MultiModem® II

MT5600BA-V92
MT5600BR-V92
MT5656ZDX
MT5656ZDXV

AT Commands
Reference Guide

AT Commands Reference Guide
Products: MT5600BA-V92, MT5600BR-V92, MT5656ZDX, MT5656ZDX-V
PN S000273G

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Record of Revisions

Revision	*Date*	*Description*
D	12/13/04	Add note to synchronous clock that Synchronous Online (&M1) must be enabled before you can set the synchronous clock. Updated voice commands. Add V.25bis commands.
E	05/18/06	Add MT5600BR-V92 as a model covered by this command guide. Removed MT5600BL as a model covered in this manual; for MT5600BL, use Rev. D of this manual.
F	04/18/07	Updated the Technical Support contact list.
G	10/06/09	Changed range of +VGR to 0-255 with default at 128. Added &EN5 value to &EN Modem-Initiated Flow Control. Note that L5 is not supported by the MT5656ZDX. Rewrite the Escape directions on page 4 and 16 (changed ATH<CR> to AT<CR>).

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Chapter 1 – Introduction

AT commands are used to control the operation of your modem. They are so called because each command must be preceded by the characters *AT* to get the ATtention of the modem.

AT commands can be issued only when the modem is in command mode or online command mode.

- The modem is in *command mode* whenever it is not connected to another modem.
- The modem is in *data mode* whenever it is connected to another modem and ready to exchange data.
- *Online command mode* is a temporary state in which you can issue commands to the modem while connected to another modem.

To put the modem into online command mode from data mode, you must issue an escape sequence: Type **+++** and wait for the OK response. Then issue the following command **AT<CR>**. **<CR>** indicates that you must click Enter). To return to data mode from online command mode, type the command **ATO**.

To send AT commands to the modem you must use a communications program, such as PhoneTools, a communications program included with your modem, or HyperTerminal in Windows 95, 98, NT 4.0, Me, 2000, XP. You can issue commands to the modem either directly or by typing them in the terminal window of the communications program. You issue them indirectly by configuring the operating system or communications program to send the commands automatically. Fortunately, communications programs make daily operation of modems effortless by hiding the commands from the user. Most users, therefore, need to use AT commands only when reconfiguring the modem; e.g., to turn autoanswer on or off.

The format for entering an AT command is **ATX*n***, where **X** is the command and ***n*** is the value for the command, sometimes called the command parameter. The value is always a number. If the value is zero, you can omit it from the command. Thus, **AT&W** is equivalent to **AT&W0**.

Most commands have a default value, which is the value that is set at the factory. Default values are provided with each command in the AT Commands section.

You must press Enter to send the command to the modem.

Any time the modem receives a command, it sends a response known as a result code. The most common result codes are *OK*, *ERROR*, and *CONNECT.* For a table of valid result codes, see the “Result Codes” sections of this manual.

You can issue several commands in one line, in what is called a command string.

The command string begins with **AT** and ends when you press Enter. Spaces to separate the commands are optional; they are ignored by the command interpreter. The most familiar command string is the initialization string, which is used to configure the modem when it is turned on or reset, or when your communications software calls another modem.

Chapter 2 – AT Commands

General Commands

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

Command: **Enter Key**
Values: na
Description: Press the ENTER or RETURN key to execute most commands.

Command: **A** **Answer**
Values: na
Description: Answers an incoming call before the final ring.

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

Command: **B*n*** **Communication Standard Setting**
Values: n = 0 or 1
Default: 1
Description:
B0 Selects ITU-T V.22 mode when the modem is at 300 or 1200 bps.
B1 Selects Bell 212A when the modem is at 300 or 1200 bps.

Command: **D*s*** **Dial**
Values: s = dial string (phone number and dial modifiers)
Default: none
Description: Dials telephone number *s*, where *s* may be up to 40 characters long and include the following dial string modifiers.

0–9	Digits 0 through 9
*****	The “star” digit (tone dialing only)
#	The “pound” digit (tone dialing only)
A–D	A, B, C, D tone digits. Country specific; some countries may prohibit these digits.
L	Redials last number. (Must be placed immediately after **ATD**.)
P	Selects pulse-dialing until a **T** is encountered. Affects current/subsequent dialing.
T	Select tone-dialing until a **P** is encountered. Affects current/subsequent dialing.
W	Wait for a new dial tone before continuing to dial.(**X2** or **X4** must be selected.)
,	Pause during dialing for time set in S-Register **S8**.
;	Return to command mode after dialing. (Place at end of dial string.)
!	Hook flash. Causes the modem to go quicking on-hook then back off-hook.
@	Wait for silence. Causes the modem to wait for 5 seconds of silence before processing the next part of the command. If silence is not detected within the time set in S-Register **S7**, the modem returns a NO ANSWER or BUSY code.
^	Toggle data calling tone on or off. Applies only to current dialing attempt.
&	Detect credit card “bong” tone. If the tone is not detected within the time specified by **S7** (US models), the modem aborts the rest of the sequence and hangs up. The character should follow the phone number and precede the user’s calling card number; e.g., **ATDT1028806127853500&123456789**.

Command: DS=*n* Dial Stored Telephone Number

Values: n = 0–3
Default: none
Description: Dials a number previously stored in directory number n by the **&Zn=*x*** command. Example: **ATDS=3**.

Command: E*n* Echo Command Mode Characters

Values: n = 0 or 1
Default: 1
Description:
E0 Does not echo keyboard input to the terminal.
E1 Does echo keyboard input to the terminal.

Command: H*n* Hook Control

Values: n = 0 or 1
Default: 0
Description:
H0 Goes on-hook (hang up) and terminate any **&T** test in progress.
H1 Goes off-hook (make the phone line busy); enters command mode.

Command: I*n* Information Request

Values: n = 0–6
Default: None
Description:
I0 Displays the product code. Example: *MT5600BA-V92.*
I1 Calculates ROM checksum; displays the least significant byte in decimal format.
I2 Calculates ROM checksum and compares it to the prestored checksum, displays OK if they match or ERROR if they don't match.
I3 Displays the firmware version and application codes.
I4 Displays the OEM-defined identifier string in either binary or ASCII format.
I5 Displays the regional or country code. Example: *098*.
I6 Displays the modem data pump model and internal code version.

Command: L5 Lists Current Operating Parameters

Note: L5 is not supported by the MT5656ZDX. Use &V).

Value: 5
Default: None
Description: Displays the current values for the error correction, flow control, data compression, and serial port speed commands. Example:

```
atL5
&E2 &E3 &E15 $SB115200
OK
```

Note: Use the **&V** command to display the other parameters.

Command: M*n* Monitor Speaker Mode

Values: n= 0, 1, 2, or 3
Default: 1
Description:
M0 Speaker is always off.
M1 Speaker is on until the carrier signal is detected.
M2 Speaker is always on when the modem is off-hook.
M3 Speaker is off when receiving carrier and during dialing, but on during answering.

Command: O*n* Return Online to Data Mode

Values: 0 or 1
Default: None
Description:
O0 Exit online command mode and return to online data mode without a retrain. Normally used after a **+++** escape (see **+++** escape sequence).
O1 Exit online command mode and return to online data mode after a retrain.

Command: P Pulse Dialing

Values: P,T
Default: T
Description: Forces pulse (non-touch-tone) dialing until a **T** command or **T** dial modifier is received.

Command: Q*n* Result Codes Enable/Disable

Values: n = 0 or 1
Default: 0
Description:
Q0 Enables result codes.
Q1 Disables result codes

Command: S*r* Select Register

Values: *r* is the S-Register number
Default: None
Description: Selects register **S*r*** as the last register accessed; e.g., **S0**. The command **AT?** can then be used to read the register, and the command **AT=*n*** can then be used to set the register to value *n.*

Command: S*r*=*n* Set Register Value

Values: *r* is the S-Register number; *n* varies
Default: None
Description: Sets value of register **S*r*** to ***n***, where ***n*** is entered in decimal format; e.g., **S0=1**.
If the short form **AT=*n*** is used, the value is written to the last accessed S-Register.

Command: S*r*? Read Register Value

Values: *r* is the S-Register number
Default: None
Description: Reads value of register **S*r*** and displays it in 3-digit decimal format. **S2?** gives the response **043**. If the short form **AT?** is used, the last accessed S-Register is read.

Command: T Tone Dialing

Values: P,T
Default: T
Description: Forces DTMF (touch-tone) dialing until a **P** command or **P** dial modifier is received.

Command: V*n* Result Code Format

Values: n = 0 or 1
Default: 1
Description:
V0 Displays result codes as digits (terse response).
V1 Displays result codes as words (verbose response)

Command: W*n* Connect Message Control

Values: n = 0, 1, or2
Default: 0
Description:
W0 The CONNECT result code reports the serial port speed only.
W1 The CONNECT result code reports the line speed, the error correction protocol, and the serial port speed, respectively.
W2 The CONNECT result code reports the line speed only.
Note: See also the **\V** command

Command: X*n* Result Code Selection

Values: n = 0–4
Default: Country Dependent
Description: Selects the result message subset that the modem will use to inform the computer of the results of commands.
X0 Sends OK, CONNECT, RING, NO CARRIER, ERROR and NO ANSWER; does not look for dial tone or busy signal.
X1 Sends X0 messages and connect speed; doesn't look for dial tone or busy signal.
X2 Sends X1 messages with NO DIALTONE; does not look for busy signal.
X3 Sends X1 messages with BUSY; does not look for dial tone.
X4 Sends all messages, including NO DIALTONE and BUSY.
Note: In fax mode, the only message sent to indicate a connection is *CONNECT* without a speed indication. See also the **\V** command.

Command: Y*n* Long Space Disconnect

Note: For use with MT5600BA and MT5600BR only.

Values: n = 0 or 1
Default: 0
Description:

Y0	Disables sending/responding to a long space break signal on disconnect.
Y1	Enables long space disconnect. In non-error correction mode, the modem sends a long space of four seconds prior to going on-hook. In non-error correction mode, the modem responds to the receipt of a long space (i.e., a break signal greater than 1.6 seconds) by going on-hook.

Command: Z*n* Modem Reset

Values: n = 0 or 1
Default: None
Description: The modem performs a soft reset and restores (recalls) the configuration profile according to the parameter supplied. If no parameter is specified, zero is assumed.

Z0	Resets modem and restores Profile 0.
Z1	Resets modem and restores Profile 1.

Note: See also the &F and &W commands.

Command: &C*n* Data Carrier Detect (DCD) Control

Values: n = 0 or 1 (all models) 2, 3, 4, 5, 6, 7 (MT5600BA and MT5600BR only)
Default: 1, 3, 4
Description:

&C0	Turns off reset on loss of carrier.
&C1	A second way to turn off reset on loss of carrier.
&C2	DCD goes high 500ms after CONNECT message is generated.
&C3	DCD goes high when the CONNECT message is generated.
&C4	Disables **&C5** and **&C6** commands.
&C5	UNIX only: Holds DCD low until proper callback security password is entered or until a disconnect occurs. This prevents UNIX login prompt from being displayed before the callback security ENTER PASSWORD prompt appears.
&C6	Linux only: Waits to display the connect message until the proper callback security password is entered.
&C7	Resets on loss of DCD.

Command: &D*n* Data Terminal Ready (DTR) Control

Values: n = 0, 1, 2, or3
Default: 2
Description: This command interprets the high to low transition of the DTR signal sent by the computer according to the supplied parameter. The action taken depends on the current **&Q** setting.

&D0	**&Q0, &Q5,&Q6:** DTR is ignored (assumed high). Allows operation with computers that do not provide DTR. **&Q1:** DTR drop causes the modem to hang up. Autoanswer is not affected. **&Q2,&Q3:** DTR drop causes the modem to hang up. Autoanswer is inhibited.
&D1	**&Q0, &Q1, &Q5,&Q6:** DTR drop is interpreted by the modem as if the asynchronous escape sequence had been entered. The modem returns to asynchronous command state without disconnecting. **&Q2,&Q3:** DTR drop causes the modem to hang up. Autoanswer is inhibited.
&D2	**&Q0–&Q6:** DTR drop causes the modem to hang up. Autoanswer is inhibited.
&D3	**&Q0, &Q1, &Q5,&Q6:** DTR drop causes modem to perform a soft reset as if the **Z** command were received. The **&Y** setting determines which profile is loaded. **&Q2,&Q3:** DTR drop causes the modem to hang up. Autoanswer is inhibited. **&Q5 or &Q6** and **+FCLASS=1** or **+FCLASS=2:** Same as for **&Q0**.

Note: If &D1, &D2,or &D3 is set, the modem will not dial without a DTR drop.

Command: &E*n* V.42 Error Correction Modes

Note: For use with MT5600BA and MT5600BR only.

Values: n = 0, 1, or 2
Default: 1
Description:

&E0	V.42 non-error correction mode (V.42 disabled).
&E1	V.42 auto-reliable mode.
&E2	V.42 reliable mode (V.42 enabled).

Command: &E*n* Modem-Initiated Flow Control

Note: **For use with MT5600BA and MT5600BR only.**

Values: n = 3, 4, or 5

Default: 4

Description:
&E3 Flow control disabled.
&E4 CTS/RTS hardware flow control.
&E5 XON/XOFF software flow control.
Note: See also the L5 and &K commands.

Command: &E*n* V.42bis Data Compression

Note: **For use with MT5600BA and MT5600BR only.**

Values: n = 14 or 15

Default: 15

Description:
&E14 V.42bis data compression disabled.
&E15 V.42bis data compression enabled.
Note: This command controls only V.42bis data compression, whereas the **%C** command controls both V.42bis and MNP-5 data compression. The command in effect is the one last entered. See also the **L5** command.

Command: &F*n* Load Factory Settings

Values: n = 0 or 1

Default: None

Description:
&F0 Loads factory configuration 0.
&F1 Loads factory configuration 1.
Note: See also the **Z**, **L5**, and **&V** commands.

Command: &G*n* V.22bis Guard Tone Control

Values: n = 0, 1, or2

Default: Varies by country

Description:
&G0 Disables guard tone.
&G1 Sets guard tone to 550 Hz.
&G2 Sets guard tone to 1800 Hz.
Note: The **&G** command is not used in North America, and may not be permitted in some countries.

Command: &K*n* Flow Control Selection

Values: n = 0, 3, 4, 5, or6

Defaults:
3 (data modem mode)
6 (fax modem and voice modes)

Description:
&K0 Disables flow control.
&K3 Enables CTS/RTS hardware flow control.
&K4 Enables XON/XOFF software flow control.
&K5 Enables transparent XON/XOFF flow control.
&K6 Enables both CTS/RTS and XON/XOFF flow control.
Note: See also the **&E** command

Command: &M*n* Communications Mode

Values: n = 0–3

Default: 0

Description: This command determines the DTR operating mode. The modem treats the **&M** command as a subset of the **&Q** command.

