Advanced Data Addendum
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Lucent Technologies
Bell Labs Innovations

MTC Data/FAX AT Command Set

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Introduction

This document specifies the Lucent Technologies MTC Data/FAX AT Command Set.

The commands listed all conform to the TIA/EIA-602 standard for Data and TIA/EIA-578 Class 1 Fax standard.

AT Commands Reference

AT commands are issued to the modem to control the modem's operation and software configuration. AT commands can only be entered while the modem is in command mode. The format for entering AT commands is:

TYPE: ATXn

where X is the AT command, and n is the specific value for that command.

PRESS: Enter

Any command issued is acknowledged with a response in either text or numeric values known as result codes. Table 2 lists all the valid result codes.

In the following listing, all commands and command-values accepted by the modem are shown; any entries other than those shown cause the ERROR result code.

+++ Escape sequence

The escape sequence allows the modem to exit data mode and enter on-line command mode. While in on-line command mode, you may communicate directly to your modem using AT commands. Once you are finished, you may return to data mode using the ATO command.

A pause, the length which is set by the Escape Guard Time (S12), must be used after an escape sequence is issued. This pause prevents the modem from interpreting the escape sequence as data.

The value of the escape sequence character may be changed using Register S2.

A/ Repeat Last Command

This command repeats the last command string entered. Do not precede this command with an AT prefix or conclude it by pressing Enter.

A Answer Command

This command instructs the modem to go off-hook and answer an incoming call.

Bn Communication Standard Setting

This command determines CCITT vs. Bell standard.

B0: Selects CCITT V.22 mode when the modem is at 1200 bits/s.

B1: Selects Bell 212A when the modem is at 1200 bits/s (default).

B2: Unselects V23 reverse channel (same as B3).

B3: Unselects V23 reverse channel (same as B2).

B15: Selects V.21 when the modem is at 300 bits/s.

B16: Selects Bell 103J when the modem is at 300 bits/s (default).

Result Codes:

OK n = 0, 1, 15, 16

ERROR Otherwise

AT Commands Reference (continued)

Cn Carrier Control

The modem will accept the C1 command without error in order to assure backward compatibility with communications software that issues the C1 command. However, this modem does not support the C0 command. The C0 command may instruct some other modems to not send carrier (i.e., it puts them in a receive-only mode).

C0: Transmit carrier always off.
C1: Normal transmit carrier switching.

Result Codes:

OK n = 1

ERROR Otherwise

Dn Dial

This command instructs the modem to begin the dialing sequence. The dial string (n, including modifiers and the telephone number) is entered after the ATD command.

A dial string can be up to 40 characters long. Any digit or symbol (0—9, *, #, A, B, C, D) may be dialed as touch-tone digits. Characters such as spaces, hyphens, and parentheses do not count—they are ignored by the modem and may be included in the dial string to enhance readability.

The following may be used as dial string modifiers:

L Redials last number. Should be the first character following ATD, ignored otherwise.
P Pulse dialing.
T Touch-tone dialing (default).
, Pause during dialing. Pause for time specified in Register S8 before processing the next character in the dial string.
W Wait for dial tone. Modem waits for a second dial tone before processing the dial string.
V The modem switches to speakerphone mode and dials the number. An ATH command may be used to disconnect the voice call.
@ Wait for quiet answer. Wait for five seconds of silence after dialing the number. If silence is not detected, the modem sends a NO ANSWER result code back to the user.
! Hook flash. Causes the modem to go on-hook for 0.5 seconds and then return to off-hook.
; Return to command mode. Causes the modem to return to command mode after dialing the number, without disconnecting the call.
^ Disable data calling tone transmission.
S=n Dial a telephone number previously stored using the &Zn=x command (see the &Zn=x command for further information). The range of n is 0—3.
$ Bong tone detection.

En Echo Command

This command controls whether or not the characters entered from your computer keyboard are echoed back to your monitor while the modem is in command mode.

E0: Disables echo to the computer.
E1: Enables echo to the computer (default).

Result Codes:

OK n = 0, 1

ERROR Otherwise

AT Commands Reference (continued)

Fn Online Data Character Echo Command

This command determines if the modem will echo data from the DTE. This modem does not support the F0 version of the command. However, the modem will accept F1, which may be issued by older communication software, to assure backward compatibility.

F0: Online data character echo enabled (NOT SUPPORTED, ERROR).
F1: Online character echo disabled.

Result Codes:

OK n = 1

ERROR Otherwise

Hn Hook Control

This command instructs the modem to go on-hook to disconnect a call, or off-hook to make the phone line busy.

