AT Commands, Voice Commands S-Registers, and Result Codes

MT5656ZDX Series
MT5600ZDX Series
MT5600BA/BL Series

Reference Guide

MultiTech® Systems

AT Commands, S-Registers, and Result Codes
Reference Guide
MT5656ZDX, MT5656ZDX–V, MT5600ZDX, MT5600ZDX–V, MT5600BA–V.92, MT5600BA–V.90, MT5600BL–V.90
P/N S000273D Revision D

Record of Revisions

Revision	*Date*	*Description*
A	10/04/02	Initial release.
B	02/20/03	Changed the V.92 Distinctive Ring Control to +VDR. Edited the Escape Sequence text. Added +VRID to Caller ID. Edited the +FCLASS= command. Added MT5600BA/BL–V.90 commands.
C	10/09/03	Added Voice Commands. Enhanced the descriptions of the following commands: escape, initiate remote configuration, +FCLASS. Removed #CBA and #CBD, which are not supported. Add MT5600ZDX to cover.
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.

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AT Commands 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 *AT*tention 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 hang-up command by typing ATH <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 the Phone Tools, 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, by typing them in the terminal window of the communications program, or indirectly, by configuring the operating system or communications program to send the commands automatically. Fortunately, communications programs make daily operation of modems effortless by hiding the commands from the user. Most users, therefore, need to use AT commands only when reconfiguring the modem, e.g., to turn autoanswer on or off.

The format for entering an AT command is **AT*Xn***, 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. The default values are shown in the "AT Commands" section, which begins on the next page.

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 the *CONNECT* messages that the modem sends to the computer when it is connecting to another modem. 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.

Note about the LED graphics.

The graphics are labeled MT5600BA. This stands for the MT5600BA-Series and includes the MT5600BA and the MT5600BL.

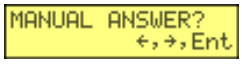
AT Commands Detail

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: n/a
Description: Press the ENTER or RETURN key to execute most commands.

Command: A Answer
Values: n/a
Description: Answers an incoming call before the final ring.

MT5600BA LCD:

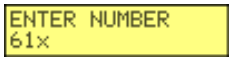


Command: A/ Repeat Last Command
Values: n/a
Description: Repeats the last command string. Do not precede this command with **AT**. Do not press ENTER to execute.

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.

MT5600BA LCD:

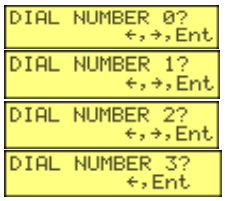


0–9 Digits 0 through 9
***** The “star” digit (tone dialing only)
# The “pound” digit (tone dialing only)
A–D A, B, C, and D tone digits. Country specific; some countries may prohibit these digits.
L Redial last number. (Must be placed immediately after **ATD**.)
P Select pulse-dialing until a **T** is encountered. Affects current and subsequent dialing.
T Select tone-dialing until a **P** is encountered. Affects current and 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 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 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 call card number, e.g., **ATDT10288061278535 00&123456789**.

Command: DS=*n* Dial Stored Telephone Number

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

MT5600BA LCD:



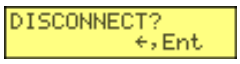
Command: E*n* Echo Command Mode Characters

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

Command: H*n* Hook Control

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

MT5600BA LCD:



Command: I*n* Information Request

Values: *n* = 0–6
Default: None
Description:
I0 Display the product code. Example: *MT5600BA-V92*.
I1 Calculate the ROM checksum and display the least significant byte in decimal format.
I2 Calculate the ROM checksum and compare it to the prestored checksum, displaying *OK* if they match, or *ERROR* if they do not.
I3 Display the firmware version and application codes.
I4 Display the OEM-defined identifier string in either binary or ASCII format.
I5 Display the country code. Example: *098*.
I6 Display the modem data pump model and internal code version.

Command: L Not applicable.

Command: L5 Lists Current Operating Parameters (MT5600BA/BL only)

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.

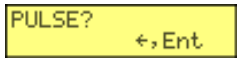
Command: O*n* Return Online to Data Mode

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.

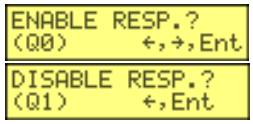
MT5600BA LCD:



Command: Q*n* Result Codes Enable/Disable

Values: *n* = 0 or 1
Default: 0
Description:
- Q0 Enable result codes.
- Q1 Disable result codes

MT5600BA LCD:



Command: S*r* Select Register

Values: *r* = 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* = 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.

MT5600BA LCD:

Command: S*r*? Read Register Value

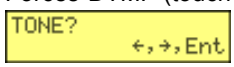
Values: *r* = S-register number
Default: None
Description: Reads value of register S*r* and display it in 3-digit decimal format. E.g., **S2?** gives the response *043*. If the short form **AT?** is used, the last accessed S-register is read.

MT5600BA LCD:

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.

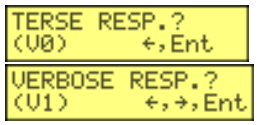
MT5600BA LCD:



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)

MT5600BA LCD:



Command: W*n* Connect Message Control

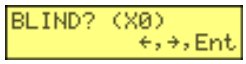
Values: *n* = 0, 1, or 2
Default: 0
Description:
W0 The *CONNECT* result code reports the serial port speed only.
W1 The *CONNECT* result code reports the line speed, the error correction protocol, and the serial port speed, respectively.
W2 The *CONNECT* result code reports the line speed only.

Note: See also the ***\V*** command

Command: X*n* Result Code Selection

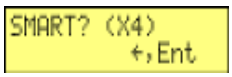
Values: *n* = 0–4
Default: Country Dependent
Description: This command selects which result message subset the modem will use to inform the computer of the results of commands.
X0 Sends *OK, CONNECT, RING, NO CARRIER, ERROR* and *NO ANSWER*; does not look for dial tone or busy signal.

MT5600BA LCD:



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*.

5600BA LCD:



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

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

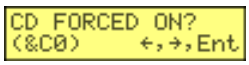
Values: *n* = 0 or 1 (all models) 0, 1, 2, 3, 4, 5, 6, 7 (MT5600BA only)

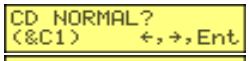
Default: 1, 3, 4

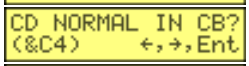
Description:

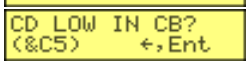
- &C0 Turns off reset on loss of carrier (all models).
- &C1 A second way to turn off reset on loss of carrier (all models).
- &C2 DCD goes high 500ms after CONNECT message is generated.
- &C3 DCD goes high when the CONNECT message is generated.
- &C4 Disables **&C5** and **&C6** command.
- &C5 UNIX 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 (MT5600BA only).
- &C6 Linux only: Wait to display the connect message until the proper callback security password is entered.
- &C7 Reset on loss of DCD.

MT5600BA LCD:









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

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

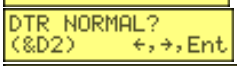
Default: 2

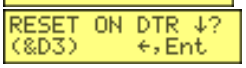
Description: This command interprets the high to low transition of the DTR signal sent by the computer according to the supplied parameter. The action taken depends on the current **&Q** setting.