&M0 Selects direct asynchronous operation. Command sequence **&M0\N0** selects normal buffered mode, but command sequence **\N0&M0** selects direct mode. This is because the **\N0** command is analogous to the **&Q6** command.

&M1 Selects synchronous connect mode with asynchronous offline command mode.

&M2 **Note:** For use with the MT5656ZDX and MT5656ZDX-V only. Selects synchronous connect mode with asynchronous offline command mode.
Same as **&M1** except that **&M2** enables DTR dialing of directory slot 0. The modem disconnects if DTR is low for more than the period stored in **S25**.

&M3 Selects synchronous connect mode. This mode allows DTR to act as a talk/data switch. A call is manually initiated while DTR is inactive; when it becomes active, the handshake proceeds in originate or answer mode according to **S14 bit 7**.

Command: &P*n* Make/Break Dial Ratio

Values: n = 0, 1, 2,3
Default: Varies by country/region
Description:
&P0 Make/Break dial ratio of 39/61 at 10 pps
&P1 Make/Break dial ratio of 33/67 at 10 pps
&P2 Make/Break dial ratio of 39/61 at 20 pps
&P3 Make/Break dial ratio of 33/67 at 20 pps

Command: &Q*n* Sync/Async Mode

Note: The MT5600ZDX does not support Sync mode.

Values: n =0-3, 5, 6
Default: 5
Description: This command is an extension of **&M** and is used to control which connection modes are permitted. It is used in conjunction with **S36** and **S48**. (See also the **\N** command.)

&Q0 Selects direct asynchronous operation. See **&M0**.
&Q1 Selects synchronous connect mode with asynchronous offline command mode. See **&M1**. Serial interface operation only.
&Q2 Selects synchronous connect mode with asynchronous offline command mode; enables DTR dialing of directory 0. See **&M2**. Serial interface only.
&Q3 Selects synchronous connect mode with asynchronous offline command mode; enables DTR to act as a talk/data switch. See **&M3**. Serial only.
&Q5 The modem will try to negotiate an error-corrected link. It can be configured using **S36** to determine whether a failure will result in disconnecting or falling back to a non-error-correction connection. See also **\N3**.
&Q6 Selects asynchronous operation with speed buffering and no error correction. Same as **\N0**.

Command: &R*n* Clear to Send (CTS) Control

Values: n = 0 or 1
Default: 1
Description:
&R0 Lets the CTS state follow the RTS state when online..
&R1 Forces CTS high (ON).

Note: This command applies only in synchronous mode.

Command: &S*n* Data Set Ready (DSR) Control

Values: n = 0 or 1
Default: 0
Description:
&S0 Forces DSR high (on) at all times.
&S1 Lets DSR go high only during a connection.

Command: &T*n* Local Analog Loopback Test

Values: n = 0,1
Default: None
Description: The modem will perform the local analog loopback test if **&T1** is selected. The test can be run only when the modem is in asynchronous operation in non-error-correction mode (normal), **AT&Q6**. To terminate a test in progress, the escape sequence (**+++**) must be entered first.

&T0 Terminates any test in progress. Clears **S16**.
&T1 Starts local analog loopback, V.54 Loop 3. Sets **S16** bit 0. If a connection exists when this command is issued, the modem hangs up. A CONNECT XXXX message is displayed at the start of the test.

Command: &V*n* Display Current Configuration and Statistics for Last Connection

Values: 0,1
Default: None
Description: &V0 Displays the current (active) configuration.&V1 Displays statistics for the last connection. Not available in all versions. Note: See also the L5 command. (L5 is not supported in MT5656ZDX).

Command: &W*n* Store Current Configuration

Values: n= 0 or 1

Default: None

Description:

&W0 Stores current modem settings in nonvolatile memory as Profile 0. Profile 0 is loaded instead of the factory defaults at power-on (if **&Y0** is set) and by the **ATZ** command.

&W1 Stores current modem settings in nonvolatile memory as Profile 1. Profile 1 is loaded instead of the factory defaults at power-on (if **&Y1** is set) and by the **ATZ1** command.

Note: See also the **Z**, **&F**, and **&Y** commands.

Command: &X*n* Synchronous Clock Source

Note: For use with MT5600BA and MT5600BR only.

Values: n= 0, 1, or 2

Default: 0

Description: Selects the source of the transmit clock for synchronous mode. In asynchronous mode, the transmit and receive clocks are turned off. In synchronous mode, the clocks are turned on with a frequency of 1200 Hz or faster corresponding to the speed selected for modem operation.

Note: Synchronous Online (&M1) must be enabled before you can set the synchronous clock.

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

&X1 Selects external timing. The local DTE sources the transmit clock signal on the XTCLK input of the serial interface. The modem applies this clock to the TXCLK output at the serial interface.

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

Command: &Y*n* Select Profile for Hard Reset

Values: n = 0 or 1

Default: None

Description:

&Y0 Select profile 0 to be loaded on power-up.

&Y1 Select profile 1 to be loaded on power-up.

Note: See also the **&W** and **Z** commands.

Command: &Z*n*=*x* Store Telephone Number

(**not** for the MT5656ZDX and the MT5656ZDX-V).

Values:

n = 0–3 (with callback security disabled)
&Z3 is the phone memory location for leased-line dial back up number
n = 0-29 (with callback security enabled – for a future release)
x = Stored telephone number

Default: None

Description: Stores telephone dial string ***x*** in memory location.
&Z3 is the phone memory location for leased-line dial back up number.
Dial the stored number using the **ATDS=*n*** command.
Note: See also the #CBS*n* command.

Command: %C*n* Data Compression Control

Values: n = 0, 1, 2, or 3

Default: 3

Description: Enables or disables data compression negotiation. The modem can only perform data compression on an error-corrected link.

%C0 Disables data compression.

%C1 Enables MNP 5 data compression negotiation.

%C2 Enables V.42bis data compression negotiation.

%C3 Enables both V.42bis and MNP 5 data compression negotiation.

Note: This command controls both V.42bis and MNP-5 data compression, whereas the **&E14** and **&E15** commands control only V.42bis data compression. The command in effect is the one last entered.

Command: %E*n* Line Quality Monitor

Values: n = 0, 1, or 2

Default: 2

Description: Controls whether or not the modem will automatically monitor the line quality and request a retrain (**%E1**) or fall back to a lower speed when line quality is insufficient and fall forward to a faster speed when line quality is sufficient (**%E2**).

%E0	Disables line quality monitor and auto-retrain.
%E1	Enables line quality monitor and auto-retrain.
%E2	Enables line quality monitor and fallback/fall forward.

Command: %L Line Signal Level

Values: None

Default: None

Description: % L Returns a value that indicates the received signal level in dBm. This value is a direct indication (DAA-dependent) of the receive level at the MDP, not at the telephone line connector. Examples: 009 = -9 dBm, 043 = -43 dBm, and so on.

Command: %Q Line Signal Quality

Values: None

Default: None

Description: % Q reports line signal quality (DAA-dependent) as a three-digit number. Returns the higher order byte of the EQM value. Based on the EQM value, retrain or fallback/fall forward may be initiated if enabled by **%E1** or **%E2**.

Command: %U PCM Code Selection

Values: n = 0 or 1

Default: 0

Description: Specifies the PCM code type for 56K modulation. Note, however, that the modem automatically selects the code type if the server sends the proper ID.

%U0	Selects µ-Law coding—used in North America and Japan.
%U1	Selects A-Law coding—used outside North America and Japan.

Note: See also the **+MS=** command.

Command: \A*n* Maximum MNP Block Size

Note: For use with MT5600BA and MT5600BR only.

Values: n= 0, 1, 2, or 3

Default: 1

Description:

\A0	64-character maximum block size.
\A1	128-character maximum block size.
\A2	192-character maximum block size.
\A3	256-character maximum block size.

Command: \B*n* Transmit Break

Values: n = 0–9 in 100 ms units

Default: 3

Description: In non-error-correction mode only, sends a break signal of the specified length to a remote modem. Works in conjunction with the **\K** command.

Command: \Kn Break Control

Values: n = 0–5

Default: 5

Description: Controls the response of the modem to a break received from the computer, the remote modem, or the **\B** command. The response is different for each of three different states.

Data mode. The modem receives the break from the computer:

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

Data mode. The modem receives the break from the remote modem during a non-error-corrected connection:

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

Online command mode. The modem receives a **\B*n*** command from the computer:

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

Command: \N*n* Error Correction Mode Selection

Values: n = 0–5

Default: 3

Description:

\N0	Normal (non-error correction) mode with data buffering. Forces **&Q6**.
\N1	Direct mode. Equivalent of **&M0** and **&Q0** modes. Forces **&Q0**.
\N2	V.42/MNP reliable (error-correction) mode. Modem attempts first a V.42 connection and then an MNP connection. Failure to make a reliable connection results in the modem hanging up. Forces **&Q5**, **S36=4**, and **S48=7**.
\N3	V.42/MNP auto-reliable mode. Modem attempts first to connect in V.42 mode, then in MNP mode, and finally in non-error-correction mode with data buffering. Forces **&Q5**, **S36=7**, and **S48=7**.
\N4	V.42 (LAPM) reliable mode. If modem cannot make a V.42 connection, it disconnects. Forces **&Q5** and **S48=0**. **Note:** **-K1** can override **\N4**.
\N5	MNP reliable mode. If the modem cannot make an MNP connection, it disconnects. Forces **&Q5**, **S36=4**, and **S48=128**.

Command: \Vn Single Line Connect Message

Values: n = 0 or 1

Default: 0

Description:

\V0	Disables single line connect message. CONNECT messages are controlled by the **X**, **W**, and **S95** settings.
\V1	Enables single line CONNECT. Formatted: *CONNECT <Serial PortSpeed> </Modulation></Protocol></Compression></Line Speed>/<Voice and Data>*. Overrides **X**, **W**, and **S95** commands. CONNECT messages display in the single line format subject to **V** and **Q**. In non-verbose mode (**V0**), single line CONNECT messages are disabled and a single numeric result code is generated.

Command: +FCLASS= Set Current Fax Class

Values: 0, 1, 2, 8

Default: None

Description:

0	Data
1	Fax – Class 1, Class 1.0
2	Fax – Class 2, 2.0, 2.1
8	Voice Commands

Report Commands:

+FCLASS?	Reports current or selected values.
+FCLASS=?	Reports supported range of parameter values.

Command: +GCI Country/Region of Installation

Description: This extended syntax command selects and indicates the region/country of installation for the modem. The parameter selects the settings for any operational parameters that need to be adjusted for national regulations or telephone networks.
Syntax: +GCI=<region_code>Defined Values: <region_code>Example: Euro/Nam = B5.
For a list of regions/countries approvals and codes, see the Multi-Tech Web site at:
http://www.multitech.com/PRODUCTS/Info/approvals

Default: If the modem is specified for use in only one country, the country code is the default. Otherwise, the default is defined by the OEM. The factory default is B5.

Report Commands:

+GCI?	Reports current or selected values.
+GCI=?	Reports supported range of parameter values.

Command: +MS= Modulation Selection

Values & Default: See description.

Description: This extended-format command selects modulation and, optionally, enables or disables automode, specifies the lowest and highest connection rates, selects µ-Law or A-Law codec type, and specifies the highest transmit rate using one to five subparameters.

The command format is:

```
+MS=[+MS=[<carrier>[,<automode>[,<min_TX_rate>[,<max_TX_rate>[,min_RX_rate>[,<max_RX_rate>]]]]]]
```

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

Subparameters: ***mod*** – A decimal number that specifies the preferred modulation (automode enabled) or the modulation to use in originating or answering a connection (auto-mode disabled).

+MS Command Supported Rates

Modulation	<carrier>	Possible (<min_rx_rate>,<max_rx_rate>,(<min_tx_rate>), and <max_tx_rate>) Rates (bps)
Bell 103	B103	300
Bell 212	B212	1200 Rx/75 Tx or 75 Rx/1200 Tx
V.21	V21	300
V.22	V22	1200
V.22 bis	V22B	2400 or 1200
V.23	V23C	1200
V.32	V32	9600 or 4800
V.32 bis	V32B	14400, 12000, 9600, 7200, or 4800
V.34	V34	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400
V.90	V90	56000, 54667, 53333, 52000, 50667, 49333, 48000, 46667, 45333, 44000, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000, 30667, 29333, 28000
V.92 downstream	V92	same as V.90 above
V.92 upstream	V92	48000, 46667, 45333, 44000, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000, 30667, 29333, 28000, 26667, 25333, 24000

Note: Some <carrier> values may not be supported by certain model models.

automode – An optional numeric value that enables or disables automatic modulation negotiation using V.8bis/V.8 or V.32bis Annex A. The options are:
0 = Disables automode
1 = Enables automode (default)

<min_rx_rate> and <max_rx_rate>

Numeric values which specify the lowest (<min_rx_rate>) and highest (<max_rx_rate>) rate at which the modem may establish a receive connection. May be used to condition distinct limits for the receive direction as distinct from the transmit direction. Values for this subparameter are decimal encoded, in units of bit/s. The possible values for each modulation are listed in the table above. Actual values will be limited to possible values corresponding to the entered <carrier> and fall-back <carrier> as determined during operation. (Default = lowest (<min_rx_rate>) and highest (<max_rx_rate>) rate supported by the selected carrier.)

<min_tx_rate> and <max_tx_rate>

Numeric values which specify the lowest (<min_tx_rate>) and highest (<max_tx_rate>) rate at which the modem may establish a transmit connection. Non-zero values for this subparameter are decimal encoded, in units of bit/s. The possible values for each modulation are listed in the table above. Actual values will be limited to possible values corresponding to the entered <carrier> and fall-back <carrier> as determined during operation. (Default = lowest (<min_tx_rate>) and highest (<max_tx_rate>) rate supported by the selected carrier.)

Command: -K*n* MNP Extended Services

Values: n = 0, 1, or 2
Default: 0
Description: Enables or disables conversion of a V.42 LAPM connection to an MNP 10 connection.

-K0	Disables V.42 LAPM to MNP 10 conversion.
-K1	Enables V.42 LAPM to MNP 10 conversion.
-K2	Enables V.42 LAPM to MNP 10 conversion; inhibits MNP Extended Services initiation during V.42 LAPM answer mode detection phase.

Command: ** Flash Memory Download

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

**0	Initiates download to flash memory at the last sensed speed.
**1	Initiates download to flash memory at 38.4K bps.
**2	Initiates download to flash memory at 57.6K bps.

Command: *B View Numbers in Blacklist

Values: n/a
Description: If blacklisting is in effect, **AT*B** displays a list of numbers for which the last call attempted in the previous two hours failed. Permanently forbidden numbers as defined by country requirements do not appear in this list. If no numbers are blacklisted, only the OK result code is displayed.

