - 1) Error control. A way for the receiving modem to detect errors and request retransmission of data. Incorrectly called error correction. 2) In AT16, the error control protocol used by the current/last connection.

**RAM** - 1) Random Access Memory 2) In AT17, the amount of RAM in the modem

**Recv/Xmit Level** - From AT111, the signal "loudness" on the receive/transmit channels (respectively).

**Retrains Granted** - From AT16, number of full retrains granted to remote modem.

**Retrains Requested** - From AT16, number of full retrains requested by local modem.

**Round Trip Delay** - From AT111, the amount of time it take data to reach the opposite end and receive acknowledgement from the remote DCE.

**Shaping** - A method of avoiding points in the constellation where there are deficiencies. From AT111, whether or not shaping is ON on the receive/transmit channels, respectively.

**SNR** - 1) Signal to Noise Ratio. The strength of the signal on the channel, when compared to the noise level. 2) From AT111, the last SNR value calculated for the current/last connect.

**Speed** - From AT16, last or current Receive/Transmit channel speeds.

**Speed Shift** - 1) A change in the speed level which takes a fraction of a second. Compare to retrain, which is an almost complete reestablishment of the protocols and take multiple seconds. 2) From AT111, the number of speed shifts to a higher/lower level.

**Status** - From AT111, information on the connection. Details on subsections is proprietary information.

**Symbol Rate** - 1) the number of carrier wave signal changes per second. Similar to baud rate, not the same as bits per second. 2) In AT111, the "baud rate" of the receive/transmit channels (respectively).

**Timing Offset** - From AT111, the amount, in parts per million, that the local modem needs to compensate to allow a successful carrier signal with the remote modem and its timing source.

**Trellis Code** - From AT111, the type of trellis code modulation used.

**Trellis Code Modulation** - A method of adding redundant bits to the stream, which reduces the error rate.

**UART** - Universal Asynchronous Receiver/Transmitter. A device that, at its basic level, converts the data in parallel (byte at a time) form from the computer to serial form (bits at a time with start/stop bits and parity) to send to another device (modem, e.g.) and vice versa.

**V.90 (or x2) Peak Speed** - From AT16, highest speed reached on the receive channel.

**Voice Options** - From AT17, a list of the major voice options supported by the modem.

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