H0: Modem goes on-hook (default).
H1: Modem goes off-hook.

Result Codes:

OK n = 0, 1

ERROR Otherwise

In Request ID Information

This command displays specific product information about the modem.

I0: Returns default speed and controller firmware version. (same as I3)
I1: Calculates ROM checksum and displays it on the DTE (e.g., 12AB).
I2: Performs a ROM check and calculates and verifies the checksum displaying OK or ERROR.
I3: Returns the default speed and the controller firmware version. (same as I0)
I4: Returns firmware version for data pump (e.g., 94).
I5: Returns the board ID: software version, hardware version, and country ID (e.g., ?????????)
I9: Returns country code (e.g., NA Ver. 1).

Result Codes:

OK n = 0—9

ERROR Otherwise

Ln Monitor Speaker Volume

This command sets speaker volume to low, medium, or high.

L0: Selects low volume.
L1: Selects low volume.
L2: Selects medium volume (default).
L3: Selects high volume.

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

AT Commands Reference (continued)

Mn Monitor Speaker Mode

This command turns the speaker on or off.

M0: The speaker is off.
M1: The speaker is on until the modem detects the carrier signal (default).
M2: The speaker is always on when modem is off-hook.
M3: The speaker is on until the carrier is detected, except while dialing.

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

Nn Modulation Handshake

This command controls whether or not the local modem performs a negotiated handshake at connection time with the remote modem when the communication speed of the two modems is different.

N0: When originating or answering, this is for handshake only at the communication standard specified by S37 and the ATB command.
N1: When originating or answering, begin the handshake only at the communication standard specified by S37 and the ATB command. During handshake, fallback to a lower speed may occur (default).

Result Codes:

OK n = 0, 1

ERROR Otherwise

On Return On-line to Data Mode

O0: Instructs the modem to exit on-line command mode and return to data mode (see AT Escape Sequence, +++).
O1: This command issues a retrain before returning to on-line data mode.
O3: This command issues a rate renegotiation before returning to on-line data mode.

Result Codes:

OK n = 0, 1, 3

ERROR Otherwise

P Select Pulse Dialing

This command configures the modem for pulse (non touch-tone) dialing. Dialed digits are pulsed until a T command or dial modifier is received. Tone dial is the default setting.

Qn Result Code Control

Result codes are informational messages sent from the modem and displayed on your monitor. Basic result codes are OK, CONNECT, RING, NO CARRIER, and ERROR. The ATQ command allows the user to turn result codes on or off.

Q0: Enables modem to send result codes to the computer (default).
Q1: Disables modem from sending result codes to the computer.

Result Codes:

OK n = 0, 1

ERROR Otherwise

AT Commands Reference (continued)

T Select Tone Dialing

This command instructs the modem to send DTMF tones while dialing. Dialed digits are tone dialed until a P command or dial modifier is received. This is the default setting.

Vn DCE Response Format

This command controls whether result codes (including call progress and negotiation progress messages) are displayed as words or their numeric equivalents.

V0: Displays result codes as digits.
V1: Displays result codes as text (default).

Result Codes:

OK n = 0, 1

ERROR Otherwise

	ATV0	ATV1
Result Code Format	<numeric code><CR>	<CR><LF> <verbose code><CR><LF>

Wn Result Code Option

W0: CONNECT result code reports DTE speed. Disable protocol result codes.
W1: CONNECT result code reports DTE speed. Enable protocol result codes.
W2: CONNECT result code reports DCE speed. Enable protocol result codes (default).

Result Codes:

OK n = 0, 1, 2

ERROR Otherwise

Xn Result Code Selection and Call Progress Monitoring

This command enables tone detection options used in the dialing process. As these functions are chosen, the modem chip set's result codes are also affected. Therefore, this command is frequently used to control the modem chip set's responses. The primary function of this control is to control the modem chip set's call response capabilities.

	Ext. Result Code	Dial Tone Detect	Busy Tone Detect
X0	Disable	Disable	Disable
X1	Enable	Disable	Disable
X2	Enable	Enable	Disable
X3	Enable	Disable	Enable
X4	Enable	Enable	Enable (default)
X5	Enable	Enable	Enable
X6	Enable	Enable	Enable
X7	Disable	Enable	Enable

AT Commands Reference (continued)

Extended Result Codes

Disabled: Displays only the basic result codes OK, CONNECT, RING, NO CARRIER, and ERROR.
Enabled: Displays basic result codes, along with the connect message and the modem's date rate, and an indication of the modem's error correction and data compression operation.