Command: *D View Delayed Numbers

Values: n/a
Description: AT*D displays a list of delayed numbers, as defined in the ***B** command, together with their delay times. If no numbers are delayed, only the OK result code is displayed.

Command: $D*n* DTR Dialing

Notes: Use this command for the MT5600BR only.
To set DTR Dialing for the **MT5600BA**, use the LCD display panel on the modem. See the MT5600BA User Guide for LCD display panel directions.

Values: n = 0 or 1
Default: 0
Description: The modem dials the number stored in the phone number location &Z0 with $D1 set when the modem receives a high DTR signal.

$D0	Disables DTR dialing.
$D1	Enables DTR dialing.

Command: $C*n* Key Abort

Values: 0, 1
Default: 1
Description: Key abort will work for both *orignate* and *answer*. The value can be stored.

$C0	Disables key abort.
$C1	Enables key abort.

Command: $SB*n* Serial Port Baud Rate

Note: Use this command with MT5600BA and MT5600BR only. Not supported by the MT5656ZDX/MT5656ZDXV

Values: n = speed in bits per second
Default: 57600
Description:

$SB300	Sets serial port to 300 bps.
$SB1200	Sets serial port to 1200 bps.
$SB2400	Sets serial port to 2400 bps.
$SB4800	Sets serial port to 4800 bps.
$SB9600	Sets serial port to 9600 bps.
$SB19200	Sets serial port to 19200 bps.
$SB38400	Sets serial port to 38400 bps.
$SB57600	Sets serial port to 57600 bps.
$SB115200	Sets serial port to 115200 bps.

Note: See also the **L5** command.

Escape Commands

Command:	**+++**	**Escape Sequence** **Note: Use with MT5600BA and MT5600BR only.** Type **+++** and wait for OK response. Then issue the following command by typing **AT <CR>**. (<CR> indicates that you must click Enter).
Values:		n/a
Description:		Puts the modem in online command mode.

Command:	***E**	**Escape Remote Configuration** **Note: Use with MT5600BA and MT5600BR only.**
Values:		n/a
Description:		Escape Remote Configure Sequence. The remote modem configuration escape command is defined in S-Register **S13**. **Notes:** The Escape Remote Configuation command (*E) must be issued while online with the remote modem. Remote Configuration is initiated by using the command: *******

Modem Connection Commands

Command: +PCW=*n* Call Waiting Enable

Values: n = 0, 1, or 2

Default: 2

Description: Controls the action to be taken upon detection of a call waiting tone in V.92 mode. Values specified by this command are not modified when an **AT&F** command is issued.

+PCW=0	Toggles V.24 Circuit 125 and collects Caller ID if enabled by **+VCID**.
+PCW=1	Hangs up.
+PCW=2	Ignores V.92 call waiting.
+PCW=?	Displays the allowed values.
+PCW?	Displays the currrent values.

Command: +PIG=*n* PCM Upstream Ignore

Values: n = 0 or 1

Default: 1

Description: Controls the use of PCM upstream during V.92 operation. PCM upstream allows faster upload speeds to a V.92 server.

+PIG=0	Disables PCM upstream.
+PIG=1	Enables PCM upstream.
+PIG=?	Displays the allowed values.
+PIG?	Displays the current values.

Command: +PQC=*n* Quick Connect Control

Values: n = 0, 1, 2, or 3

Default: 3

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

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

Command: +PSS Use Short Sequence

Description: This command causes a calling modem to force either a V.92 short or full startup sequence as defined by the **+PQC** command on the next and subsequent connections.
Syntax: +PSS=<value>

Values: **<value>** Decimal number corresponding to the selected sequence.

0	The modems decide whether or not to use the short startup procedures. The short startup procedures can only be used if enabled by the +PQC command. **Default**
1	Reserved.
2	Forces the use of the full startup procedures on the next and subsequent connections independent of the setting of the +PQC command.

Result Codes: OK 0 - 2 in V.92 Mode (+MS=V.92)
ERROR Otherwise

Report Commands:

+PSS?	Reports selected values.
+PSS=?	Reports supported range of parameter values.

Command: -QCPC Force Full Startup Procedure Next Connection

Description:	This command causes the modem to use full startup procedures on the next connection attempt regardless of the setting of the **+PQC** command. After this attempt, the modem will select the startup procedure as defined by the **+PQC** command. If a shortened startup procedure is enabled by **+PQC**, then the quick connect profile will also be updated on the next connection attempt. Syntax: -QCPC
Result Code:	OK ERROR Otherwise

Command: -QCPS Enable Quick Connect Profile Save

Description:	This command controls whether or not the modem will save the generated quick connect profile. Syntax: -QCPS=<value>
Values:	0, 1
	<value> Decimal number corresponding to the desired operation. 0 Do not allow the quick connect profile to be saved. 1 Allow the quick connect profile to be saved. **Default**
Result Codes:	OK 0 or 1 in V.92 Mode (+MS=V.92) and quick connect is enabled (+PSS = 0) ERROR Otherwise
Report Commands:	-QCPS? Reports selected value -QCPS=? Reports supported range of parameter values

Caller ID Commands

Command: +VCID=*n* Caller ID Selection

Values: n = 0, 1, or 2

Default: 0

Description: Enables Caller ID detection and configures the reporting and presentation of the Caller ID data that is detected after the first ring. The reported data includes the date and time of the call, the caller's name and number, and a message. Set **S0=2**.

+VCID=0	Disables Caller ID.
+VCID=1	Enables Caller ID with formatted data.
+VCID=2	Enables Caller ID with unformatted data.
+VCID=?	Displays the allowed values.
+VCID?	Displays the current values.

Command: +VRID= Caller ID Report Retrieved

Values: 0, 1

Default: 0

Description: This command reports the data associated with the Caller ID services in the Incoming Call Line ID (ICLID) data format for the last received call.

+VRID=0	Reports Caller ID with formatted presentation to the DTE. Data includes date, time, name, and telephone number.
+VRID=1	Reports Caller ID with unformatted presentation to the DTE.
+VRID=?	Displays the supported range of parameter values.
+VRID	Displays Caller ID information of the last call received.

Callback Security Commands

Note: Callback Security Commands apply to the MT5600BA and MT5600 BR only.

Command: #CBN*n*=*[-]x* Store Callback Number

Values: n = 01–30x = dialing string

Default: None

Description: Stores the callback dialing string ***x*** in a memory location. The dialing string can include the digits 0 through 9 and any of the following characters:
#, *, comma (,), semicolon (;), W, A, B, C, and D.
Up to 30 characters can be used.
Example:AT#CBN01=9,16127853000.
If the optional - character precedes the dialing string, and the caller appends the same character to the password, the caller is immediately connected.

Command: #CBP*n*=*x* Store Callback Password

Values: n = 01–30
x = password (6–10 characters)

Default: None

Description: Stores callback security password ***x*** in memory location ***y***. The password must have 6 to 10 characters. Example: **AT#CBP01**=gilamep.
Note: A direct connect password may not end with a hyphen (-).

Command: #DB*n* Callback Enable/Disable

Values: n = 0 or 1

Default: 0

Description: Enables or disables callback security. When callback security is enabled, phone number memory locations 0–4, used for quick dialing and DTR dialing, become unavailable and are replaced by callback security memory locations 1–30. The phone number memory locations and their contents are restored when callback security is disabled.

#DB0	Disables callback security.
#DB1	Enables callback security.

Data Compression Commands

Command: +DR Data Compression Reporting

Values: 0, 1

Default: 1

Description: This extended-format numeric parameter controls whether or not the extended-format +DR: intermediate result code is transmitted from the modem to the DTE. S95 bit 5 is reset to 0 for +DR=0 and is set to a 1 for +DR=1. The more recent setting of +DR or S95 bit 5, and the W command setting, determines the actual data compression result code reporting (see **S95** Parameter and **W** Command).

+DR0	Data compression reporting disabled (no +DR result code transmitted).
+DR1	Data compression reporting enabled (+DR result code transmitted). (Default.)
+DR:	<type> Intermediate Result Code. The +DR: <type> reported represents the current (negotiated or renegotiated) modem-modem data compression type. If enabled, the intermediate result code is transmitted at the point after error control negotiation (handshaking) at which the modem has determined which data compression technique will be used (if any) and the direction of operation. The +DR intermediate result code, if enabled, is issued after the Error Control Report (+ER) and before the final result code (e.g., CONNECT).

Report Commands:

+DR?	Reports current or selected values.
+DR=?	Reports supported range of parameter values.

Command: +DS Data Compression

Values:

<direction> Specifies the desired direction(s) of operation of the data compression function; from the DTE point of view.

+DS0	Negotiated; no compression (V.42bis P0=0).
+DS3	Both directions, accept any direction (V.42bis P0=11).

<compr_neg> Specifies whether or not the modem should continue to operate if the desired result is not obtained.

+DS0	Do not disconnect if V.42bis is not negotiated by the remote modem as specified in <direction>.

<max_dict> Specifies maximum number of dictionary entries (2048 entries) that should be negotiated (may be used by the DTE to limit the code word size transmitted, based on its knowledge of the data to be transmitted).

<max_string> Specifies max string length (32 bytes) to be negotiated (V.42bis P2).

Default: 3

Description: This extended-format compound parameter controls the V.42bis data compression function if provided in the modem. It accepts four numeric subparameters:
+DS=[<direction>[,<compr_neg>[,<max_dict>[,<max_string>]]]]

Report Commands:

+DS?	Reports current or selected values.
+DS=?	Reports supported range of parameter values.

Command: +DS44 V.44 Compression Select

Description: This extended-format compound parameter controls V.44 data compression function.

Values:

<direction> The decimal number that specifies the desired direction(s) of operation of the data compression function; from the DTE point of view.

0	Negotiated, no compression.
1	Transmit only.
2	Receive only.
3	Both directions, accept any direction. **Default**

<compress_negotiation> The decimal number that specifies whether or not the modem should continue to operate if the desired result is not obtained.

0	Do **not** disconnect if V.44 is not negotiated by the remote DCE as specified in <direction>. **Default**
1	Disconnect if V.44 is not negotiated by remote DCE as specified in <direction>.

<capability> The decimal number that specifies the use of stream method, packet method, multi-packet method.

0	Stream method. **Default**
1	Packet method.
2	Multi-packet method.

<max_codewords_tx> The decimal number from 256 to 2048 that specifies the maximum number of code words which should be negotiated in the transmit direction. **Default = 2048**

<max_codewords_rx> The decimal number from 256 to 2048 that specifies the maximum number of code words which should be negotiated in the receive direction. **Default = 2048**

<max_string_tx> The decimal number from 32 to 255 (maximum string length).

Error Control Commands

Command: +EB Break Handling in Error Control Operation

Description: This extended-format compound parameter controls the break handling in V.42 operation. It accepts three numeric subparameters:
+EB=[<break_selection>[,<timed>[,<default_length>]]]

Subparameters:

<break_selelction>	Decimal number 0 specifying that break is to be ignored; i.e., not signaled to remote DCE.
<timed>	Decimal number 0 specifying that any transmitted V.42 L-SIGNAL will not indicate break signal length.
<default_length>	Decimal number 0 specifying that break is not delivered to the DTE.

Report Commands:

+EB?	Reports current or selected values.
+EB=?	Reports supported range of parameter values.

Command: +EFCS 32-bit Frame Check Sequence

Description: This extended-format numeric parameter controls the use of the 16-bit or 32-bit frame check sequence (FCS) option in V.42.

Values:

<value>	Decimal number 0 specifying the use of the 16-bit FCS specified in V.42.
+EFCS?	Reports current or selected values.
+EFCS=?	Reports supported range of parameter values.

Command: +ER Error Control Reporting

Description: This extended-format numeric parameter controls whether or not the intermediate result code is transmitted from the modem to the DTE.
S95 bit 3 is reset to 0 for +ER=0 and is set to a 1 for +ER=1. The more recent setting of+ER or S95 bit 3, and the W command setting, determines the actual error control result code reporting (see **S95** Parameter and **W** Command).

Values: 0, 1
0 = Error control reporting disabled (no +ER intermediate result code transmitted).
1 = Error control reporting enabled (+ER intermediate result code transmitted).

Default: 0

Report Commands:

+ER?	Reports current or selected values.
+ER=?	Reports supported range of parameter values.

Command: +ES Error Control Selection

Description: This extended-format command specifies the initial requested mode of operation when the modem is operating as the originator, optionally specifies the acceptable fallback mode of operation when the modem is operating as the originator, and optionally specifies the acceptable fallback mode of operation when the modem is operating as the answerer.
It accepts three numeric subparameters:
+ES=[<orig_rqst>[,<orig_fbk>[,<ans_fbk>]]]

Subparameters:

<orig_rqst> Decimal number which specifies the initial requested mode of operation when the modem is operating as the originator. The options are:

0	Initiate call with Direct Mode.
1	Initiate call with Normal Mode (also referred to as Buffered Mode) only.
2	Initiate V.42 without Detection Phase. If V.8 is in use, disable V.42 Detection Phase.
3	Initiate V.42 with Detection Phase. **Default**
4	Initiate MNP.
7	Initiate Frame Tunneling Mode when connection is complete and Data Mode is entered.

<orig_fbk> Decimal number which specifies the acceptable fallback mode of operation when the modem is operating as the originator.

0 LAPM, MNP, or Normal Mode error control optional. **Defaul**t
1 LAPM, MNP, or Direct Mode error control optional.
2 LAPM or MNP error control required; disconnect if error control is not established.
3 LAPM error control required; disconnect if error control is not established.
4 MNP error control required; disconnect if error control is not established.

<ans_fbk> Decimal number which specifies the acceptable fallback mode of operation when the modem is operating as the answerer.

0 Direct Mode.
1 Error control disabled, use Normal Mode.
2 LAPM, MNP, or Normal Mode error control optional. **Default**
3 LAPM, MNP, or Direct Mode error control optional.
4 LAPM or MNP error control required; disconnect if error control is not established.
5 LAPM error control required; disconnect if error control is not established.
6 MNP error control required; disconnect if error control is not established.

Report Commands:
+ES? Reports current or selected values.
+ES=? Reports supported range of parameter values.

Command: +ESR Selective Reject

Description: This extended-format numeric parameter controls the use of the selective reject (SREJ) option in V.42.
Syntax: +ESR=[<value>]
Decimal number 0 specifying that SREJ is not used.

Report Commands:
+ESR? Reports current or selected values.
+ESR=? Reports supported range of parameter values.

Command: +ETBM Call Termination Buffer Management

Description: This extended-format compound parameter controls the handling of data remaining in modem buffers upon call termination. It accepts three numeric subparameters:
Syntax: +ETBM=[<pending_TD>[,<pending_RD>[,<timer>]]]

Values: <pending_TD> Decimal number 0 specifying that disconnect will occur immediately and all buffered transmit data will be discarded when the local DTE requests call disconnection.
<pending_RD> Decimal number 0 specifying that disconnect will occur immediately and all buffered receive data will be discarded when the local DTE requests call disconnection.
<timer> Decimal number 0 specifying that the modem will not attempt to deliver the buffered data before abandoning the attempt and discarding remaining data.