- &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.

MT5600BA LCD:





Command: &E*n* V.42 Error Correction Modes (MT5600BA V.92 only)

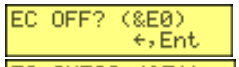
Values: *n* = 0, 1, or 2

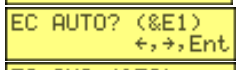
Default: 1

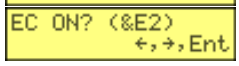
Description:

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

MT5600BA LCD:



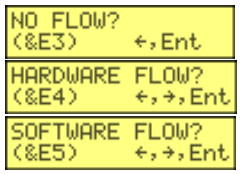




Command: &E*n* Modem-Initiated Flow Control (MT5600BA V.92 only)

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.

MT5600BA LCD:



Note: See also the ***L5*** and ***&K*** commands.

Command: &E*n* V.42bis Data Compression (MT5600BA V.92 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 Load factory configuration 0.
&F1 Load factory configuration 1.
Note: See also the **Z**, **L5**, and **&V** commands.

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

Values: *n* = 0, 1, or 2
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, or 6
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 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
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

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.
Note: MT5600ZDX does not support synchronous mode.

&Q3 Selects synchronous connect mode with asynchronous offline command mode; enables DTR to act as a talk/data switch. See **&M3**. Serial only.
Note: MT5600ZDX does not support synchronous mode.

&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

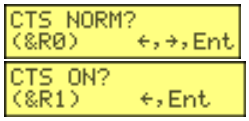
Values: *n* = 0 or 1
Default: 1
Description:

&R0 Let the CTS state follow the RTS state when online..

&R1 Force CTS high (ON).

Note: This command applies only in synchronous mode.

MT5600BA LCD:



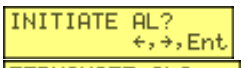
Command: &S*n* Data Set Ready (DSR) Control

Values: *n* = 0 or 1
Default: 0
Description:
&S0 Force DSR high (on) at all times.
&S1 Let 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. (See the MT5600BA/BL V.90 Section for more options).
&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.

MT5600BA LCD:



Not supported in MT5600BA V.92

Not supported in MT5600BA V.92

Not supported in MT5600BA V.92

Not supported in MT5600BA V.92

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 (MT5600BA 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.

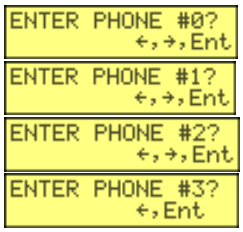
Command: &Y*n* Select Profile for Hard Reset

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

Values: *n* = 0–3 (with callback security disabled - MT5600BA/BL only) 0-29 (with callback security enabled - MT5600BA/BL only)
x = Stored telephone number
Default: None
Description: Stores telephone dial string *x* in memory location. Dial the stored number using the **ATDS=n** command.
Note: See also the #CBS*n* command. For callback security options, see Chapter 6.

MT5600BA LCD:



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 Disable line quality monitor and auto-retrain.
%E1 Enable line quality monitor and auto-retrain.
%E2 Enable line quality monitor and fallback/fall forward.

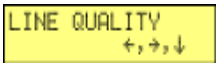
Command: %L Line Signal Level

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**.

MT5600BA LCD:



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

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

Command: \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: The **-K1** command can override the **\N4** command.
\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 messages in the format: *CONNECT <Serial Port Speed></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 for CONNECT.

Command: +FCLASS= Display 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
10 = Reserved
V.90 Choices: 0, 1, 8, 10. **V.92 Choices:** 0, 1, 2, 8, 10

Command: +MS= Modulation Selection

Values: See description.
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. (See the MT5600BA/BL–V.90 Section for V.90 description of this command.)
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.
+MS? Reports current options in the format *mod*,*automode*,*min_RX_rate*,*max_RX_rate*,*x_law*,*reserved*,*max_TX_rate.* Example: 56,1,300,56000,0,0,33600.
+MS=? Reports supported options in the format (list of supported *mod* values),(list of supported *automode* values),(list of supported *min_RX_rate* values),(list of supported *max_RX_rate* values), (list of supported *x_law* values), (list of supported *reserved* values),(list of supported *max_TX_rate* values). Example: (0,1,2,3,9,10,11,12,56,64,69),(0,1),(300-33600),(300-56000),(0,1),(0,1),(300-33600).

+MS= Modulation Selection Continued

Subparameters

mod A decimal number that specifies the preferred modulation (automode enabled) or the modulation to use in originating or answering a connection (automode 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	56000, 54667, 53333, 52000, 50667, 49333, 48000, 46667, 45333, 44000, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000, 30667, 29333, 28000
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. For example, modem models supporting V92 may not support K56.

automode An optional numeric value that enables or disables automatic modulation negotiation using V.8 bis/V.8 or V.32 bis Annex A. The options are:

0 = Disable automode

1 = Enable automode (default)

<min_rx_rate> and <max_rx_rate>

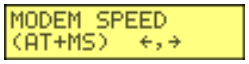
Numeric values which specify the lowest (<min_rx_rate>) and highest (<max_rx_rate>) rate at which the modem may establish a receive connection. May be used to condition distinct limits for the receive direction as distinct from the transmit direction. Values for this subparameter are decimal encoded, 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.)

MT5600BA LCD:



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: +VDR=x,y Distinctive Ring Report

Values: x = 0, 1 Distinctive Ring report control. See description.
(See the MT5600BA/BL–V.90 Section for the V.90 equivalent of this command).
y = 0–255 Minimum ring interval in 100 ms units. See description.

Default: 0

Description: Enables reporting of ring cadence information to the DTE and specifies the minimum ring cadence that will be reported.
The report format is one line per silence period and one line per ring period. The length of the silence period is in the form *DROF=number in units of 100 ms<CR><LF>*, and the length of the ring is in the form *DRON=number in units of 100 ms<CR> <LF>*.
The modem may produce a Ring event code after the DRON message if enabled by the *y* parameter. The *y* parameter must be set to a value equal to or smaller than the expected ring cadence in order to pass the report to the DTE.

+VDR=0, n/a	Disables Distinctive Ring cadence reporting.
+VDR=1, 0	Enables Distinctive Ring cadence reporting. Other call progress result codes (including RING) are reported as normal.
+VDR=1, >0	Enables Distinctive Ring cadence reporting. The RING result code is reported after the falling edge of the ring pulse (i.e., after the DRON report).
+VDR=?	Displays the allowed values.
+VDR?	Displays the currrent value.

Command: ** Flash Memory Download

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

Description:
**0 Initiate download to flash memory at the last sensed speed.
**1 Initiate download to flash memory at 38.4K bps.
**2 Initiate 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: $SB*n* Serial Port Baud Rate (not supported by the MT5600ZDX)

Values: *n* = speed in bits per second

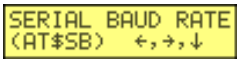
Default: 57600

Description:

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

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

MT5600BA LCD:



Escape Commands

Command: +++ Escape Sequence.

Type +++ and wait for OK response. Then issue the hang-up command by typing ATH <CR>. (<CR> indicates that you must click Enter).