Dial Tone Detect

Disabled: The modem dials a call regardless of whether it detects a dial tone. The period of time the modem waits before dialing is specified in register S6.
Enabled: The modem dials only upon detection of a dial tone, and disconnects the call if the dial tone is not detected within 10 seconds.

Busy Tone Detect

Disabled: The modem ignores any busy tones it receives.
Enabled: The modem monitors for busy tones.

Result Codes:

OK n = 0, 1, 2, 3, 4, 5, 6, 7

ERROR Otherwise

Yn Long Space Disconnect

Long space disconnect is always disabled.

Y0: Disable long space disconnect (default).
Y1: Enable long space disconnect. NOT SUPPORTED.

Result Codes:

OK n = 0

ERROR Otherwise

Zn Recall Stored Profile

This command instructs the modem chip set to go on-hook and restore the profile saved by the last &W command. Either Z0 or Z1 restores the same single profile.

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Bn V.32 Auto Retrain

This modem always auto retrains.

&B0: Disable V.32 auto retrain — NOT SUPPORTED.
&B1: Enable V.32 auto retrain (default).

Result Codes:

OK n = 1

ERROR Otherwise

AT Commands Reference (continued)

&Cn Data Carrier Detect (DCD) Control

Data Carrier Detect is a signal from the modem to your computer indicating that the carrier signal is being received from a remote modem. DCD normally turns off when the modem no longer detects the carrier signal.

&C0: The state of the carrier from the remote modem is ignored. DCD circuit is always on.
&C1: DCD turns on when the remote modem's carrier signal is detected, and off when the carrier signal is not detected (default).

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Dn DTR Control

This command interprets how the modem responds to the state of the DTR signal and changes to the DTR signal.

&D0: Ignore. The modem ignores the true status of DTR and treats it as always on. This should only be used if your computer does not provide DTR to the modem.
&D1: If the DTR signal is not detected while in on-line data mode, the modem enters command mode, issues OK result code, and remains connected.
&D2: If the DTR signal is not detected while in on-line data mode, the modem disconnects (default).
&D3: Monitor DTR signal when an on-to-off transition occurs, the modem performs a soft reset as if the ATZ command was received.

Result Codes:

OK n = 0, 1, 2, 3

ERROR Otherwise

&Fn Load Factory Settings

This command loads the configuration stored and programmed at the factory. This operation replaces all of the command options and the S-register settings in the active configuration with factory values.

Note: In voice mode (AT+FCLASS=8), if this command is placed on the same line as other commands, the command is ignored. In voice mode, to load factory settings, this command must be issued by itself.

&F0: Recall factory setting as active configuration.
The following command is for testing purposes only.
&F5: Recall factory settings appropriate for ETC mode as active configuration.

Result Codes:

OK n = 0, 5

ERROR Otherwise

AT Commands Reference (continued)

&Gn V.22bis Guard Tone Control

This command determines which guard tone, if any, to transmit while transmitting in the high band (answer mode). This command is only used in V.22 and V.22bis mode. This option is not used in North America and is for international use only.

&G0: Guard tone disabled (default).
&G1: Sets guard tone to 550 Hz.
&G2: Sets guard tone to 1800 Hz.

Result Codes:

OK	n = 0, 1, 2
ERROR	Otherwise

&Jn Auxiliary Relay option

&J0: The auxiliary relay is never closed.
&J1: NOT SUPPORTED, responds ERROR.

Result Codes:

OK	n = 0
ERROR	Otherwise

&Kn Local Flow Control Selection

&K0: Disable flow control.
&K1: Reserved.
&K2: Reserved.
&K3: Enable RTS/CTS flow control (default).
&K4: Enable XON/XOFF flow control.

Result Codes:

OK	n = 0, 3, 4
ERROR	Otherwise

&Mn Asynchronous Communications Mode

&M0: Asynchronous mode (default).
&M1: Reserved.
&M2: Reserved.
&M3: Reserved.
&M4: Reserved.

Result Codes:

OK	n = 0
ERROR	Otherwise

AT Commands Reference (continued)

&Pn Pulse Dial Make-to-Break Ratio Selection

This command is effective only for Japan.

&P0: 34/66 make/break ratio (10 pps) (default).
&P1: 34/66 make/break ration (20 pps).