Report Commands:
+ETBM? Reports current or selected values.
+ETBM=? Reports supported range of parameter values.

DTE Commands

Command: +IFC DTE-Modem Local Flow Control

Description: This extended-format compound parameter controls the operation of local flow control between the DTE and the modem during the data state when V.42 error control is used or when fallback to non-error control mode is specified to include buffering and flow control. It accepts two numeric subparameters.

Syntax: +IFC=[<modem_by_DTE>[,<DTE_by_modem>]]

Values:

<modem_by_DTE> Specifies method DTE will use to control flow of received data from the modem.

0None.
1 XON/XOFF on transmitted data; do not pass XON/XOFF characters to remote modem.
2 Circuit 133 (RR). **Default**
3 DC1/DC3 on circuit 103 (TD) with DC1/DC3 characters being passed through to the remote DCE in addition to being acted upon for local flow control.

<DTE_by_modem> Specifies method modem will use to control flow of transmitted data from the DTE.

0 None.
1 XON/XOFF on received data.
2 CTS/RTS. **Default**

Report Commands:

+IFC? Reports current or selected values.
+IFC=? Reports supported range of parameter values.

Command: +ILRR DTE-Modem Local Rate Reporting

Description: This extended-format numeric parameter controls whether or not the +ILRR:<rate> information text is transmitted from the modem to the DTE.

Syntax: +ILRR=<value>

Values:

<value> Decimal number corresponding to the selected option.

0 Disables reporting of local port rate (+ILRR: is not transmitted). **Default**
1 Enables reporting of local port rate (+ILRR: is transmitted).

Report Commands:

+ILRR? Reports current or selected values.
+ILRR=? Reports supported range of parameter values.

Reported Rate: The <rate> reported is the current (negotiated or renegotiated) DTE-modem rate. If enabled, intermediate result code is transmitted after any modulation, error control or data compression reports are transmitted and before any final result code is transmitted. The <rate> is applied after the final result code is transmitted. The DTE-modem port rate changes only if neither buffered mode nor error controlled means are enabled (**+ES=x,0**) and if the negotiated carrier rate (**+MRR**) does not match the current DTE-modem port rate (auto detected from previous command line).

Syntax: +ILRR: <rate>[,<rx_rate>].

Reported Rate Values:

<rate>	Decimal value representing the current (negotiated or renegotiated) DTE-modem rate: 0, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400
<rx_rate>	Optional decimal value reporting the RXD rate, if it is different from the TXD rate: 0,300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, or 230400

Command: +IPR Fixed DTE Rate

Description: This numeric extended-format parameter specifies the data rate at which the modem will accept commands during online operation. It may be used to select operation at rates at which the modem is not capable of automatically detecting the data rate being used by the DTE.

Specifying a value of 0 disables the function and allows operation only at rates automatically detectable by the modem. The specified rate takes effect following any issued result code(s) associated with the current command line.

The <rate> specified does not apply in OnLine Data State if Normal Mode (Direct Mode) of operation is selected.

Syntax: +IPR=<rate>

Values: **<rate>** Specifies the DTE-modem interface operation rate in bits/s. The available rates are: 0, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, or 230400.

If unspecified or set to 0, automatic detection is selected and the character format is also forced to auto detect. +ICF=0.

If the specified rate is not supported by the modem, an ERROR result will be returned.

Report Commands:

+IPR? Reports current or selected values.
+IPR=? Reports supported range of parameter values.

Modulation Command

Command: +MR Modulation Reporting Control

Description: This extended-format numeric parameter controls whether or not the extended-format +MCR:<carrier> and +MRR:<rate> intermediate result codes are transmitted from the modem to the DTE. If enabled, +MCR:<carrier> and +MRR:<rate> intermediate result codes represent the current (negotiated or renegotiated) modulation <carrier> and <rate> that are transmitted at the point during connect negotiation (handshaking) at which the modem has determined which modulation and rate will be used; i.e., before any Error Control or Data Compression reports are transmitted and before any final result code (e.g., CONNECT) is transmitted.

S95 bit 2 is reset to 0 for +MR=0 and is set to a 1 for +MR=1 or +MR=2. The more recent setting of +MR or S95 bit 2 and the W command setting determines modulation result code reporting (see **S95** Parameter and **W** Command).

Syntax: +MR=[<value>]

Values: **<value>** A decimal number corresponding to the selected option:

- 0 Disables reporting of modulation connection (+MCR: and +MRR: are not transmitted). **Default**
- 1 Enables reporting of modulation connection (+MCR: and +MRR: are transmitted with tx rate, rx rate).
- 2 Enables reporting of modulation connection (+MCR: and +MRR: are transmitted with rx rate only).

Report Commands:

+MR? Reports current or selected values.
+MR=? Reports supported range of parameter values.

+MCR: Report Syntax: Response: +MCR: <carrier>

<carrier> Alphanumeric code corresponding to the reported carrier.
Defined values are:
B103 for Bell 103
B212 for Bell 212
V21 for V.21
V22 for V.22
V22B for V.22bis
V23C for V.23
V32 for V.32
V32B for V.32bis
V34 for V.34
V90 for V.90
V92 for V.92

+MRR: Report Syntax: Response: +MRR: <tx_rate>,<rx_rate>

<tx_rate> Decimal transmit rate in bits/s.
<rx_rate> Decimal receive rate in bits/s.

Call Control Command

Command: -STE= Set Telephony Extension

Description: This command enables/disables Line-In-Use, Extension Pickup, and Remote Hang up detection features.

Note: Additional hardware may be required to support these features.

Syntax: -STE=<value>

Values: **<value>** Decimal number corresponding to the selected bit-mapped options.

The bit fields are defined as follows:

Bit 0 Line-In-Use detection – enable/disable.
Bit 1 Extension Pickup – detection enable/disable.
Bit 2 Remote Hang up – detection enable/disable.

<value> (decimal)	Remote Hangup	Extension Pickup	Line-in-Use
0 **(default)**	Disabled	Disabled	Disabled
1	Disabled	Disabled	Enabled
2	Disabled	Enabled	Disabled
3	Disabled	Enabled	Enabled
4	Enabled	Disabled	Disabled
5	Enabled	Disabled	Enabled
6	Enabled	Enabled	Disabled
7	Enabled	Enabled	Enabled

Report Commands:

-STE? Reports current or selected values
-STE=? Reports supported range of parameter values

Result Codes:

OK <value> = 0-7
ERROR Otherwise.

Behavior in Data Mode (+FCLASS=0):

When on-hook, if the line is in use and an **ATDT** is issued, the modem will not go off-hook and will return with the message LINE-IN-USE.

When off-hook and either an extension is picked up or a line reversal is detected, the modem will drop the connection. The disconnect reason in register **S86=25** (also defined for **#UD**). The user must flash the hook in order to get a dial tone because the remote server will be retraining.

If local handset is picked up while modem is off-hook, modem will do a link-disconnect, flash the hook for 1.5 seconds, then connect local handset to the line. Now, the user dial tone is on the local handset. Disconnect reason **S86=25**.

Behavior in Voice Mode (+FCLASS=8):

When in voice mode and an extension is picked-up, a <DLE>P is sent to the DTE. When the modem is off-hook, a line reversal may also be detected in which case a <DLE>l is sent to the DTE.

In voice mode, there is no blocking of **ATDT** when the line is in use. Also, there is no automatic hang-up in voice mode as in data mode. There is only the above stated <DLE> shielding event reporting.

Operation in Data Mode: **Line-In-Use (Enabled by AT-STE=1, AT-STE=3, AT-STE=5, or AT-STE=7)**

Case 1: Telephone Line is in Use

If an ATDT, ATDP or ATDL is issued while Line-In-Use detection is enabled and the telephone line is in use, the modem will immediately return the message LINE-IN-USE to the DTE without going off-hook, and then return to command mode.

Case 2: Telephone Line is in Use But Disconnected

If an ATDT, ATDP or ATDL is issued while Line-In-Use detection is enabled and the telephone line is NOT in use, the modem will go off-hook after a short pause, then respond with CONNECT or NO CARRIER message.

Case 3: Telephone Line is Not Connected to Modem

If an ATDT, ATDP or ATDL is issued while Line-In-Use detection is enabled and the telephone line is not connected, the modem will go off-hook momentarily, go back on-hook, then respond with NO DIAL TONE message.

Extension Pick-up (Enabled by AT-STE=2, AT-STE=3, AT-STE=6, or AT-STE=7):

Case 1: Modem off-hook, Local Handset Goes Off-Hook

If the local handset goes off-hook while the modem is in a data connection, the modem will then send a GSTN Clear down to the remote modem and then go on-hook. The modem will then send a NO CARRIER message to the DTE. A result code of 25 will be left in S86 register.

Remote Hang-up (enabled by AT-STE=4, AT-STE=5, AT-STE=6, or AT-STE=7):

Case 1: Modem off-hook, Remote Hang-up

If the modem is connected (off-hook) and the remote modem/server goes hangs up, the central office may issue a line polarity reversal. If a line polarity reversal is detected, the modem will drop the call and respond with NO CARRIER. The reason for hang-up can be determined by #UD or by S86=25. A line reversal can also be simulated by simply pulling out the telephone line during a connection.

Operation in Voice Mode: **Line-In-Use (enabled by AT-STE=1, AT-STE=3, AT-STE=5, or AT-STE=7):**

This feature does not apply in voice mode.

Extension Pickup (Enabled by AT-STE=2, AT-STE=3, AT-STE=6, or AT-STE=7)

If the modem is off-hook and an extension goes off-hook, the modem issues a <DLE>P to the DTE. The application software then hangs up the line (VLS=0).
Remote Hang-up (Enabled by AT-STE=4, AT-STE=5, AT-STE=6, or AT-STE=7).
If the modem is off-hook and the remote user goes on-hook, the modem issues a <DLE>P to the DTE. The application software then hangs up the line (VLS=0).

Examples: **User is talking on an extension and the modem tries to dial**

```
AT-STE=7
ATDT555-1212
LINE-IN-USE.
```

The line is not in use and the modem tries to dial

```
AT-STE=7
ATDT555-1212
Modem goes off-hook
CONNECT
```

An extension is off-hook but there is silence on the line and the modem tries to dial

```
AT-STE=3
ATDT555-1212
Modem goes off-hook
NO DIAL TONE
```

Modem is connected in data mode and remote modem goes on-hook

```
AT-STE=4
ATDT555-1212
CONNECT
NO CARRIER Remote modem drops line
ATS86=?
025
```

Modem is in answer machine mode and an extension goes off-hook

```
AT-STE=2
AT+FCLASS=8
OK
<DLE>h Local handset on-hook
<DLE>R Ring
AT+VLS=1
OK
AT+VSM=1,8000
AT+VTX Starts to play greeting message
<DLE>P User picks up extension
<DLE>! DTE send abort to end playback
AT+VLS=0 DTE hangs up.
```

Continued on next page.

Automated system that needs to periodically use the line while giving the voice user the highest priority

A common use for these features: An automated system that needs to periodically use the line while giving the voice user the highest priority. The automated system makes a connection when the line is free. It does this without disturbing the line if the line is in use. The automated system periodically retries the connection until the line is free.
Once free, it dials and makes its connection. If a voice user wishes to use the line while the modem is connected. the modem drops the line and gives it to the user. The modem will then try to regain control of the line by once again periodically retrying to establish a connection.

```
AT-STE=7
OK
ATDT5551212
CONNECT
Sometime later, the user picks up phone
NO CARRIER
ATS86?
25
OK
Delay 30 seconds
ATDT5551212
LINE-IN-USE
Try again some time later user hangs up the phone
CONNECT
```

Test Command

Command: &T*n* V.54 Test Command

Values: n = 0, 1, 8

Default: None

Description: The modem can perform selected test and diagnostic functions. A test can be run only when the modem is in asynchronous operation in non-error-correction mode (normal or direct mode). To terminate a test in progress, the escape sequence (+++) must be entered first.

&T0	Abort. Stop any test in progress.
&T1	Start local analog loopback, V.54 Loop 3. If a connection exists when this command is issued, the modem hangs up. A CONNECT message is displayed at the start of the test.
&T8	Starts local analog loopback, V.54 Loop 3, with self-test. If a connection exists, the modem hangs up before the test begins. When the test is terminated, the number of detected errors is reported to the computer.

Chapter 3 – Voice Commands

Note: Voice commands apply to the MT5656ZDX-V only.

Voice Commands Overview

Non-Voice Commands	**For Configuring the Voice Function**
+FCLASS	Set Mode
+VCID	Caller ID
+VNH	Automatic Hang-up Control
+FLO	Flow Control

Voice Commands	**Description**
+VIP	Voice Initialize All Parameters
+VRX	Start modem Receive (Record)
+VTS	Voice Tone Send (Send single frequency or DTMF)
+VTX	Start modem Transmit (Playback)
+VGR	Voice Gain Receive (Record Gain)
+VGT	Voice Gain Transmit (Playback Volume)
+VIT	Voice Inactivity Timer (DTE/Modem)
+VLS	Analog Source/Destination Selection
+VRA	Ringback Goes Away Timer
+VRN	Ringback Never Appeared Timer
+VSD	Silence Detection (QUIET & SILENCE)
+VSM	Compression Method Selection
+VTD	Beep Tone Duration Timer
+VDR	Distinctive Ring
+VDT	Control Tone Cadence Reporting
+VPR	Select DTE/modem Interface Rate (Turn off autobaud)
Command	**Speakerphone**
+VSP	Speakerphone ON/OFF
+VDX	Speakerphone Duplex Mode
+VGM	Microphone Gain
+VGS	Speaker Gain

Configuration Commands

These configuration commands must be set before using the Voice Commands.

Command: +FCLASS=8 Select Voice Mode

+FCLASS=8 selects the Voice Mode. The Voice Mode commands and responses described in this section are applicable when command +FCLASS=8. (See the Generic Modem Control section for the definition of the FCLASS command.)

Command: +VCID Caller ID

See +VCID for Caller ID in Chapter 2.

Command: +VNH= Automatic Hang-up Control

Description: This command enables or disables automatic hang ups.
Syntax: +VNH=<hook>

Values: **<hook>** Decimal number corresponding to the selected option.

0	Modem enables automatic hang ups as is normal in other modes.
1	Modem disables automatic hang ups usually found in the other non-voice modes.
2	The modem disables automatic hang ups in the other non-voice modes. The modem performs a “logical” hang up (returns OK result code).

Default: 0

Report Commands:

+VNH?	Reports current or selected values.
+VNH=?	Reports supported range of parameter values.