Values: n/a

Description: Puts the modem in online command mode.

Command: * * *

Initiates Remote Configuration Sequence (Remote Configuration is not supported in MT5600ZDX)

***E** **Escape Remote Configure Sequence** (Remote Configuration is not supported in MT5600ZDX)

Values: n/a

Description: *** * *** Initiates remote configuration mode while online with remote modem. The remote modem configuration escape command (***E**) is defined in Register S13.

V.92 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 value

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 currrent value

Command: +PMH=*n* Modem on Hold Enable

Values: *n* = 0 or 1

Default: 1

Description: Controls if modem on hold procedures are enabled during V.92 operation. Normally controlled by a modem on hold program. Values specified by this command are not modified when an **AT&F** command is issued.

+PMH=0	Enables V.92 modem on hold
+PMH=1	Disables V.92 modem on hold
+PMH=?	Displays the allowed values
+PMH?	Displays the currrent value

Command: +PMHF V.92 Modem Hook Flash

Values: n/a
Default: n/a
Description: Causes the DCE to go on-hook for a specified period of time, and then return off-hook for at least a specified period of time. The specified period of time is normally one-half second, but may be governed by national regulations. “ERROR” is returned if MOH is not enabled.

Command: +PMHR=*n* Modem on Hold Initiate

Values: *n* = 0–13
Default: 0
Description: **+PMHR** is an action command that causes the modem to initiate MOH with the central site modem. It returns the following values to indicate what has been negotiated. Valid only if MOH is enabled and the modem is off-hook or in data mode. Otherwise, *ERROR* will be returned.

+PMHR=0	Deny MOH request
+PMHR=1	Grant MOH request with 10 second timeout
+PMHR=2	Grant MOH request with 20 second timeout
+PMHR=3	Grant MOH request with 30 second timeout
+PMHR=4	Grant MOH request with 40 second timeout
+PMHR=5	Grant MOH request with 1 minute timeout
+PMHR=6	Grant MOH request with 2 minute timeout
+PMHR=7	Grant MOH request with 3 minute timeout
+PMHR=8	Grant MOH request with 4 minute timeout
+PMHR=9	Grant MOH request with 6 minute timeout
+PMHR=10	Grant MOH request with 8 minute timeout
+PMHR=11	Grant MOH request with 12 minute timeout
+PMHR=12	Grant MOH request with 16 minute timeout
+PMHR=13	Grant MOH request with indefinite timeout
+PMHR=?	Displays the allowed values
+PMHR?	Displays the currrent value

Command: +PMHT=*n* Modem on Hold Timer

Values: *n* = 0–13
Default: 0
Description: Determines if the modem will accept a V.92 Modem on Hold (MOH) request and will set the MoH timeout.

+PMHT=0	Deny MOH request
+PMHT=1	Grant MOH request with 10 second timeout
+PMHT=2	Grant MOH request with 20 second timeout
+PMHT=3	Grant MOH request with 30 second timeout
+PMHT=4	Grant MOH request with 40 second timeout
+PMHT=5	Grant MOH request with 1 minute timeout
+PMHT=6	Grant MOH request with 2 minute timeout
+PMHT=7	Grant MOH request with 3 minute timeout
+PMHT=8	Grant MOH request with 4 minute timeout
+PMHT=9	Grant MOH request with 6 minute timeout
+PMHT=10	Grant MOH request with 8 minute timeout
+PMHT=11	Grant MOH request with 12 minute timeout
+PMHT=12	Grant MOH request with 16 minute timeout
+PMHT=13	Grant MOH request with indefinite timeout
+PMHT=?	Displays the allowed values
+PMHT?	Displays the currrent value

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 fluctuation 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 currrent value

Caller ID Commands (V.92)

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.

See the MT5600BA/BL–V.90 Section for the V.90 Caller ID Selection command.

+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 currrent value

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 (V.92)

Note: Callback Security not supported in MT5600ZDX or MT5656ZDX.

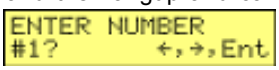
Command: #CBN*n*=[-]*x* Store Callback Number

Values: *n* = 01–30
x = dialing string

Default: None

Description: Stores the callback dialing string *x* in 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, and the hangup and callback are skipped.

MT5600BA LCD:



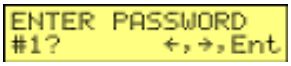
Command: #CBP*n*=*x* Store Callback Password

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=gilgamesh**.
Note: A direct connect password may not end with a hyphen (-).

MT5600BA LCD:



Command: #DB*n* Callback Enable/Disable

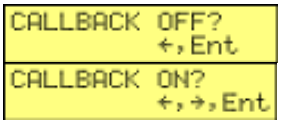
Values: *n* = 0 or 1

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.

MT5600BA LCD:



Other V.92 Commands

These are V.92 commands even though they are not formally a part of the V.92 protocol set of commands.

Command: +A8I CI Signal Indication

Values: 0
Default: None
Description: This indication is issued by an answering modem to indicate detection of a V.8 CI signal and report the recovered Call Function octet(s).

Command: +DR Data Compression Reporting

Defined Values: 0, 1
0 Data compression reporting disabled (no +DR result code transmitted).
1 Data compression reporting enabled (+DR result code transmitted). (Default.)
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).
Reporting Current or Selected Values:
Command: +DR?
Response: +DR: <current value>
Example: +DR: 1 For the default setting.
Reporting Supported Range of Parameter Values:
Command: +DR=?
Response: +DR: (<value> range)
Example: +DR: (0,1)
+DR: <type> Intermediate Result Code:
+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).

Command: +DS Data Compression

Defined Values: <direction> Specifies the desired direction(s) of operation of the data compression function; from the DTE point of view.
0 Negotiated; no compression (V.42bis P0=0).
3 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.
0 Do not disconnect if V.42bis is not negotiated by the remote modem as specified in <direction>.
<max_dict> Specifies the maximum number of dictionary entries (2048 entries) that should be negotiated (may be used by the DTE to limit the codeword size transmitted, based on its knowledge of the nature 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>]]]]
Reporting Current or Selected Values:
Command: +DS?
Response: +DS: <direction>,<compr_neg>,<max_dict>,<max_string>
Example: +DS: 3,0,2048,32 for the defaults and 2048 entry max dictionary.
Reporting Supported Range of Parameter Values:
Command: +DS=?
Response: +DS: (<direction> range),(< compr_neg > range),(<max_dict> range),(<max_string> range)
Example: +DS: (0,3),(0),(2048),(32)

Command: +DS44 V.44 Compression Select

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

Defined Values: <direction> 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> 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> 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> Decimal number from 256 to 2048 that specifies the maximum number of codewords which should be negotiated in the transmit direction. (Default = 2048.)

<max_codewords_rx> Decimal number from 256 to 2048 that specifies the maximum number of codewords which should be negotiated in the receive direction. (Default = 2048.)

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

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:

Syntax: +EB=[<break_selection>[,<timed>[,<default_length>]]]

Defined Values: <break_seleIction> 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.