Result Codes:

OK n = 0, 1

ERROR Otherwise

&Qn Asynchronous Communications Mode

&Q0: Asynchronous Mode, buffered. ***Same as \N0.***
&Q1: Reserved.
&Q2: Reserved.
&Q3: Reserved.
&Q4: Reserved.
&Q5: Error Control Mode, buffered (default). ***Same as \N3***
&Q6: Asynchronous Mode, buffered. ***Same as \N0.***
&Q7: Reserved.
&Q8: *MNP* error control mode. If an *MNP* error control protocol is not established, the modem will fallback according to the current user setting in S36.
&Q9: V.42 or *MNP* error control mode. If neither error control protocol is established, the modem will fallback according to the current user setting in S36.

Result Codes:

OK n = 0, 5, 6, 8 ,9

ERROR Otherwise

&Sn Data Set Ready (DSR) Option

This command selects DSR action.

&S0: DSR always ON (default).
&S1: DSR comes on when establishing a connection and goes off when the connection ends.

Result Codes:

OK n = 0, 1

ERROR Otherwise

AT Commands Reference (continued)

&Tn Self-Test Commands

This command allows the user to perform diagnostic tests on the modem. These tests can help to isolate problems when experiencing periodic data loss or random errors.

&T0	Abort. Stops any test in progress.
&T1	Local analog loop. This test verifies modem operation, as well as the connection between the modem and computer. Any data entered at the local DTE is modulated, then demodulated, and returned to the local DTE. To work properly, the modem must be off-line.
&T3	Local digital loopback test.
&T6	Remote digital loopback test. This test can verify the integrity of the local modem, the communications link, and the remote modem. Any data entered at the local DTE is sent to, and returned from, the remote modem. To work properly, the modems must be on-line with error control disabled.

Result Codes:

OK	n = 0
CONNECT	n = 1, 3, 6
ERROR	Otherwise

&V View Active Configuration and Stored Profile

This command is used to display the active profiles.

&V0: View active file

For example:

Option	Selection	AT Cmd
Comm Standard	Bell	B
CommandCharEcho	Enable	E
Speaker Volume	Medium	L
Speaker Control	OnUntilCarrier	M
Result Codes	Enable	Q
Dialer Type	Tone	T/P
ResultCode Form	Text	V
DialTone Detect	Enable	X
BusyTone Detect	Enable	X
LSD Action	Standard RS232	&C
DTR Action	Standard RS232	&D

Press any key to continue; ESC to quit.

Option	Selection	AT Cmd
V22b Guard Tone	Disable	&G
Flow Control	Hardware	&K
Error Control Mode	V42, MNP, Buffer	\N
Data Compression	Enable	%C
AutoAnswerRing#	0	S0
AT Escape Char	43	S2
CarriageReturn Char	13	S3
Linefeed Char	10	S4
Backspace Char	8	S5
Blind Dial Pause	2 sec	S6
NoAnswer Timeout	50 sec	S7

AT Commands Reference (continued)

"," Pause Time	2 sec	S8

Press any key to continue; ESC to quit.

Option	Selection	AT Cmd
No Carrier Disc	2000 msec	S10
DTMF Dial Speed	95 msec	S11
Escape GuardTime	1000 msec	S12
Data Calling Tone	Disabled	S35
Line Rate	33600	S37
DSVD mode	Disabled	-SSE

Press any key to continue; ESC to quit.

Stored Phone Numbers

&Z0=

&Z1=

&Z2=

&Z3=

OK

&Wn Store Current Configuration

This command stores certain command options and S-register values into the modem's nonvolatile memory. The ATZ command or a power-up reset of the modem restores this profile.

Result Codes:

OK	n = 0
ERROR	Otherwise

&Yn Select Stored Profile for Hard Reset

This command does not change the behavior of the modem but is included for compatibility with applications that issue the &Y0 command

&Y0:	Select stored profile 0 on power-up
&Y1:	ERROR.

Result Codes:

OK	n = 0
ERROR	Otherwise

&Zn=x Store Telephone Number

This command is used to store up to four dialing strings in the modem's nonvolatile memory for later dialing. The format for the command is &Zn = "stored number" where n is the location 0—3 to which the number should be written. The dial string may contain up to 40 characters. The ATDS = n command dials using the string stored in location n.

Result Codes:

OK	n = 0, 1, 2, 3
ERROR	Otherwise

AT Commands Reference (continued)

\G Modem Port Flow Control

\G0: Returns an “OK” for compatibility (default).
\G1: NOT SUPPORTED responds ERROR.

Result Codes:

OK	n = 0
ERROR	Otherwise

\J Adjust Bits/s Rate COntrol

When this feature is enabled, the modem emulates the behavior of modems that force the DTE interface to the line speed.