Command Responses:

	Automatice Hang-up Command Responses			
Command	**No Carrier Present**	**ATH**	**ATZ**	**DTR & D2**
+VNH=0	Y	Y	Y	Y
+VNH=1	N	Y	Y	Y
+VNH=2	N	N	N	Y

Notes:
Y = will hang up; N = will not hang up
How +VNH is reset:
DTE uses +VNH command to change the setting.
DTE issues another +FCLASS mode change without issuing another +VNH.
A hang-up event occurs (see this table).
DTE issues +VIP command.

Command: +FLO Flow Control

Function: Select Flow Control Method

Values: 0, 1, 2, 3-255

Result Codes: OK or ERROR

Description: The +FLO? command lets you select the method of flow control provided and used by the modem. If +FLO=0, some other method (such as credit flow control) is used. The Xon-Xoff method is required. Xon is the ASCII character <DC1> (11 hex). Xoff is the ASCII character >DC3> (13 hex). CCITT V.24 circuits 106 and 133 are optional flow control methods. If circuits 106 and 133 are not used (+FLO<>2), then circuit 106 is held On whenever +FCLASS=8.

In Voice mode, circuit 105 has no effect on the state of transmitted data. (Circuit 133 normally reverts to use as circuit 105 (RTS) when not used for Flow Control.)

+FLO=0	Disables Xon-Xoff and 133/105 flow control
+FLO=1	Enables Xon-Xoff flow control in either direction
+FLO=2	Enables CCITT Circuit 133 for flow control of the modem by the PC; use CCITT Circuit 106 for flow control of the PC by the modem.
+FLO=3-255	Reserved for future standards.

Voice Commands

These commands are listed in the order in which they might be used.

Command: +VIP Voice Initialize All Parameters

Description: This command causes the modem to initialize all voice parameters to their default values.
Syntax: +VIP

Default: None

Result Code: OK
ERROR If not in Voice Mode.

Command: +VRX Start Modem Receive (Record)

Description: This command causes the modem to start the voice reception process.
Syntax: +VRX

Default: None

Result Codes: OK
ERROR If not in Voice Mode.

Command: +VTS Send Voice Tone(s)

Description: This command causes the modem to send DTMF digit or hookflash tones with the duration specified by +VTD, to send DTMF digit or hookflash tones with duration specified by +VTS, or to send single or dual tone frequencies with duration specified by +VTS.
Syntax: +VTS=<string>

Default: See the highlighted text for a discussion of defaults.

Values: **<string>** The tone generation consists of elements in a list where each element is separated by a comma. Each element can be:

- A single character which the modem interprets as a DTMF digit (0 - 9, #, *, or A-D) or hookflash (!), with a duration given by +VTD.
- A 3-element string enclosed in square brackets, "[freq1,freq2,dur]", which the modem interprets as a general dual tone and duration selection, or
- A 2-element string enclosed in curly braces, "{X,dur}", which the modem interprets as a DTMF digit (0 - 9, #, *, or A-D), or hookflash (!) with a duration (dur) different than that given by the +VTD command.

Missing subparameters assume the default value. Unspecified values always default to zero for frequencies, DTMF * for DTMF tones, and +VTD for duration. The omission of commas (and associated subparameters) is valid.

The quantity in the square brackets consists of a 3-element list (freq1,freq2,dur), which can be used to send single or dual tones.

- The first element is the first frequency (freq1) with range 0 or 200-3000 Hz.
- The second element is the second frequency (freq2) with range 0 or 200-3000 Hz.
- The third element is the duration (dur) in 0.01 second intervals with range 0-255 (ASCII units of 10 ms).

A list may contain null elements. For example, [3000] means that the DCE generates a single tone at 3000 Hz for the default duration, **[3000,3300] means that the DCE generates a dual tone at 3000 and 3300 Hz for the default duration, and [,3300] means that the DCE generates a single tone at 3300 Hz for the default duration.**

The quantity in the curly braces consists of a 2-element list (X,dur), which can be used to send DTMF tones or hookflash. The first element is the DTMF tone or hookflash (!) character (X), and the second element is the duration (dur) in 0.01 seconds. The characters are of the same set given above. A list may contain null elements. **For example, {2} means DTMF tone 2 for the default duration and { } means silence for the default duration.**

The modem will stop the tone generation at the point in the string where the modem detects a parsing error or encounters an invalid frequency range, a <CR>, or a semicolon.

Report Command: +VTS=? Reports supported range of parameter values.

+VTS Examples:

Example 1

This example illustrates tone generation without using any null elements.

The command example is followed by a description of command execution.

AT+VTS= {!,30},1,2,[1000,1300,50],!,{*,6},[800,1300,50],9

1. Hookflash with a duration of 300 ms.
2. Play DTMF 1 with a duration given by the +VTD command.
3. Play DTMF 2 with a duration given by the +VTD command.
4. Play tone pair at 1 000 Hz and 1 300 Hz with a duration of 500 ms.
5. Hookflash with a duration given by the +VTD command.
6. Play DTMF * with a duration of 60 ms.
7. Play tone pair at 800 Hz and 1300 Hz with a duration of 500 ms.
8. Play DTMF 9 with a duration given by the +VTD command.

Example 2

This example illustrates tone generation using null elements.

The command example is followed by a description of command execution.

AT+VTS=1,2,[1000,1300,50],[800],9

1. Play DTMF 1 with a duration given by the +VTD command.
2. Play DTMF 2 with a duration given by the +VTD command.
3. Play tone pair at 1000 Hz and 1300 Hz with a duration of 500 ms.
4. Play tone pair at 800 Hz with a duration given by the +VTD command.
5. Play DTMF 9 with a duration given by the +VTD command.

Example 3

This example illustrates tone generation using null elements and periods of silence.

The command example is followed by a description of command execution.

AT+VTS=1,[,,50],2,[ ],9

1. Play DTMF 1 with a duration given by the +VTD command.
2. Play silence with a duration of 500 ms.
3. Play DTMF 2 with a duration given by the +VTD command.
4. Play silence with a duration given by the +VTD command.
5. Play DTMF 9 with a duration given by the +VTD command.

Command +VTX Start Modem Transmit (Playback)

Description: This command causes the modem to start the voice transmission process.
Syntax: +VTX

Default: None

Result Codes: CONNECT. The modem accepts the command.
ERROR. The modem is not connected to at least one off-hook telephone line or one non-telephone line.

Command: +VGR Voice Gain Receive (Record Gain)

Description: This command causes the modem to set the gain for received voice samples.
Syntax: +VGR=<gain> selects automatic gain control. Range 0-255

Default: 128

Result Codes: OK <gain> = 0.
ERROR. Otherwise, or if not in Voice Mode.

Report Commands:
+VGR? Reports current or selected values.
+VGR=? Reports supported range of parameter values.

Command: +VGT Voice Gain Transmit (Playback Volume)

Description: This command causes the modem to set the volume level.
Syntax: +VGT=<level>.

Values: <level> Decimal number corresponding to the volume level. Range = 0-255.

Default: 128

Report Commands:
+VGT? Reports current of selected values.
+VGT=? Reports supported range of parameter values.

Command: +VIT Voice Inactivity Timer (DTE/Modem)

Description: This command sets the modem’s initial value for the DTE/modem inactivity timer.
Syntax: +VIT=<timer>

Values:
<timer> Decimal number corresponding to the time in units of 1.0 second. A value of 0 disables the timer. Range = 0-255.

Default: 0

Report Commands:
+VIT? Reports current of selected values.
+VIT=? Reports supported range of parameter values.

Command: +VLS Analog Source/Destination Selection

Description: This command causes the modem to select one or more source/destinations of the analog data.
Syntax: +VLS=<label>

Values:
<label> Decimal number corresponding to the selected analog source/destination hardware configuration.

Default: 0

Report Commands:
+VLS? Reports current of selected values.
+VLS=? Reports supported range of parameter values.

Report Query Response: <label>,<devices>,<transmit event>,<receive event>,<idle event>

Where each event subparameter is a hex number the represents an event bit field of the reporting capabilities of each state. (See the Table Command Options on the next page):

<label>	Identifies the modem analog source/destination hardware configuration.
<devices>	A <string constant> made up of Primitives.
<xxxx event>	<transmit event>, <receive event>, and <idle event>subparameters are the DCE event reporting capabilities for the Voice Transmit State, Voice Receive State, and the Voice Command State, respectively. Each of the event reporting subparameters is a hex number that represents an event bit field. The hex number format is defined in Table 5-6); a one in the bit field indicates that the DCE can report the associated event.

Each of the possible hardware configurations has its own <label>, ..., <idle event> description line (the above form description shows just one). A <CR><LF> terminates each description line.

+VLS Example:

```
AT+VLS=?
     0,””,B0804100,B0804100,B0804100
     1,”T”,0B8433C1,0FE431C1,0B8431C1
     2,”L”,08800300,0CE00100,08800100
     3,”LT”,0B8433C1,0FE431C1,0B8431C1
     4,”S”,00800300,04E00100,20800100
     5,”ST”,0B8433C1,0FE431C1,0B8431C1
     8,”S1",00800300, 04E00100,20800100
     9,”S1T”,0B8433C1,0FE431C1,0B8431C1
     11,”M1",00800300,04E00100,20800100
     14,”H”,00800300,04E00100,20800100
     18,”M1S”,00800300,04E00100,20800100
     19,”M1S1",00800300,04E00100,20800100
```

Result Codes:
OK <label> = 0-5,8-9,11,14,18-19.
ERROR The <label> value is out of range, or if the modem cannot service the request in the <label> subparameter.

Table of +VLS Command Options

Label	Primitives	Description	+VTX	+VRX	+VSP=1
0	None	DCE on-hook. Local phone connected to the line.			
1	T	DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.	X	X	
2	L	DCE on-hook. Local phone connected to the DCE.	X	X	
3	LT	DCE off-hook. Local phone connected to the line. DCE connected to the line.	X	X	
4	S	Internal Speaker connected to the DCE. DCE on-hook. Local phone connected to the line.	X		
5	ST	Internal Speaker connected to the line. DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.	X	X	
6	M	Internal Microphone connected to the DCE. DCE on-hook. Local phone connected to the line.		X	
7	MST	Internal Microphone and Internal Speaker connected to the line. DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.			X
8	S1	External Speaker connected to the DCE. DCE on-hook. Local phone connected to the line.	X		
9	S1T	External Speaker connected to the line. DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.	X	X	
10	MS1T	Internal microphone and External Speaker connected to the line. DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.			X
11	M1	External Microphone connected to the DCE. DCE on-hook. Local phone connected to the line.		X	
12	M1ST	External Microphone and Internal Speaker connected to the line. DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.			X
13	M1S1T	External Microphone and External Speaker connected to the line. DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.			X
14	H	External Microphone and Speaker combination (handset or headset) connected to the DCE. DCE on-hook. Local phone connected to the line.	X	X	
15	HT	External Microphone and Speaker combination (handset or headset) connected to the line. DCE off-hook. DCE connected to the line. Local phone provided with power to detect hook condition.	X	X	
16	MS	MS Internal Microphone and Internal Speaker connected to DCE.			
17	M1S	MS1 Internal Microphone and External Speaker connected to DCE.			
18	MS1	External Microphone and Internal Speaker connected to DCE.			
19	M1S1	External Microphone and External Speaker connected to DCE.			

Primitives (Column 2):

L	Local Phone.
T	Telephone Line.
M	Internal Microphone.
M1	External Microphone.
S	Internal Speaker.
S1	External Speaker.
H	External Microphone and Speaker combination (handset or headset).

Note: All label options in this table may not be supported by the product; see +VLS command

Command: +VRA Ringback Goes Away Timer

Description: This command sets the length of time the modem will wait between ringbacks during call origination before the modem can assume that the remote station has gone off-hook.
Syntax: +VRA=<interval>r r

Values: **<interval>** Decimal number (0-255) specifying the silence interval time in units of 0.10 second between the end of one ring interval and the start of the next ring interval. A value of 0 forces the modem to report the OK result code immediately after the first Ringback. Range is 0.1 to 25.5 seconds for <interval> = 1 to 255.

Default: Interval of 50 (5 seconds)

Report Commands:

+VRA?	Reports current of selected values.
+VRA=?	Reports supported range of parameter values.

Command: +VRN Ringback Never Appeared Timer

Description: This command sets the length of time the modem will wait between ringbacks during call origination before the modem can assume that the remote station has gone off-hook.

Syntax: +VRN=<interval>

Values:

<interval> Decimal number specifying the time period, in units of 1.0 second, that the modem will wait for Ringback during call origination.

A value of 0 forces the modem to report the OK result code immediately after dialing.

The range is 1 to 25 seconds for <interval> = 1 to 25.

Default: Interval of 10 (10 seconds)

Result Codes:

OK <interval> = 0-25
ERROR Otherwise, or if not in Voice Mode.

Report Commands:

+VRN?	Reports current of selected values.
+VRN=?	Reports supported range of parameter values.

Command: +VSD Silence Detection (Quiet and Silence)

Description: This command causes the modem to set the silence detection sensitivity and the required period of silence before the modem reports silence detected at the end of a voice receive either with the “Presumed End of Message” (QUIT) or “Presumed Hangup (SILENCE) event reports.

Syntax: +VSD=<sds>,<sdi>

Values:

<sds> Decimal number corresponding to the selected parameter.

0	Use +VSM silence compression setting and algorithm for long-term silence detection (if +VSM is in use) or proprietary silence compression setting and algorithm for long-term silence detection (if +VSM is not in use).
127	Sets less aggressive long-term silence detection independent of presence or use of silence compression.
128	Sets nominal long-term silence detection independent of presence or use of silence compression.
129	Sets more aggressive long-term silence detection independent of presence or use of silence compression.

<sdi> Decimal number specifying the required period of silence, in units of 0.1 second, before the modem can report silence detected at the end of a voice receive either with the “Presumed End of Message” (QUIT) or “Presumed Hang up (SILENCE) event reports.

A value of 0 disables the modem silence detection.

The range is 0.1 to 25.5 seconds for <sdi> = 1 to 255.

Defaults: 0,50

Report Commands:

+VSD?	Reports current of selected values.
+VSD=?	Reports supported range of parameter values.

Command: +VSM Compression Method Selection

Description: This command causes the modem to set the voice compression method, the silence compression sensitivity, and the voice sampling rate.

Syntax: +VSM=<cml><vsr><sds><sel>

Values:

<cml>	Decimal number identifying the compression method.
<vsr>	<range of values> containing the supported range of voice samples per second of the analog signal.
<sds>	<range of values> containing the supported range of sensitivity settings for voice receives.
<sel>	<range of values> containing the supported range of expansion values for voice transmits.

Defaults: 1,8000,0,0

Report Commands:

+VSM?	Reports current of selected values.
+VSM=?	Reports supported range of parameter values.