Reporting Current or Selected Values:

Command: +EB?
Response: +EB: <break_selection>,<timed>,<default_length><CR>
Example: +EB: 0,0,0 For default settings.

Reporting Supported Range of Parameter Values:

Command: +EB=?
Response: +EB: (<break_selection> range),(<timed> range), (default_length> range)
Example: +EB: (0),(0),(0)

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.

Defined Values: <value> Decimal number 0 specifying the use of the 16-bit FCS specified in V.42.

Reporting Current or Selected Values:

Command: +EFCS?
Response: +EFCS: <value>
Example: +EFCS: 0 For default setting.

Reporting Supported Range of Parameter Values :

Command: +EFCS=?
Response: +EFCS: (<value> range)
Example: +EFCS: (0)

Command: +ER Error Control Reporting

Description: This extended-format numeric parameter controls whether or not the extended-format +ER: 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).
+ER=[<value>] +ER=[<value>] +ER=[<value>] +ER=[<value>]

Syntax: +ER=[<value>]

Defined Values: <value> A decimal number corresponding to the selected error control option:
0 = Error control reporting disabled (no +ER intermediate result code transmitted). (Default.)
1 = Error control reporting enabled (+ER intermediate result code transmitted).

Reporting Current or Selected Values:
Command: +ER?
Response: +ER: <current value>
Example: +ER: 0 for the default setting

Reporting Supported Range of Parameter Values:
Command: +ER=?
Response: +ER: (<value> range)
Example: +ER: (0,1)

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:

Syntax: +ES=[<orig_rqst>[,<orig_fbk>[,<ans_fbk>]]]

Defined Values: <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. (Default.)
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.

Reporting Current or Selected Values:
Command: +ES?
Response: +ES: <orig_rqst>,<orig_fbk>,<ans_fbk>
Example: +ES: 3,0,2 For the default setting.
+ES: 6,0,8 For V.80 Synchronous Access Mode originator and answerer.

Reporting Supported Range of Parameter Values:
Command: +ES=?
Response: +ES: (<orig_rqst> range),(<orig_fbk> range), (<ans_fbk> range)
Example: +ES: (0-4,6,7),(0-4),(0-6,8,9)

Command: +ESR Selective Reject (This is a V.92 command)

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.

Reporting Current or Selected Values:

Command: +ESR?

Response: +ESR: <value>

Example: +ESR: 0 For default setting

Reporting Supported Range of Parameter Values:

Command: +ESR=?

Response: +ESR: (<value>)

Example: +ESR: (0)

Command: +ETBM Call Termination Buffer Management (This is a V.92 command)

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>]]]

Defined 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.

Reporting Current or Selected Values:

Command: +ETBM?

Response: +ETBM: <pending_TD>,<pending_RD>,<timer>

Example: +ETBM: 0,0,0

Reporting Supported Range of Parameter Values:

Command: +ETBM=?

Response: +ETBM: (<pending_TD> range),(<pending_RD> range), (<timer> range)

Example: +ETBM: (0),(0),(0)

Command: +GCI Country of Installation

Description: This extended syntax command selects and indicates the country of installation for the modem. This parameter selects the settings for any operational parameters that need to be adjusted for national regulations or telephone networks.

Syntax: +GCI=<country_code>

Defined Values: <country_code>

Example: Euro/Nam = B5. For more countries, contact Multi-Tech.

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. Factory default is B5 (Europe and North America).

Reporting Current or Selected Values:

Command: +GCI?

Response: +GCI:<country_code>

Examples: +GCI: 3D (3D stand for a specific country)

Reporting Supported Range of Parameter Values:

Command: +GCI=?

Response: +GCI:<country_code>[,<country_code]...]]

Examples: +GCI:(20,73,B5) Three numbers indicated that this modem can be set for the three countries listed).

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>]]

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

0 None.
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.)

Reporting Current or Selected Values:

Command: +IFC?
Response: +IFC: <modem_by_DTE>,<DTE_by_modem>
Example: +IFC: 2,2 For the defaults.

Reporting Supported Range of Parameter Values:

Command: +IFC=?
Response: +IFC: (<modem_by_DTE> range),(<DTE_by_modem> range)
Example: +IFC: (0-3),(0-2).

Command: +ILRR DTE-Modem Local Rate Reporting

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

Syntax: +ILRR=<value>

Defined 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).

Reporting Current or Selected Values:

Command: +ILRR?
Response: +ILRR: <current value> Example: +ILRR: 0 For the default setting

Reporting Supported Range of Parameter Values:

Command: +ILRR=?
Response: +ILRR: (<value> range) Example: +ILRR: (0,1)

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 (autodetected from previous command line).

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

Defined 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

Example: +ILRR: 19200

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>

Defined 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 autodetect, +ICF=0.
If the specified rate is not supported by the modem, an ERROR result will be returned.

Reporting Current or Selected Values:
Command: +IPR?
Response: +IPR: <rate>
Example 1: +IPR: 0 For automatic rate detection.
Example 2: +IPR: 115200 For 115200 bps.

Reporting Supported Range of Parameter Values:
Command: +IPR=?
Response: +IPR (<rate> range)
Example: +IPR: (0,300,1200,2400,4800,9600,19200,38400,57600,115200, 230400)

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>]

Defined 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).

Reporting Current or Selected Values:
Command: +MR?
Response: +MR: <current value>
Example: +MR: 0 For default setting

Reporting Supported Range of Parameter Values:
Command: +MR=?
Response: +MR: (<value>range)
Example: +MR: (0-2)

+MR Modulation Reporting Control Continued

+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
K56 For K56flex
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.
Example: +MRR: 28800, 48000

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>

Defined 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

Reporting Selected Values:
Command: +PSS?
Response: +PSS: <value>
Example: +PSS: 0 For the default <value>.

Reporting Supported Range of Parameter Values:
Command: +PSS=?
Response: +PSS: (<value> range)
Example: +PSS: (0,1,2)

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 the +PQC command, then the quick connect profile will also be updated on the next connection attempt.

Syntax: -QCPC

Result Code: OK In V.92 Mode (+MS=V.92)
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>

Defined Values: <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

Reporting Selected Value(s):
Command: -QCPS?
Response: -QCPS: <value>
Example: -QCPS: 1 For the default setting.

Reporting Supported Range of Parameter Values:
Command: -QCPS=?
Response: -QCPS: (<value> range)
Example: -QCPS: (0,1)

Command: –STE= Set Telephony Extension

Description: The –STE command enables/disables Line-In-Use, Extension Pickup, and Remote Hangup detection features.
Note: Additional hardware may be required to support these features.

Syntax: -STE=<value>

Defined 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 Hangup detection enable/disable.

<value> (Dec.)	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

Reporting Current or Selected Values:
Command: -STE?
Response: -STE: <value>
Example: -STE: 4 Remote Hangup enabled, Extension Pickup disabled; Line-In-Use disabled.

Reporting Supported Range of Parameter Values:
Command: -STE=? Show available options.
Response: -STE: 0-7

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.

–STE= Set Telephony Extension Continued

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>I 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 Cleardown 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

–STE= Set Telephony Extension Continued

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.