Command: +VTD Beep Tone Duration Timer

Description: This is a V.90 command. This command causes the modem to set the default DTMF/tone generation duration. Syntax: +VTD=<dur>

Values:

<dur>	Decimal number specifying the default DTMF/tone generation duration in units of 0.01 second. A value of 0 specifies the value entered by the S11 parameter (50-255 ms). The range is 0.01 to 2.55 seconds for <dur> = 1 to 255.

Default: 100 ms

Report Commands:

+VTD?	Reports current of selected values.
+VTD=?	Reports supported range of parameter values.

Command: +VDR Distinctive Ring

Note: **This command does not require the Voice Configuration commands to be set before using it.**

Description: This command causes the modem to enable or disable reporting of the ring cadence information and to control the timing of the RING event code report if ring cadence reporting is enabled.

Syntax: +VDR=<enable>, <report>

Values:

<enable> Decimal number corresponding to the selected option.

0	The modem will not report ring cadence information.
1	The modem will report ring cadence information as specified for the <report> subparameter.

<report> Decimal number specifying ring cadence information report when enabled by the <enable> subparameter.

0	The modem will produce only DROF and DRON messages. The modem will not produce any RING event codes. The modem will report other call progress event codes as normal.
Other	The modem will produce only DROF and DRON messages. The modem will produce a RING event code after <report>/10 seconds after the falling edge of the ring pulse (i.e., after the DRON report).

Defaults: 0,0

Report Commands:

+VDR?	Reports current of selected values.
+VDR=?	Reports supported range of parameter values.

Command: +VDT Control Tone Cadence Reporting

Description: This command is included for compatibility only and has no effect other than returning a result code.

This command allows the modem to enable or disable reporting of the control tone cadence information in the frequency band used by the Ringback/Remote Ring, BUSY, and reorder/Fast Busy tones (usually in the 300 to 600 Hz range).

Syntax: +VDT=<enable>,<report>

Values:

<enable> Decimal number corresponding to the selected option.

0	The modem will not produce any control tone cadence report.

<report> Decimal number specifying the produced any control tone cadence report when enabled by the <enable> subparameter.

0	The modem will produce only CPOF and CPON messages.
Other	Reserved

Defaults: 0,0

Report Commands:

+VDT?	Reports current of selected values.
+VDT=?	Reports supported range of parameter values.

Command: +VPR Select DTE/Modem Interface Rate (Turn Off Autobaud)

Description: This command selects the DTE/modem interface rate.
Syntax: +VPR=<rate>

Values: **<rate>** Decimal number corresponding to the DTE/modem interface rate where 0 = autobaud rate determined by processing the AT command, and 1,2,3,4,8,16,24,48,96 correspond to multipliers of 2400 bps to determine the actual rate:

0 = Autobaud
1 = 2400 bps
2 = 4800 bps
3 = 7200 bps
4 = 9600 bps
8 = 19200 bps
16 = 38400 bps
24 = 57600 bps
48 = 115200 bps
96 = 230400 bps

Default: 0

Report Commands:

+VPR?	Reports current of selected values.
+VPR=?	Reports supported range of parameter values.

Speakerphone Commands

Command: +VSP Speakerphone ON/OFF

Description:	This command turns the speakerphone ON or OFF. Syntax: +VSP=<mode>	
Values:	**<mode>**	Decimal number corresponding to the selected option. 0 The speakerphone function is OFF. **Default** 1 The speakerphone function is ON.
Default:	0	
Report Commands:	+VSP?	Reports current of selected values.
	+VSP=?	Reports supported range of parameter values.

Command: +VGM Microphone Gain

Description:	This command causes the modem to set the microphone gain of the speakerphone function. Syntax: +VGM=<gain>	
Values:	**<gain>**	Decimal number between 0 and 255 corresponding to the gain. 1 The speakerphone mode is full duplex.
Default:	64	
Report Commands:	+VGM?	Reports current of selected values.
	+VGM=?	Reports supported range of parameter values.

Command: +VGS Speaker Gain

Description:	This command causes the modem to set the speaker gain of the speakerphone function. Syntax: +VGS=<gain>	
Values:	**<gain>**	Decimal number between 0 and 255 corresponding to the gain. 1 The speakerphone mode is full duplex.
Default:	128	
Report Commands:	+VGS	Reports current of selected values.
	+VGS=?	Reports supported range of parameter values.

Unformatted Form Reporting – Caller ID

The MultiModem does not display the Caller ID information if it detects a checksum error in the caller ID packet (either SDM or MDM) while in presentation mode. If the MultiModem receives multiple copies of the Caller ID packets, the MultiModem presents all of the packets to the computer. The MultiModem presents all data items and packet control information found in the SDM and MDM packets, except the leading ***Us*** (line seizure information) from the presentation. The checksum is included in the presentation. The entire Caller ID packet is presented in ASCII hex as printable numbers. The characters in the ASCII hex message are in the bit order presented to the MultiModem. The MultiModem does not insert spaces, <cr>, or <lf> ASCII codes for formatting between the characters of the packet.

The MultiModem does not check the checksum, and it is the computer's job to check message validity. Note that this means that the MultiModem presents the Caller ID information even if the MultiModem detects a check sum error in the Caller ID packet (SDM or MDM) in the presentation mode.

The MultiModem presents all of the information in the packet in ASCII hex as printable characters. The MultiModem includes all Message Type Octets, Message Length Octets, Data Octets, and Checksum Octets for the presentation mode.

Voice Mode Shielded Codes

These codes can be sent in either Command mode or Data mode. The DCE may return the event detection reports after the OK result code from the +FCLASS command. One or more simple event detection reports may be embedded within the data portion of a complex event detection report. The Table below describes voice mode shielded codes. The number in the first column is the ASCII equivalent (in hex). The number in the second column refers to the numbering scheme used below.

Shielded Code	**Hex**	**Event Report Description**
<DLE>	(10)	Two contiguous <DLE><DLE> codes indicate a single <DLE> in the data stream.
<SUB>	(1A)	<DLE><DLE> in the data stream.
<ETX>	(3)	End Data State; signifies the end of voice data. Can end with Event 9 (Presumed Hangup Timeout), Event 10 (Presumed End of Message), Event 13 (Loop Current Interruption), Event 14 (Loop Current Polarity Reversal), Event 19 (BUSY), or Event 20 (DIALTONE).
Q	(51)	Data stream shielded Xon character. Used in the +VXT command to shield XON characters in the full-duplex data stream and in the Packet Protocol.
S	(53)	Data stream shielded Xoff character. Used in the +VXT command to shield XOFF characters in the full-duplex data stream and in the Packet Protocol.
M	(4D)	Data stream shielded SOH code used for the Packet Protocol.
W	(57)	Data stream shielded ETB code used for the Packet Protocol.
F	(46)	Data stream shielded ACK code used for the Packet Protocol.
U	(55)	Data stream shielded NAK code used for the Packet Protocol.
G	(47)	Data stream shielded ENQ code used for the Packet Protocol.
T	(54)	Timing Mark.
X	(58)	Packet Header for the "Complex Event Detection Report" (additional event data transfers to the DTE).
.	(2E)	Packet Terminator for the "Complex Event Detection Report" (additional event data transfers to the DTE).
/	(2F)	Start of DTMF tone shielding.
~	(7F)	DTMF transitions to off.
R	(52)	Event Number 3 (RING). The <DLE> shielded version of the RING result code.
1	(31)	Event Number 4 (DTMF 1).
2	(32)	Event Number 4 (DTMF 2).
3	(33)	Event Number 4 (DTMF 3).
4	(34)	Event Number 4 (DTMF 4).
5	(35)	Event Number 4 (DTMF 5).
6	(36)	Event Number 4 (DTMF 6).
7	(37)	Event Number 4 (DTMF 7).

Shielded Code	**Hex**	**Event Report Description**
8	(38)	Event Number 4 (DTMF 8).
9	(39)	Event Number 4 (DTMF 9).
0	(30)	Event Number 4 (DTMF 0).
A	(41)	Event Number 4 (Extended Keypad DTMF A).
B	(42)	Event Number 4 (Extended Keypad DTMF B).
C	(43)	Event Number 4 (Extended Keypad DTMF C).
D	(44)	Event Number 4 (Extended Keypad DTMF D).
*	(2A)	Event Number 4 (Extended Keypad DTMF E).
#	(23)	Event Number 4 (Extended Keypad DTMF E).
o	(6F)	Event Number 5 (Receive Buffer Overrun).
c	(63)	Event Number 6 (Facsimile Calling).
e	(65)	Event Number 7 (Data Calling).
h	(68)	Event Number 8 (line current break). Local phone goes on hook.
H	(48)	Event Number 8 (line current detected). Local phone goes off hook.
s	(73)	Event Number 9 (Presumed Hang up "SILENCE" Timeout).
q	(71)	Event Number 10 (Presumed End of Message "QUIET" Timeout).
J	(4A)	Event Number 11 (SIT Tone).
$	(24)	Event Number 12 (Bong Tone).
l	(6C)	Event Number 13 (Loop Current Interruption). Usually indicates a remote hang up.
L	(4C)	Event Number 14 (Loop Current Polarity Reversal). May indicate a hang up or a receive, depending on CO implementation.
w	(77)	Event Number 15 (Call Waiting/Beep Interrupt).
t	(74)	Event Number 17 (TDD Detected - 1400/1800).
r	(72)	Event Number 18 (Ringback).
b	(62)	Event Number 19 (BUSY). May be repeatedly sent.
d	(64)	Event Number 20 (DIALTONE). May be repeatedly sent.
K	(4B)	Event Number 21 (Reorder/Fast Busy).
F	(46)	Event Number 22 (V.21 Channel 2 7E flags).
u	(75)	Event Number 23 (Transmit Buffer Underrun).
p	(70)	Event Number 24 (Line voltage increase - extension phone goes on hook).
P	(50)	Event Number 24 (Line voltage increase - extension phone goes off hook).
a	(61)	Event Number 25 (Facsimile or Data Answer).
f	(66)	Event Number 26 (Data Answer).
V	(56)	Event Number 27 (Voice Detection). A high confidence of voice.
v	(76)	Event Number 27 (Voice Detection). A low confidence of voice.
i	(69)	Event Number 29 (Stuttered Dial tone).
E	(45)	Event Number 30 (Invalid Voice Data Format. Voice data is incompatible with selected Voice Compression Methods.
Y	(59)	Event Number 31 (Lost Data Detected Event).
m	(6d)	Event Number 32 (Facsimile Answer).
%	(25)	Event Number 63 (manufacturer specific).
&	(26)	Event Number 48 (manufacturer specific).
'	(27)	Event Number 49 (manufacturer specific).
(	(28)	Event Number 50 (manufacturer specific).
)	(29)	Event Number 51 (manufacturer specific).
all other	7-=bit ASCII Reserved for future use.	

Chapter 4 – V.8 / V.8bis Commands

V.8 is a way V.34 modems negotiate connections features and options, and **V.8bis** is a start-up sequence for multimedia modems.

Command: +A8E V.8 and V.8bis Operation Controls

Description: This command is defined for two conditions: as a parameter while the modem is on-hook, and as an action command while the modem is off-hook. If enabled, V.8 negotiation does not preclude simultaneous implementation of other negotiation means (e.g., V.8bis, V.18, V.32bis Annex A). It is a compound parameter if issued while the modem is on-hook, used to precondition V.8 and V.8bis originating and answering operation. It is issued by the DTE before the **Dial (D)** or **Answer (A)** command, regardless of the state of the +FCLASS parameter. This command is an action command if issued while the modem is off-hook to (re)start V.8 or V.8bis negotiation.

Example: If initial V.8 negotiation fails, but subsequent T.30 negotiation indicates V.8 capability, this command may be used to initiate V.8 negotiation.

Syntax: +A8E=<v8o>,<v8a>,<v8cf>[,<v8b>][,<cfrange>][,<protrange>]

Values:

<v8o> Decimal number which enables/disables issuance of +A8x indications during modem-controlled V.8 origination negotiation.
- 1 Enable DCE-controlled V.8 origination negotiation without +A8x indications. **Default**
- 6 Enable DCE-controlled V.8 origination negotiation with +A8x indications.

<v8a>= Decimal number which enables/disables issuance of +A8x indications during modem-controlled V.8 answer negotiation.
- 1 Enable DCE-controlled V.8 answer negotiation without +A8x indications. **Default**
- 5 Enable DCE-controlled V.8 answer negotiation with +A8x indications.

<v8cf>= Set the V.8 CI signal call function to the hexadecimal octet XY
- 00 **Default**
- 21
- C1

<v8b>= Decimal number which enables/disables V.8bis negotiation.
- 0 Disable V.8bis negotiation.
- 1 Enable V.8bis negotiation. **Default**

<cfrange>= "<string of values>". Applicable only for <v8a>=5. Not supported.

< protrange >= <string of values>". Applicable only for <v8a>=5. Not supported.

Default Values: 1,1,00,1,0,0
The ATD and ATA commands behave as specified in V.250, and +A8n indications are not generated by the modem. For subparameter values <v8o>=6 and <v8a>=5, +A8I indications are issued during the V.8session to notify the DTE when the relevant V.8 signals are received.

Report Commands:
+A8E? Reports current or selected values.
+A8E=? Reports supported range of parameter values.

Command: +A8I CI Signal Indication

Description: This indication is issued by an answering modem, if +A8E,<v8a> .0, to indicate detection of a V.8 CI signal and report the recovered Call Function octet(s).
Indication Syntax: +A8I:<v8cf><CR>

Values: **<v8cf>** A hexadecimal code octet representation of those Call Function octet(s). +A8I:0 indicates that the modem timed out waiting for CI.

Example:
+A8I:0 The modem timed out waiting for CI.
+A8I:X YYY

Chapter 5 – V.25bis Commands

Note: These commands can be used with the MT5600BA only.

The V.25bis commands control synchronous communications between the host and the modem using the HDLC or character-oriented protocol. Modulation depends on the serial port rate and setting of the transmitting clock source. These commands apply to modems that support synchronous communications.

Command: CIC Connect Incoming Call

Description: Answers an incoming call. Values: n/a

Command: DIC Disregard Incoming Call

Description : Disregards current incoming call. Values: n/a

Command: CRN*s* Call Request Number

Description: Used to dial a number

Values: s =dial string (0-9, *, #, :, <, =, P, T)

Command: CRI*s* Call Request Identification

Description: Used to dial a number

Values: s =dial string (0-9, *, #, :, <, =, P, T)

V.25bis Number Format:

0-9	Dialing Digit
:	Wait tone
<	Pause
=	Separator
P	Dialing to be continue in Pulse mode
T	Dialing to be continue in DTMF

Command: PRN*x;s* Program Number

Description: Used to store dial string s in location x.

Values: x=(0-3)

s = dial string (0-9, *, #, :, <, =, P, T)

Command: CRS*x* Call Request Address

Description: Recalls dial string to dial from location x.

Values: x=(0-3)

Command: PRI*a;s* Program Identification Number

Description: Dummy Command (just returns VAL).

Command: RLD List Request of Delayed Call Number

Description: Returns current listing of Delayed numbers. Values: n/a.

Command: RLF List Request of Forbidden Number

Description: Returns current listing of Forbidden Numbers. Values: n/a

Command: RLI List Identification Number

Description: Dummy Command (just returns VAL)

Command: RLN List Request of Stored Number

Description: Returns dial strings stored in locations 0 – 3. Values: n/a

V.25bis Responses

CFI*rr*	Call Failure Indication (where *rr* is the equals the following messages) *ab* Call not answered *et* Engaged tone (same as Busy) *fc* Number on forbidden list (Number is blacklisted) *nd* No dial tone *ns* Number not stored in memory *nt* Call answered but no answer tone *rt* No answer
DLC	Delayed call
INC	Incoming call (RING)
VAL	A valid V.25bis command has been attempted
INV	Invalid
CNX*s*	Connection with ***s*** as the speed connected

Chapter 6 – S-Registers

Certain modem values, or parameters, are stored in memory locations called S-Rregisters. Use the **S** command to read or alter the contents of the S-Registers.

S-Registers

S-Reg	Unit	Range	Default	Description
S0	1 ring	0,1–255	country dep.	**Number of Rings to Auto-Answer:** Sets the number of rings required before the modem automatically answers a call. ATS0=0 disables autoanswer completely.
S1	1 ring	0–255	0	**Ring Counter:** Counts the rings that have occurred.
S2	decimal	0–127	43 (+)	**Escape Character:** Sets ASCII code for the escape sequence128–255 character. Values greater than 127 disable escape.
S3	decimal	0–127	13 (^M)	**Carriage Return Character:** Sets the ASCII code for the carriage return character.
S4	decimal	0–127	10 (^J)	**Line Feed Character:** Sets the ASCII code for the line feed character.
S5	decimal	0–32	8 (^H)	**Backspace Character:** Sets the ASCII code for the backspace33–127 character. Values greater than 32 disable backspace.
S6	seconds	2–255	country dep.	**Wait Time Before Blind Dialing or for Dial Tone:** Sets the time the modem waits after it goes off-hook before it begins to dial the phone number.
S7	seconds	1–255	country dep.	**Wait Time for Carrier, Silence, or Dial Tone:** Sets the time the modem waits for a carrier signal before aborting a call. Sets the wait for silence time for the @ dial modifier. Sets the time the modem waits for a dial tone after encountering W in the dial string.
S8	seconds	0–255	2	**Pause Time for Dial Delay:** Sets the length of the pause caused by a comma character in a dialing command.
S9	100 ms	1–255	6	**Carrier Detect Response Time:** Sets the time, in tenths of a second that the carrier must be present before the modem considers it valid.
S10	100 ms	1–255	14	**Lost Carrier to Hang Up Delay:** Sets how long a carrier signal must be lost before the modem disconnects.
S11	1 ms	50–255	country dep.	**DTMF Tone Duration:** Sets spacing and duration of dialing tones.
S12	20 ms	0–255	50	**Escape Prompt Delay (EPD):** Defines the maximum period, in fiftieths of second, allowed between receipt of the last character of the three escape character sequences from the computer and the sending of the OK result code to the computer (escape code guard time).
S13	decimal	0, 1–127	42 (*)	**Remote Configuration Escape Character:** Sets the ASCII code for the remote configuration escape character. ATS13=0&W disables remote configuration. For use with the MT5600BA and MT5600BR only.
S15	minutes	0, 10–255	30	**Dialup Backup:** Sets the length of time the modem waits after making a dial-up connection before it checks for a restored lease line. Zero disables dial backup. For use with the MT5600BA and MT5600BR only.
S17	minutes	0–255	1	**Dialup Connection:** Sets the length of time the modem waits after a lease line fails before it attempts a dial-up connection. For use with the MT5600BA and MT5600BR only.
S24	seconds	0–255	0	**Sleep Inactivity Timer:** Sets the number of seconds that the modem operates in normal mode with no detected telephone or serial port activity before it enters low-power sleep mode. The timer is reset upon any serial port or telephone line activity.
S25	10 ms (async)	0–255	5	**Delay to DTR OFF:** Sets the length of time that the modem1 ms (sync) ignores DTR while taking the action specified by &D .
S26	10 ms	0–255	1	**RTS to CTS Delay:** When &R0 is commanded, sets the time after detecting an OFF-to-ON transition on RTS before the modem turns CTSON. Applies to synchronous operation only.

S-Reg	Unit	Range	Default	Description
S29	10 ms	0–255	70	**On Hook Time:** Sets the length of time that the modem goes on-hook when it encounters a flash dial modifier (!) in the dialing string.
S30	10 seconds	0, 1–255	0	**Disconnect Inactivity Timer:** Sets the length of time that the modem waits before disconnecting when no data is sent or received. A value of zero disables the timer. Applies to asynchronous operation only.
S36	decimal	0–7	7	**LAPM Failure Control:** Specifies the fallback action to take in the event of an LAPM negotiation failure. These fallback options are initiated immediately upon connection if S48 is set to 128. If an invalid number is entered, S36 acts as if the default value has been entered. (See S48.) 0 Modem disconnects. 1 Modem stays online and a direct mode connection is established. 3 Modem stays on-line; normal mode connection established. 4 MNP connection is attempted. If it fails, modem disconnects. 5 MNP connection is attempted. If it fails, a direct mode connection is established. 7 An MNP connection is attempted and if it fails, a normal modem connection is established.
S38	seconds	0–254, 255	20	**Delay Before Forced Hang Up:** Sets the delay between the modem's receipt of the H command to disconnect (or high-to-low transition of DTR if the modem is programmed to follow the signal) and the disconnect operation. Applies only to error-correction connections. This register can be used to ensure that data in the modem buffer is sent before the modem disconnects. If S38 is set between 0 and 254, the modem waits for the remote modem to acknowledge all data in the buffer before disconnecting. IfS38 is set to 255, the modem does not time out and continues to attempt to deliver data in the buffer until the connection is lost or the data is delivered.
S46	decimal	136, 138	138	**Data Compression Control:** Enables/disables data compression: 136 Error correction without compression.138 Error correction with compression.
S48	decimal	0, 7, 128	7	**V.42 Negotiation Control:** Enables or disables LAPM negotiation. An invalid value is treated as a 128 value. 0 Disables negotiation and proceeds with LAPM. 7 Enables negotiation. 128 Disables negotiation. Proceeds at once with the fallback action specified in S36. Can be used to force MNP.
S86	decimal	0, 3–23	n/a	**Call Failure Reason Code:** When the modem issues a NO CARRIER result code, a value is written to this register to help determine the reason for the failed connection. S86 records the first event that contributes to a NO CARRIER message. Use the S86? command to read the value. 0 Normal disconnect; no error occurred. 3 Call Waiting caused disconnect. 4 Physical loss of carrier. 5 No error correction at the other end. 6 No response to feature negotiation. 7 This modem is async-only, the other sync-only. 8 No framing technique in common. 9 No protocol in common. 10 Bad response to feature negotiation. 11 No sync information from remote modem. 12 Normal disconnect initiated by remote modem. 13 Remote modem doesn't respond after 10 retransmissions of the message. 14 Protocol violation. 15 DTR lost. 16 Received GSTN clear down. 17 Inactivity timeout. 18 Speed not supported. 19 Long space disconnect. 20 Key abort disconnect. 21 Clears previous disconnect reason. 22 No connection established. 23 Disconnect after three retrains. 24 Call Waiting tone detected. 25 Extension pickup detected. 26 Remote hang up detected.

S-Reg	Unit	Range	Default	Description
S95	decimal	0–255	0	**Extended Result Codes Control:** A bit set to a 1 in this register, in conjunction with the W command, enables the corresponding result code. The +MR, +ER, and +DR settings also control S95 bits 2, 3, and 5respectively. The more recent settings of +MR, +ER, and +DR, or host writing of S95 bits 2, 3, and 5, along with the W command setting, determine the corresponding actual result code reporting (see +MR, +ER,+DR, and W commands). Default: 0 Bit 0 CONNECT result code indicates DCE speed instead of DTE speed. Bit 1 Append /ARQ to CONNECT XXX result code in error-correction mode (XXXX=rate). Bit 2 Enable +MCR: XXXX result code (XXXX=modulation) and +MRR: XXXX result code (XXXX=rate). (Also see +MR). Bit 3 Enable +ER XXXX result code (XXXX=protocol identifier). Bit 5 Enable +DR XXXX result code (XXXX=compression type).

Chapter 7 – Result Codes

The modem responds to commands from the DTE and to activity on the line by signaling to the DTE in the form of result codes. The result codes that the modem can send are described below.

Two forms of each result code are available: long-form (verbose) response and a short-form (terse) response. The long-form code is preceded and terminated by the sequence < CR> < LF>.

The short-form is terminated by < CR>, only with no preceding sequence.

If result messages are suppressed, nothing is returned to the DTE. The long-form results codes can be modified by the OEM through the .INF file.

Terse	***Verbose***	***Description***
+F4	+FCERROR	High speed fax data (V.27, V.29, V.33, or V.17) is expected but a V.21 signal is received.
0	OK	Command executed.
1	CONNECT	Modem connected to the line. For X command values specifying no speed reporting, the modem has connected to the line and either the line speed is 300 bps and line speed is enabled, or the DTE speed is 300 bps and DTE speed reporting is enabled.
2	RING	Ring signal detected. An incoming ring signal is detected on the line. What qualifies as a ring signal is determined by country-dependent parameters.
3	NO CARRIER	Carrier signal lost/not detected. Sent when trying to establish a call if: 1. Ringback is detected and later ceases but no carrier is detected within the period of time determined by register S7, or 2. No ringback detected within the period of time determined by register S7. Also sent when the modem auto-disconnects due to loss of carrier. For X0, sent for the following conditions: 1. If busy tone detection is enforced, busy/circuit-busy has been detected. 2. If dial tone detection is enforced or selected, dial tone has not been detected.
4	ERROR	Invalid command. Sent during an attempt to execute a command line if any of the following conditions occur: 1. Command line contains a syntax error. 2. Modem cannot execute a command contained in the command line; i.e., the command does not exist or is not supported. 3. Command parameter within command line is outside permitted range. For X0, X1, X2, and X3, this message is sent instead of DELAYED and BLACKLISTED.
5	CONNECT	1200 Connected at 1200 bps. Modem connects to the line. Either the line speed is 1200 bps and DCE speed reporting is enabled, or DTE speed is 1200 bps and DTE speed reporting is enabled.
6	NO DIAL TONE	No dial tone detected. For X2 and X4, the modem has been instructed to wait for dial tone during dialing but none is received.
7	BUSY	Busy signal detected. For X3 and X4, if busy tone detection is enforced, the busy (engaged) signal is detected on the line when the modem is attempting to originate a call.
8	NO ANSWER	No answer at remote end. Modem is trying to originate a call if a continuous ringback signal detected on line until the expiration of timer S7.
9	CONNECT 600	Connected at 600 bps; speed reporting enabled. Modem connects to the line, the DTE speed is 600 bps, and speed reporting is enabled.
10	CONNECT 2400	Connected at 2400 bps; speed reporting enabled. Modem connects to the line; either the line speed is 2400 bps with speed reporting enabled, or the DTE speed is 2400 bps and the DTE speed reporting is enabled.
11	CONNECT 4800	Connected at 4800 bps and speed reporting enabled. Modem connects to the line; either the line speed is 4800 bps with DCE speed reporting enabled, or the DTE speed is 4800 bps and the DTE speed reporting is enabled.
12	CONNECT 9600	Connected at 9600 bps and speed reporting enabled. Modem connects to the line; either the line speed is 9600 bps with DCE speed reporting enabled, or the DTE speed is 9600 bps and the DTE speed reporting is enabled.

Terse	***Verbose***	***Description***
13	CONNECT 7200	Connected at 7200 bps and speed reporting enabled. Modem connects to the line at7200 bps and DCE speed reporting enabled.
14	CONNECT 12000	Connected at 12000 bps and speed reporting enabled. Modem connects to the line at 12000 bps and DCE speed reporting enabled.
15	CONNECT 14400	Connected at 14400 bps and speed reporting enabled. Modem connects to the line at 14400 bps and DCE speed reporting enabled.
16	CONNECT 19200	Connected at 19200 bps and speed reporting enabled. Modem connects to the line; either line speed is 19200 bps with DCE speed reporting enabled, or DTE speed is19200 bps and DTE speed reporting is enabled.
17	CONNECT 38400	Connected at 38400 bps and speed reporting enabled. Modem has connected to the line, DTE speed is 38400 bps, and DTE speed reporting is enabled.18 CONNECT 57600 Connected at 57600 bps and speed reporting enabled. Modem is connected to the line, DTE speed is 57600 bps, and DTE speed reporting is enabled.19 CONNECT 115200 Connected at 115200 bps and speed reporting enabled. Modem connects to the line, DTE speed is 115200 bps, DTE speed reporting is enabled.20 CONNECT 230400 Connected at 230400 bps and speed reporting enabled. Modem has connected to the line, DTE speed is 230400 bps, and DTE speed reporting is enabled.22 CONNECT V.23 connection and line speed reporting enabled. Modem has established 75TX/1200RX a V.23 originate connection and line speed reporting is enabled.23 CONNECT V.23 connection and line speed reporting enabled. Modem has established 1200TX/75RX a V.23 answer connection and line speed reporting is enabled.24 DELAYED Delay is in effect for the dialed number. For X4, sent when a call fails to connect and the number dialed is considered ‘delayed’ due to country blacklisting requirements.32 BLACKLISTED Dialed number is blacklisted. For X4, sent when a call fails to connect and the number dialed is considered ‘blacklisted’.
33	FAX	Connected in fax mode. Modem connection is established in a facsimile mode.
35	DATA	Connected in data mode. Modem connection is established in a data mode.
40	+MRR: 300	Connected at 300 bps and carrier reporting enabled. Modem connects to the line at 300 bps and carrier reporting is enabled. (See S95 and Xn.)
44	+MRR: 1200/75	V.23 backward channel. V.23 backward channel carrier is detected; carrier reporting is enabled. (See S95, Xn.)45 +MRR: 75/1200 V.23 forward channel. V.23 forward channel carrier is detected; carrier reporting is enabled. (See S95, Xn.)46 +MRR: 1200 Connected at 1200 bps and carrier reporting enabled. Modem connects to the line at1200 bps and carrier reporting is enabled. (See S95, Xn.)47 +MRR: 2400 Connected at 2400 bps and carrier reporting enabled. Modem connects to the line at2400 bps and carrier reporting is enabled. (See S95, Xn.)48 +MRR: 4800 Connected at 4800 bps and carrier reporting enabled. Modem connects to the line at4800 bps and carrier reporting is enabled. (See S95, Xn.)49 +MRR: 7200 Connected at 7200 bps and carrier reporting enabled. Modem connects to the line at7200 bps and carrier reporting is enabled. (See S95, Xn.)50 +MRR: 9600 Connected at 9600 bps and carrier reporting enabled. Modem connects to the line at9600 bps and carrier reporting is enabled. (See S95, Xn.)5 +MRR: 12000 Connected at 12000 bps and carrier reporting enabled. Modem connects to the lineat12000 bps; carrier reporting is enabled. (See S95, Xn.)5 +MRR: 14400 Connected at 14400 bps and carrier reporting enabled. Modem connects to the line at 14400 bps; carrier reporting is enabled. (See S95, Xn.)5 +MRR: 16800 Connected at 16800 bps and carrier reporting enabled. Modem connects to the line at 16800 bps; carrier reporting is enabled. (See S95, Xn.)5 +MRR: 19200 Connected at 19200 bps and carrier reporting enabled. Modem connects to the line at 19200 bps; carrier reporting is enabled. (See S95, Xn.)5 +MRR: 21600 Connected at 21600 bps and carrier reporting enabled. Modem connects to the line at 21600 bps; carrier reporting is enabled. (See S95, Xn.)5 +MRR: 24000 Connected at 24000 bps and carrier reporting enabled. Modem connects to the line at 24000 bps; carrier reporting is enabled. (See S95, Xn.)5 +MRR: 26400 Connected at 26400 bps and carrier reporting enabled. Modem connects to the line at 26400 bps; carrier reporting is enabled. (See S95, Xn.)5 +MRR: 28800 Connected at 28800 bps and carrier reporting enabled. Modem connects to the line at 28800 bps; carrier reporting is enabled. (See S95, Xn.)5 CONNECT 16800 Connected at 16800 bps and DTE speed reporting enabled. Modem connects to the line, the DTE speed is16800 bps and DTE speed reporting is enabled.
61	CONNECT 21600	Connected at 21600 bps and DTE speed reporting enabled. Modem connects to the line, the DTE speed is 21600 bps and DTE speed reporting is enabled.
62	CONNECT 24000	Connected at 24000 bps and DTE speed reporting enabled. Modem connects to the line, the DTE speed is 24000 bps and DTE speed reporting is enabled.
63	CONNECT 26400	Connected at 26400 bps and DTE speed reporting enabled. Modem connects to the line, the DTE speed is 26400 bps and DTE speed reporting is enabled.