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

V.8/V.8bis Commands

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>]

Defined Values:
<v8o> Decimal number which enables/disables issuance of +A8*x* 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 +A8*x* 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.8 session to notify the DTE when the relevant V.8 signals are received.

Reporting Current or Selected Values:
Command: +A8E?
Response: +A8E: <v8o>,<v8a>,<v8cf>[,<v8b>][,<cfrange>][,<protrange>]
Example: +A8E: 1,1,00,1,0,0 For the defaults

Reporting Supported Range of Parameter Values:
Command: +A8E=?
Response: +A8E: (<v8o> range),(<v8a> range),(v8cf in octets),
(<v8b> range),(<cfrange>),(<protrange>)
Example: +A8E: (1,6),(1,5),(0,21,C1),(0,1),(0),(0)

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>

Defined 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:XYYY

MT5600BA/BL–V.90 Commands

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

Values: *n* = 0, 1, 3, 4, 5, 6, 7, or 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). For tests 3, 6, and 7, a connection between the two modems must first be established. To terminate a test in progress, the escape sequence (**+++**) must be entered first, except for parameters 7 and 8. If ***S18*** is non-zero, a test terminates automatically after the time specified by ***S18*** and displays the *OK* message.

- &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.
- &T3 Start local digital loopback, V.54 Loop 2. If no connection exists, *ERROR* is returned.
- &T4 Enables acknowledgment for remote digital loopback request.
- &T5 Ignores acknowledgment for remote digital loopback request.
- &T6 Requests a remote digital loopback, V.54 Loop 2, without self-test. If no connection exists, *ERROR* is returned. The *CONNECT XXXX* message is displayed at the start of the test.
- &T7 Requests a remote digital loopback, V.54 Loop 2, with self-test. (In self-test, a test pattern is looped back and checked by the modem.) If no connection exists, *ERROR* is returned. When the test is terminated, the number of detected errors is reported to the computer.
- &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.

Command: +MS= Modulation Selection

Values: See description.
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=[*mod*][,[*automode*][,[*min_RX_rate*][,[*max_RX_rate*][,[*x_law*]
[,[*reserved*][,[*max_TX_rate*]]]]]]]<CR>
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.

- +MS? Reports current options in the format *mod*,*automode*,*min_RX_rate*,*max_RX_rate*,*x_law*,*reserved*,*max_TX_rate*. Example: 56,1,300,56000,0,0,33600.
- +MS=? Reports supported options in the format (list of supported *mod* values),(list of supported *automode* values),(list of supported *min_RX_rate* values),(list of supported *max_RX_rate* values), (list of supported *x_law* values), (list of supported *reserved* values),(list of supported *max_TX_rate* values). Example: (0,1,2,3,9,10,11,56,64,69),(0,1),(300-33600),(300-56000),(0,1),(0,1),(300-33600).

Subparameters

mod A decimal number that specifies the preferred modulation (automode enabled) or the modulation to use in originating or answering a connection (automode disabled).

+MS= Modulation Selection Continued

<mod>	Modulation	Possible rates (bps)[1]
0	V.21	300
1	V.22	1200
2	V.22bis	2400 or 1200
3	V.23	1200
9	V.32	9600 or 4800
10	V.32bis	14400, 12000, 9600, 7200, or 4800
11	V.34	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400
12[2]	V.90	56000, 54667, 53333, 52000, 50667, 49333, 48000, 46667, 45333, 44000, 42667, 41333, 40000, 38667, 37333, 36000, 34667, 33333, 32000, 30667, 29333, or 28000
56[3]	K56flex	56000, 54000, 52000, 50000, 48000, 46000, 44000, 42000, 40000, 38000, 36000, 34000, 32000
64	Bell 103	300
69	Bell 212	1200

Table Notes:

1. See optional <automode>, <min_RX_rate>, <max_RX_rate>, and <max_TX_rate> subparameters.
2. Selects V.90 modulation as first priority. If a V.90 connection cannot be established, the modem attempts K56flex, V.34, V.32bis, etc. (Default)
3. Selects K56flex modulation as first priority. If a K56flex connection cannot be established, the modem attempts V.90, V.34, V.32bis, etc.

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

min_RX_rate An optional number that specifies the lowest rate at which the modem may establish a receive connection. The value is decimal coded in units of bps, e.g., 2400 specifies the lowest rate to be 2400 bps. See “Possible rates” in the *mod* table. The default is 300 for 300 bps.

max_RX_rate An optional number that specifies the highest rate at which the modem may establish a receive connection. The value is decimal coded in units of bps, e.g., 28800 specifies the highest rate to be 28800 bps. See “Possible rates” in the *mod* table. The default is 56000, for 56000 bps.

x_law An optional number that specifies the PCM code type for 56K modulation. The options are:
0 = µ-Law—used in North America and Japan (default)
1 = A-Law—used outside North America and Japan
The modem automatically selects A-Law or µ-Law if the server sends the Conexant ID. Note that the **ATZ** command restores the *x_law* value from NVRAM. You can also manually select A-Law or µ-Law using the ***%U*** command.

reserved Must not be changed from the default value of 0.

max_TX_rate An optional number that specifies the highest rate at which the modem may establish a transmit connection. The value is decimal coded in units of bps, e.g., 33600 specifies the highest rate to be 33600 bps. See “Possible rates” in the *mod* table. The default is
[redacted]

Command: -SDR=*n* Distinctive Ring Control

Values: 0–7
Default: 0
Description: This command enables or disables detection and reporting of distinctive ring. One, two, or three distinctive ring types can be simultaneously enabled depending upon the value of *n*. The detected ring type is reported in the verbose result code by appending the ring type number to the end of the *RING* message.

-SDR=0 Disables distinctive ring. Any valid ring detected is reported as *RING*.
-SDR=1 Enables distinctive ring type 1.
-SDR=2 Enables distinctive ring type 2.
-SDR=3 Enables distinctive ring types 1 and 2.
-SDR=4 Enables distinctive ring type 3.
-SDR=5 Enables distinctive ring types 1 and 3.
-SDR=6 Enables distinctive ring types 2 and 3.
-SDR=7 Enables distinctive ring types 1, 2, and 3.

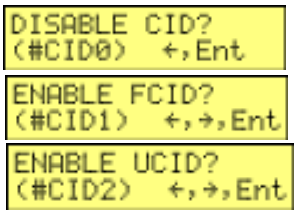
The supported ring types and ring cadence detection criteria are shown in the following table:

Distinctive Ring Type	*Ring cadence detection criteria*
1	*2.0 sec. on, 4.0 sec off*
2	*0.8 sec on, 0.4 sec off, 0.8 sec on, 0.4 sec off*
3	*0.4 sec on, 0.2 sec off, 0.4 sec on, 0.2 sec off, 0.8 sec on, 0.4 sec off*

Command: #CID=*n* Caller ID

Values: *n* = 0, 1, or 2
Default: 0
Description: Enables or disables Caller ID recognition and reporting.
#CID=0 Disables Caller ID.
#CID=1 Enables formatted Caller ID reporting of ICLID SDM (Single Data Message) and MDM (Multiple Data Message) packets.
#CID=2 Enables unformatted Caller ID reporting of any ICLID packet received after the first *RING* cycle, including SDM, MDM, or call waiting packets.
#CID? Retrieves the current Caller ID mode from the modem.
#CID=? Returns the mode capabilities of the modem in a list with each element separated by commas.

MT5600BA LCD:



Voice Commands

Voice Commands Overview

The following list of Voice commands shows you the commands that will be described in detail in this section.

Command	To Configure Voice Function
+FCLASS	Set Mode
+VCID	Caller ID
+VNH	Automaticd Hang-up Control
+FLO	Flow Control

Command	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)
+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
+VPR	Select DTE/modem Interface Rate (Turn off autobaud)

Command	Speakerphone
+VSP	Speakerphone ON/OFF
+VDX	Speakerphone Duplex Mode

Configuration 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 Caller ID +VCID on page 20)

Command: +VNH= Automatic Hang-up Control

Description: This command enables or disables automatic hangups.

Syntax: +VNH=<hook>

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

0 Modem enables automatic hangups as is normal in other modes.

1 Modem disables automatic hangups usually found in the other non-voice modes.

2 The modem disables automatic hangups in the other non-Voice Modes. The modem performs only a “logical” hangup (returns to OK result code).

Reporting Current or Selected Values:

Command: **+VNH?**
Response: <hook>
Example: 0 For the default setting.

Reporting Supported Range of Parameter Values:

Command: **+VNH=?**
Response: (<hook> range)
Example: (0-2)
Result Codes: OK <hook> = 0-2.
ERROR Otherwise.

Command: +FLO Flow Control

Function: Select Flow Control Method

Values: 0, 1, 2, 3-255

Default:

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 Disable Xon-Xoff and 133/105 flow control

+FLO=1 Enable Xon-Xoff flow control in either direction

+FLO=2 Enable 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

Command: +VIP Voice Initialize All Parameters

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

Syntax: +VIP

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

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 this command, or to send single or dual tone frequencies with duration specified with this command.

Syntax: +VTS=<string>

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

1. A single character which the modem interprets as a DTMF digit (0 - 9, #, *, or A-D) or hookflash (!), with a duration given by the +VTD command.
2. A 4-element string enclosed in square brackets, “[freq1,freq2,dur]”, which the modem interprets as a general dual tone and duration selection, or
3. 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 4-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, encounters an invalid frequency range, encounters a <CR>, or encounters a semicolon.

Reporting Supported Range of Parameter Values:

Command: **+VTS=?**
Response: (<freq1> range), (<freq2> range), (<dur> range)
Example: (200-3000),(200-3000),(0-255)
OK

Result Codes: OK Valid command.
ERROR The <string> command is invalid, or a selected frequency is out of range.

Command: +VTX Start Modem Transmit (Playback)

Description: This command causes the modem to start the voice transmission process.
Syntax: +VTX
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> 0 (only valid number) selects automatic gain control
Reporting Current or Selected Values:
Command: **+VGR?**
Response: <gain>
Example: 0 For the default setting.
Reporting Supported Range of Parameter Values:
Command: **+VGR=?**
Response: <gain> range
Example: 0
Result Codes: OK <gain> = 0.
ERROR Otherwise, or if not in Voice Mode.

Command: +VGT= Voice Gain Transmit (Playback Volume)

Description: This command causes the modem to set the volume level.
Syntax: +VGT=<level>
Defined Values: <level> Decimal number corresponding to the volume level.
Reporting Current or Selected Values:
Command: **+VGT?**
Response: <level>
Example: 128 For the default setting.
Reporting Supported Range of Parameter Values:
Command: **+VGT=?**
Response: <level> range
Example: 0-255
Result Codes: OK <level> = 0-255.
ERROR Otherwise, or if not in Voice Mode.

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>
Defined Values: <timer> Decimal number corresponding to the time in units of 1.0 second.
A value of 0 disables the timer.
Reporting Current or Selected Values:
Command: **+VIT?**
Response: <timer>
Example: 0 For the default setting.
Reporting Supported Range of Parameter Values:
Command: **+VIT=?**
Response: <timer> range
Example: 0-255
Result Codes: OK <timer> = 0-255.
ERROR Otherwise, or if not in Voice Mode.

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>

Defined 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.

Reporting Current or Selected Values:

Command: **+VRA?**
Response: <interval>
Example: 50 (5 seconds) For the default setting.

Reporting Supported Range of Parameter Values:

Command: **+VRA=?**
Response: (<interval> range)
Example: (0-255) 255 = 25.5 sec

Result Codes: OK <interval> = 0-255
ERROR Otherwise, or if not in Voice Mode.

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>

Defined 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.

Reporting Current or Selected Values:

Command: **+VRN?**
Response: <interval>
Example: 10 (10 seconds) For the default setting.

Reporting Supported Range of Parameter Values:

Command: **+VRN=?**
Response: (<interval> range)
Example: (0-25)

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

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>

Defined 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.

+VSD Silence Detection (Quiet and Silence) Continued

<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 Hangup (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.

Reporting Current or Selected Values:
Command: **+VSD?**
Response: <sds>,<sdi>
Example: 0,50 For the default setting.

Reporting Supported Range of Parameter Values:
Command: **+VSD=?**
Response: (<sds> range),(<sdi> range)
Example: (0,127-129),(0-255)

Result Codes: OK <hook> = 0 or 1.
ERROR Otherwise, or if not in Voice Mode.

Command: +VTD= Beep Tone Duration Timer

Description: This command causes the modem to set the default DTMF/tone generation duration.

Syntax: +VTD=<dur>

Defined 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.

Reporting Current or Selected Values:
Command: **+VTD?**
Response: <dur>
Example: 100 For the default setting.

Reporting Supported Range of Parameter Values:
Command: **+VTD=?**
Response: (<dur> range)
Example: (0-255)

Result Codes: OK <dur>= 0-255.
ERROR Otherwise, or if not in Voice Mode.

Command: +VDR= Distinctive Ring

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>

Defined 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).

Reporting Current or Selected Values:
Command: **+VDR?** Response: <enable>,<report>
Example: 0,0 For the default setting.

Reporting Supported Range of Parameter Values:
Command: **+VDR=?** Response: (<enable> range),(<report>range)
Example: (0,1),(0-6)

Result Codes: OK <enable>,<report> = (0,1),(0-6)
ERROR Otherwise, or if not in Voice Mode.

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

Description: This command selects the DTE/modem interface rate.

Syntax: +VPR=<rate>

Defined 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

Reporting Current or Selected Values:

Command: **+VPR?**
Response: <rate>
Example: 0 For the default setting (Autobaud).

Reporting Supported Range of Parameter Values:

Command: **+VPR=?**
Response: (<rate> range)
Example: (0,1,2,3,4,8,16,24,48,96)

Result Codes: OK <rate> = 0,1,2,3,4,8,16,24,48,96.
ERROR Otherwise, or if not in Voice Mode.

Speakerphone Commands

Command: +VSP= Speakerphone ON/OFF

Description: This command turns the speakerphone ON or OFF

Syntax: +VSP=<mode>

Defined Values: <mode> Decimal number corresponding to the selected option.
0 The speakerphone function is OFF. (Default.)
1 The speakerphone function is ON.