Terse	***Verbose***	***Description***
64	CONNECT 28800	Connected at 28800 bps and line speed reporting enabled. Modem connects to the line; either the line speed is 28800 bps and DCE speed reporting is enabled, or the DTE speed is 28800 bps and DTE speed reporting is enabled.
66	+DR: ALT	Connected in MNP Class 5 data compression. Modem connects to the line in MNP Class 5 and +DR: message reporting is enabled. (See S95, Wn, Xn.)
67	+DR: V.42B	Connected in V.42 bis data compression. Modem connects to the line in V.42 bis and 120 +DR: message reporting is enabled. (See S95, Wn, Xn.)
69	+DR: NONE	Connected without data compression. Modem connects to the line without data compression and +DR: message reporting is enabled. (See S95, Wn, Xn.)
70	+ER: NONE	Connected without any protocol. Modem connects to the line without any form of error correction and +ER: message reporting is enabled. (See S95, Wn, Xn.)
77	+ER: LAPM	Connected in V.42 LAPM mode. Modem connects to the line in V.42 LAPM error correction mode. +ER: message reporting is enabled. (See S95, Wn, Xn.)
78	+MRR: 31200	Connected at 31200 bps; carrier reporting enabled. Modem connects to the line at31200 bps and carrier reporting is enabled. (See S95, Xn.)
79	+MRR: 33600	Connected at 33600 bps; carrier reporting enabled. Modem connects to the line at33600 bps and carrier reporting is enabled. (See S95, Xn.)
80	+ER: ALT	Connected in MNP mode. Sent when the modem connects in MNP mode of error correction. +ER: message reporting has been enabled. (See S95, Wn, Xn.)
83	LINE-IN-USE	Line in use. Modem attempted to go off-hook when an extension was already occupying the line.
84	CONNECT 33600	Connected at 33600 bps. Modem connects to the line, the DTE speed is 33600 bps and the DTE speed reporting is enabled.
91	CONNECT 31200	Connected at 31200 bps. Modem connects to the line DTE speed of 31200 bps and the modem is to report the DTE speed upon connecting.
134	+MCR: B103	Connected with Bell 103 modulation. Modem connects to the line with Bell 103 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
135	+MCR: B212	Connected with Bell 212 modulation. Modem connects to the line with Bell 212 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
136	+MCR: V21	Connected with ITU-T V.21. Modem connects to the line with ITU-T V.21 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
137	+MCR: V22	Connected with ITU-T V.22. Modem connects to the line with ITU-T V.22 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
138	+MCR: V22B	Connected with ITU-T V.22B. Modem connects to the line with ITU-T V.22B modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
139	+MCR: V23	Connected with ITU-T V.23. Modem connects to the line with ITU-T V.23 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
140	+MCR: V32	Connected with ITU-T V.32. Modem connects to the line with ITU-T V.32 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
141	+MCR: V32B	Connected with ITU-T V.32B. Modem connects to the line with ITU-T V.32B modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
142	+MCR: V34	Connected with ITU-T V.34. Modem connects to the line with ITU-T V.34 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
145	+MCR: V90	Connected with ITU-T V.90. Modem connects to the line with ITU-T V.90 modulation and modulation reporting is enabled. (See +MR, S95, Xn.)
150	+MRR: 32000	Connected at 32000 bps. Modem connects to the line at 32000 bps and carrier reporting is enabled. (See S95, Xn.)
151	+MRR: 34000	Connected at 34000 bps. Modem connects to the line at 34000 bps and carrier reporting is enabled. (See S95, Xn.)
152	+MRR: 36000	Connected at 36000 bps. Modem connects to the line at 36000 bps and carrier reporting is enabled. (See S95, Xn.)
153	+MRR: 38000	Connected at 38000 bps. Modem connects to the line at 38000 bps and carrier reporting is enabled. (See S95, Xn.)
154	+MRR: 40000	Connected at 40000 bps. Modem connects to the line at 40000 bps and carrier reporting is enabled. (See S95, Xn.)
155	+MRR: 42000	Connected at 42000 bps. Modem connects to the line at 42000 bps and carrier reporting is enabled. (See S95, Xn.)
156	+MRR: 44000	Connected at 44000 bps. Modem connects to the line at 44000 bps and carrier reporting is enabled. (See S95, Xn.)
157	+MRR: 46000	Connected at 46000 bps. Modem connects to the line at 46000 bps and carrier reporting is enabled. (See S95, Xn.)
158	+MRR: 48000	Connected at 48000 bps. Modem connects to the line at 48000 bps and carrier reporting is enabled. (See S95, Xn.)
159	+MRR: 50000	Connected at 50000 bps. Modem connects to the line at 50000 bps and carrier reporting is enabled. (See S95, Xn.)

Terse	***Verbose***	***Description***
160	+MRR: 52000	Connected at 52000 bps. Modem connects to the line at 52000 bps and carrier reporting is enabled. (See S95, Xn.)
161	+MRR: 54000	Connected at 54000 bps. Modem connects to the line at 54000 bps and carrier reporting is enabled. (See S95, Xn.)
162	+MRR: 56000	Connected at 56000 bps. Modem connects to the line at 56000 bps and carrier reporting is enabled. (See S95, Xn.)
165	CONNECT 32000	Connected at 32000 bps. Modem connects to the line at 32000 bps and DCE speed reporting is enabled.
166	CONNECT 34000	Connected at 34000 bps. Modem connects to the line at 34000 bps and DCE speed reporting is enabled.
167	CONNECT 36000	Connected at 36000 bps. Modem connects to the line at 36000 bps and DCE speed reporting is enabled.
168	CONNECT 38000	Connected at 38000 bps. Modem connects to the line at 38000 bps and DCE speed reporting is enabled.
169	CONNECT 40000	Connected at 40000 bps. Modem connects to the line at 40000 bps and DCE speed reporting is enabled.
170	CONNECT 42000	Connected at 42000 bps. Modem connects to the line at 42000 bps and DCE speed reporting is enabled.
171	CONNECT 44000	Connected at 44000 bps. Modem connects to the line at 44000 bps and DCE speed reporting is enabled.
172	CONNECT 46000	Connected at 46000 bps. Modem connects to the line at 46000 bps and DCE speed reporting is enabled.
173	CONNECT 48000	Connected at 48000 bps. Modem connects to the line at 48000 bps and DCE speed reporting is enabled.
174	CONNECT 50000	Connected at 50000 bps. Modem connects to the line at 50000 bps and DCE speed reporting is enabled.
175	CONNECT 52000	Connected at 52000 bps. Modem connects to the line at 52000 bps and DCE speed reporting is enabled.
176	CONNECT 54000	Connected at 54000 bps. Modem connects to the line at 54000 bps and DCE speed reporting is enabled.
177	CONNECT 56000	Connected at 56000 bps. Modem connects to the line at 56000 bps and DCE speed reporting is enabled.
178	CONNECT 230400	Connected at 230400 bps. Modem connects to the line; the DTE speed is 230400 bps, and DTE SPEED reporting is enabled.
180	CONNECT 28000	Connected at 28000 bps. Modem connects to the line at 28000 and DCE speed reporting is enabled.
181	CONNECT 29333	Connected at 29333 bps. Modem connects to the line at 29333 and DCE speed reporting is enabled.
182	CONNECT 30667	Connected at 30667 bps. Modem connects to the line at 30667 bps and DCE speed reporting is enabled.
183	CONNECT 33333	Connected at 48000 bps. Modem connects to the line at 33333 bps and DCE speed reporting is enabled.
184	CONNECT 34667	Connected at 34667 bps. Modem connects to the line at 34667 bps and DCE speed reporting is enabled.
185	CONNECT 37333	Connected at 37333 bps. Modem connects to the line at 37333 bps and DCE speed reporting is enabled.
186	CONNECT 38667	Connected at 38667 bps. Modem connects to the line at 38667 bps and DCE speed reporting is enabled.
187	CONNECT 41333	Connected at 41333 bps. Modem connects to the line at 41333 bps and DCE speed reporting is enabled.
188	CONNECT 42667	Connected at 42667 bps. Modem connects to the line at 42667 bps and DCE speed reporting is enabled.
189	CONNECT 45333	Connected at 45333 bps. Modem connects to the line at 45333 bps and DCE speed reporting is enabled.
190	CONNECT 46667	Connected at 46667 bps. Modem connects to the line at 46667 bps and DCE speed reporting is enabled.
191	CONNECT 49333	Connected at 49333 bps. Modem connects to the line at 49333 bps and DCE speed reporting is enabled.
192	CONNECT 50667	Connected at 50667 bps. Modem connects to the line at 50667 bps and DCE speed reporting is enabled.
193	CONNECT 53333	Connected at 53333 bps. Modem connects to the line at 53333 bps and DCE speed reporting is enabled.
194	CONNECT 54667	Connected at 54667 bps. Modem connects to the line at 54667 bps and DCE speed reporting is enabled.
195	+MRR: 28000	Connected at 28000 bps. Modem connects to the line at 28000 bps and carrier reporting is enabled. (See S95, Xn)

Terse	***Verbose***	***Description***
196	+MRR: 29333	Connected at 29333 bps. Modem connects to the line at 29333 bps and carrier reporting is enabled. (See S95, Xn)
197	+MRR: 30667	Connected at 30667 bps. Modem connects to the line at 30667 bps and carrier reporting is enabled. ((See S95, Xn)
198	+MRR: 33333	Connected at 33333 bps. Modem connects to the line at 33333 bps and carrier reporting is enabled. (See S95, Xn)
199	+MRR: 34667	Connected at 34667 bps. Modem connects to the line at 34667 bps and carrier reporting is enabled. (See S95, Xn)
200	+MRR: 37333	Connected at 37333 bps. Modem connects to the line at 37333 bps and carrier reporting is enabled. (See S95, Xn)
201	+MRR: 38667	Connected at 38667 bps. Modem connects to the line at 38667 bps and carrier reporting is enabled. (See S95, Xn)
202	+MRR: 41333	Connected at 41333 bps. Modem connects to the line at 41333 bps and carrier reporting is enabled. (See S95, Xn)
203	+MRR: 42667	Connected at 42667 bps. Modem connects to the line at 42667 bps and carrier reporting is enabled. (See S95, Xn)
204	+MRR: 45333	Connected at 45333 bps. Modem connects to the line at 45333 bps and carrier reporting is enabled. (See S95, Xn)
205	+MRR: 46667	Connected at 46667 bps. Modem connects to the line at 46667 bps and carrier reporting is enabled. (See S95, Xn)
206	+MRR: 49333	Connected at 49333 bps. Modem connects to the line at 49333 bps and carrier reporting is enabled. (See S95, Xn)
207	+MRR: 50667	Connected at 50667 bps. Modem connects to the line at 50667 bps and carrier reporting is enabled. (See S95, Xn)
208	+MRR: 53333	Connected at 53333 bps. Modem connects to the line at 53333 bps and carrier reporting is enabled. (See S95, Xn)
209	+MRR: 54667	Connected at 54667 bps. The modem has connected to the line at 54667 bps and carrier reporting is enabled. (See S95, Xn)

Notes:

1. See **V*n*** for result code selection; i.e., short form (result code) or verbose/extended (result message).
2. See **W*n*** for extended connect message control.
3. See **S95** for extended result code enabling options (which override some **W*n*** commands).
4. See **X*n*** for extended result code subset enabling options.
5. See **\V*n*** for single line connect message enable options.
6. See **+MR** for modulation reporting control.

Chapter 8 – Setting Country/Regional Codes

The Default Country/Regional Code is B5.

If You Want to Change the Country/Regional Code

1. View the List of Available Country/Regional Codes by executing the command **AT+GCI=?<CR>**
2. Set and save the code by executing the command **AT+GCI=*nn*<CR>**
   Note: ***nn*** is the country/regional code. See the country/regional code list on the Multi-Tech Web site
3. **OK** is displayed.
4. The country code is then displayed (see the example below).

To Verify the Country Code

1. Type **AT+GCI?<CR>**, or you can type **ATI5<CR>**

Example

1. Type the command **AT+GCI=B5<CR>**
2. Verify **B5** was set by typing **AT+GCI?<CR>** or **ATI5<CR>**
3. **B5** indicates the configuration is set for any **B5** country such as **Canada** or the **United States**, etc.

Countries/Regions Supported

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

Go to:

http://www.multitech.com/PRODUCTS/Info/approvals

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

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