Reporting Current or Selected Values:

Command: **+VSP?**
Response: <mode>
Example: 0 For the default setting.

Reporting Supported Range of Parameter Values:

Command: **+VSP=?**
Response: (<mode> range)
Example: (0,1)

Result Codes: OK <mode> = 0 or 1.
ERROR Otherwise, or if not in Voice Mode.

Command: +VDX= Speakerphone Duplex Mode

Description: This command selects speakerphone full duplex mode.

Syntax: +VDX=<mode>

Defined Values: <mode> Decimal number corresponding to the selected option.
1 The speakerphone mode is full duplex.

Reporting Current or Selected Values:

Command: **+VDX?**
Response: <mode>
Example: 1 For the default setting.

Reporting Supported Range of Parameter Values:

Command: **+VDX=?**
Response: (<mode> range)
Example: (1)

Result Codes: OK <mode> = 1.
ERROR Otherwise, or if not in Voice Mode.

Unsolicited Voice Mode Result Codes

The unsolicited result codes for voice mode differs from standard modem Command mode result codes. The +V specification refers to these voice mode result codes as "event detection reports". Event detection reports are provided in simple report format when one character is enough to report an event, such as RING. A complex report format is used when one character is not enough to report an event; generally, all multi-character responses.

Complex event reports are in the format <tag> <=> <data> <cr>, where <tag> is the data type, = is the ASCII = sign, <data> is a specific data instance, and <cr> is ASCII 13 decimal. The table below defines the complex event report tags.

Valid Complex Event Report Tags

Tag	*Description*
TIME	Caller ID Tag in the form TIME=HHMM, where HH is the hour (00-23) and MM is the minute (00-59). All numbers are in ASCII and numbers less than 10 have a leading 0.
DATE	The current date in the format MMDD (where MM is the month 0-12 nad DD is the day 01-31). All numbers are in ASCII and numbers less than 10 have a leading 0.
NMBR	The caller's telephone number, in the format NMBR=<Number> or P or O (ASCII 4F hex). The P indicates the caller's information is unavailable (Private). The O indicates the caller's information is unavailable (Outside area code).
NAME	The caller's name in the format NAME=<Listing Name>.
MESG	Indicates a data item not listed above in Multiple Message Format: MESG=<Data Tag><Length of Message><Data><Chec*ksum> in printable ASCII (to avoid confusion with binary output).*
ERRM	Error Tag (used for Caller ID and other uses). Refer to the +VCID comand.
DRON	Distinctive Ring Cadence On time.
DROF	Distinctive Ring Cadence Off time.
CPON	Control Tone Cadence On time.
CPOF	Control Tone Cadence Off time.
CWON	Call Waiting Cadence On time.
CWOF	Call Waiting Cadence Off time.
ASTB	See Table 4.
NDID	DID Services. Refer to the +VDID comand.
SITT	The data value for the SITT tag, in the format <SITT><=><data><cr>, where <data> means: ICNT Intercept Tone VCCT Vacant Code Tone REOT Reorder Tone NCDT No Circuit Detected Tone TON4 Fourth SIT Tone Number TON5 Fifth SIT Tone Number TON6 Sixth SIT Tone Number TON7 Seventh SIT Tone Number

In the event of an unrecognized data tag, the MultiModem presents the data item information as printable hex ASCII numbers following the MESG tag. For example:

RING
DATE=0321
TIME-1405
NMBR=5045551234
NAME-DOE JOE
MESG=060342424231
RING
RING

Unformatted Form Reporting

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 prresented 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 computers job to check message validity. Note that this means that the MultiModem presents the Caller ID information even if the MultiModem detects a checksum 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 Mesasage 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. Table 3 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 Curent 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).

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 Hangup "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).
I	(6C)	Event Number 13 (Loop Current Interruption). Ususally indicates a remote hangup.
L	(4C)	Event Number 14 (Loop Current Polarity Reversal). May indicate a hangup 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 Dialtone).
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.

Voice Sample Sessions

This section provides Voice mode send and receive handshaking examples.

Suggested Compression Method and Sample Rate Selection

Command	***Response***
AT+VSM=?	The PC inquires about the compression methods and bits-per-sample options.
	The modem reports three compression methods:
	• PCM, twelve bits per sample, timing marks, sampling rates of 7200-8000 and 11025, three levels of silence compression sensitivity, and silence clip to 0.5 seconds.
	• The same as 1 above, but without silence compression.
	• ADPCM, two bits per sample, timing marks, sampling rate of 7200, no silence compression, and no silence clip.
	128, "SIGNED PCM", 12, 40, (7200-8000, 11025), (127-129), (0-50)
	129, "SIGNED PCM", 12, 0, (7200-8000, 11025), (0), (0)
	132, "ADPCM/AQ", 2, 40, (7200), (0), (0)
	OK
AT+VSM=128	The PC selects the first compression method with the intent of queying the event detection capabilities of the modem.
OK	The modem agrees.
AT+VEM=?	Checks the modem event detection capability for the first compression method.
"C"	The modem reports Service Level C.
0A000100	
0E601800	
1A803840	
OK	
AT+VSM=132	Selects the second compression method with the intent of querying the event detection capabilities of the modem.
OK	The modem agrees.
AT+VEM=?	Checks the modem event detection capability for the second compression method.
"B"	The modem reports Service Level B.
0A000100	
04600000	
1A803040	
OK	
AT+VLS?	The modem inquires about what analog source and destinations are available.
	The modem reports that a microphone and speaker are available:
	0, " ", 0A000100, 0E601800, 1A803840
	1, " T", 0A000100, 0E601800, 1A803840
	4, " S", 0A000100, 0E601800, 1A803840
	6, " M", 0A000100, 0E601800, 1A803840
	OK
AT+VSD=?	The modem inquires about what end-of-voice receive silence detection capabilities are available.
(127-129), (50-200)	
	The modem reports three levels of sensitivity and a time interval between 5.0 and 20.0 seconds.
	Later, to transmit or receive a voice message, the PC selects:
	• The first compression method at 7200 sampling rate, enable silence compression with nominal silence sensitivity, and no silence clipping.
	• Report all modem-supported event detection.
	• Set end of receive silence detection at nominal silence sensitivity setting and for 5.0 seconds: AT+VSM=128, 7200, 128, 0; +VEM=FFFFFFFF8; +VSD=128, 50
OK	The modem agrees.

AT+VSM=129, 7200, 0, 0	The PC changes its PC/modem interface rate to 38400 bps and selects a compression method with the least sensitive setting, with the goal of playing a message with less distortion, and at 7200 samples per second. (Assume that the PC issued a +VSM=? command earlier.)
OK	The modem agrees.
AT+VLS=4	The modem selects the speaker. The modem had earlier reported that a speaker was available.
OK	The modem agrees.
AT+VTX	The PC selects the Voice Tranmit mode.
CONNECT	The modem agrees.
<Data>	The PC deleivers <DLE> shielded and silence compressed voice data across the PC/ modem interface.
<DLE> <ETX>	The PC indicates the end of the Voice data stream.
OK	The modem indicates it is in Voice Command mode.
AT+VLS=0	The PC deselects all devices.
OK	The modem agrees.
	The PC switches to Data mode, Command mode, and autobauding enabled: AT+VIT=0; +VPR=0; +FCLASS=0
OK	The modem agrees.

Answer Phone, Play Greeting Message, and Record Message Example

Command	**Response**
AT+FCLASS=8; AT+VIT=60; +VPR=16	The DCE switches to Voice mode. The DTE selects a fixed DTE-DCE interface rate. The DTE knows from the sample rate selected earlier and the bits-per- the bits-per-sample that the DTE-DCE interface rate should be 38400 bps. The DTE-DCE Inactivity Timer starts with 60 seconds.
OK	DCE agrees (to the old DTE/DCE interface rate).
AT+VSM=129, 7200, 0, 0	DTE changes its DTE/DCE rate to 38400 bps and selects a compression method with the least sensitive setting, with the goal of recording a message with less distortion, and at 7200 samples per second. Assume that the DTE issued a +VSM=? command earlier.
OK	The DCE agrees.
AT+VSD=127, 20	DTE selects a silence detection period of
AT+VLS=0	DTE selects a silence detection period of 2 seconds with the least sensitive setting (for detecting the end of voice recording).
OK	The DCE agrees.
AT+VIT=0; +FCLASS=0; S0=0	The DTE selects the Data mode with autobauding, and disables +VPR=0; automatic DCE answering. The DCE waits for a phone call (not necessarily in Data mode).
OK	The DCE agrees.
RING	At some time, a remote station calls.
AT+FCLASS=8;	The DCE switches to Voice mode. The DCE selects a fixed AT+VIT=60; DTE/ DCE Interface Rate. The DTE knows from the sample AT+VPR=16; rate selected earlier and the bits per sample that the DTE/DCE Interface Rate should be 38400 baud. The DTE/DCE Inactivity Timer starts with a value of 60 seconds.
OK	The DCE agrees (at the old DTE/DCE Interface Rate).

V.25 bis Commands

The V.25 bis 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.

Command: CIC Connect Incoming Call

Values: n/a
Description: Answers an incoming call

Command: DIC Disregard Incoming Call

Values: n/a
Description Disregard current incoming call

Command: CRNs Call Request Number

Values: s = dial string (0-9, *, #, :, <, =, P, T)
Description: Used to dial a number

Command: CRIs Call Request Identification

Values: s = dial string (0-9, *, #, :, <, =, P, T)
Description: Used to dial a number

V25Bis Number format

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

Command: PRNx;s Program Number

Values: x = (0 - 3)
s = dial string (0-9, *, #, :, <, =, P, T)
Description: Used to store dial string s in location x.

Command: CRSx Call Request Address

Values: x = (0 - 3)
Description Recalls dial string to dial from location x

Command: PRIa;s Program Identification Number

Values: n/a
Description: Dummy Command (just returns VAL)

Command: RLD List Request of Delayed Call Number

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

Command: RLF List Request of Forbidden Number

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

Command: RLI List Identification Number

Values: n/a
Description: Dummy Command (just returns VAL)

Command: RLN List Request of Stored Number

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

V.25 bis Responses

CFIrr **Call Failure Indication (rr is the message)**

AB	Call Not Answered
ET	Engaged Tone (Busy)
FC	Forbidden Call (Number is black listed)
ND	No Dial tone
NS	No number stored
NT	Call Answered but No Answer Tone
RT	No Answer

DLC **Delayed Call**

INC **Incoming Call (RING)**

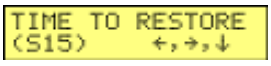
VAL **Valid**

INV **Invalid**

CNX s **Connection with *s* as the speed connected**

V.92 S-Registers

Certain modem values, or parameters, are stored in memory locations called S-registers. Use the ***S*** command to read or alter the contents of S-Registers. See the MT5600BA/BL–V.90 S-Registers Section for S-Registers that apply the V.90 only.

Register	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	0–127 128–255	43 (+)	**Escape Character:** Sets ASCII code for the escape sequence 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 33–127	8 (^H)	**Backspace Character:** Sets the ASCII code for the backspace 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 sequence 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 Escpae Character:** Sets the ASCII code for the remote configuration escape character. **ATS13=0&W** disables remote configuration. MT5600BA/BL-V.92 and V.90 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 the lease line for restoral. Zero disables dial backup. MT5600BA-V.92 only. MT5600BA V.92 LCD: 
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. MT5600BA-V.92 only. MT5600BA-V.92 LCD: 

Register	Unit	Range	Default	Description
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	10ms (async) 1 ms (sync)	0–255	5	**Delay to DTR OFF:** Sets the length of time that the modem 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 CTS ON. Applies to synchronous operation only.
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 ms	0, 1–255	0	**Disonnect 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. If ***S38*** 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.

Register	Unit	Range	Default	Description
S86 Continued				
				10 Bad response to feature negotiation. 11 No sync information from remote modem. 12 Normal disconnect initiated by remote modem. 13 Remote modem does not respond after 10 retransmissions of the same message. 14 Protocol violation. 15 DTR lost. 16 Received GSTN cleardown. 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 hangup detected.
S95	decimal	0–155	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 5 respectively. The more recent settings of +MR, +ER, and +DR, or host writng 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).

V.90 S-Registers

These S-Registers are used with the MT5600BA/BL–V.90 modems only.

S18	seconds	0–255	0	**&T Test Time:** Sets the number of seconds that the modem conducts an &T test before it returns to the command mode. If the value is zero, the test must be terminated from command mode by issuing an **&T0** or **H** command. When **S18** is non-zero, the modem returns the **OK** message upon test termination.
S32	decimal	0–255	17	**XON character:** Sets the ASCII code for the XON character.
S33	decimal	0–255	19	**XON character:** Sets the ASCII code for the XOFF character.

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.

Notes about V.90 Result Codes: The Verbose response differs in some instances:

V.92 Response	V.90
+MRR	Carrier
+DR	Compression
+ER	Protocol
+MCR	Connect

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 at 7200 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 is 19200 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 75TX/1200RX	**V.23 connection and line speed reporting enabled.** Modem has established a V.23 originate connection and line speed reporting is enabled.
23	CONNECT 1200TX/75RX	**V.23 connection and line speed reporting enabled.** Modem has established 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 at 1200 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 at 2400 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 at 4800 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 at 7200 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 at 9600 bps and carrier reporting is enabled. (See S95, Xn.)
51	+MRR: 12000	**Connected at 12000 bps and carrier reporting enabled.** Modem connects to the line at12000 bps; carrier reporting is enabled. (See S95, Xn.)
52	+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.)
53	+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.)
54	+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.)
55	+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.)
56	+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.)
57	+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.)
58	+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.)
59	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.

Terse	*Verbose*	*Description*
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.
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 +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 at 31200 bps and carrier reporting is enabled. (See S95, Xn.)
79	+MRR: 33600	**Connected at 33600 bps; carrier reporting enabled.** Modem connects to the line at 33600 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.)

Terse	*Verbose*	*Description*
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.)
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.

Terse	*Verbose*	*Description*
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)
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.

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