\J0: Turn off feature (default).
\J1: Turn on feature.

Result Codes:

OK	n = 0, 1
ERROR	Otherwise

\K Set Break Control

This command determines how the modem processes a Break signal received from the local DTE during a connection (online).

\K0: Reserved, returns ERROR.
\K1: Reserved, returns ERROR.
\K2: Reserved, returns ERROR.
\K3: Reserved, returns ERROR.
\K4: Reserved, returns ERROR.
\K5: Modem sends the break to the remote modem in sequence with the transmitted data, non-destructive/non-expedited (default).

Result Codes:

OK	n = 5
ERROR	Otherwise

AT Commands Reference (continued)

\Nn Error Control Mode Selection

This command determines the type of error control used by the modem when sending or receiving data.

\N0: Buffer mode. No error control (same as &Q6).
\N1: Direct mode.
\N2: *MNP* or disconnect mode. The modem attempts to connect using *MNP* 2—4 error control procedures. If this fails, the modem disconnects. This is also known as *MNP* reliable mode.
\N3: V.42, *MNP,* or buffer (default).
The modem attempts to connect in V.42 error control mode. If this fails, the modem attempts to connect in *MNP* mode. If this fails, the modem connects in buffer mode and continues operation. This is also known as V.42/*MNP* auto reliable mode (same as &Q5).
\N4: V.42 or disconnect. The modem attempts to connect in V.42 error control mode. If this fails, the call will be disconnected.
\N5: V.42. *MNP* or buffer (same as \N3).
\N7: V.42. *MNP* or buffer (same as \N3).

Result Codes:

OK n = 0, 1, 2, 3, 4,5,7

\Q Local Flow Control Selection

\Q0: Disable flow control. Same as &K0.
\Q1: XON/XOFF software flow control. Same as &K4.
\Q2: CTS-only flow control. This is not supported and the response is ERROR.
\Q3: RTS/CTS to DTE (default). Same as &K3.

Result Codes:

OK n = 0, 1, 3

ERROR Otherwise

\Tn Inactivity Timer

This command specifies the length of time (in minutes) that the modem will wait before disconnecting when no data is sent or received. A setting of zero disables the timer. Alternatively, this timer may be specified in register S30. This function is only applicable to buffer mode.

Result Codes:

OK n = 0≠255

ERROR Otherwise

\Vn Protocol Result Code

\V0: Disable protocol result code appended to DCE speed.
\V1: Enable protocol result code appended to DCE speed (default).

Result Codes:

OK n = 0, 1

ERROR Otherwise

AT Commands Reference (continued)

-Cn Data Calling Tone

Data Calling Tone is a tone of certain frequency and cadence as specified in V.25 which allows remote Data/FAX/Voice discrimination. The frequency is 1300 Hz with a cadence of .5 s on and 2 s off.

-CO: Disabled (default).
-C1: Enabled.

Result Codes:

OK	n = 0, 1
ERROR	Otherwise

-SSE DSVD command

This command enables or disables DSVD (Digital Simultaneous Voice and Data).

-SSE = 0 Disabled (default)
-SSE = 1 Enabled

\Xn XON/XOFF Pass Through

\X0: Modem processes XON/XOFF flow control characters locally (DEFAULT).
\X1: NOT SUPPORTED responds ERROR.

Result Codes:

OK	n = 0
ERROR	Otherwise

%B View Numbers in Blacklist

If blacklisting is in effect, this command displays the numbers for which the last call attempted in the past two hours failed. The ERROR result code appears in countries that do not require blacklisting.

%Cn Data Compression Control

This command determines the operation of V.42bis and *MNP* class 5 data compression. Online changes do not take effect until a disconnect occurs first.

%C0: V.42bis/*MNP* 5 disabled. No data compression.
%C1: V.42bis/*MNP* 5 enabled. Data compression enabled (default).

Result Codes:

OK	n = 0, 1
ERROR	Otherwise

AT Commands For Testing and Debugging

The following commands are to be used for testing and debugging only and are not meant for general use.

&&C Write to/Read from DSP Register

AT&&C<loc>,<val> writes the value <val> to DSP register at location <loc>.
AT&&C<loc> reads from location <loc>.

&&L Line-to-Line Loopback

This command provides a loopback for line-to-line.

&&R Write to/Read from DSP RAM Location

AT&&R<loc>,<val> writes the value <val> to DSP RAM location <loc>.
AT&&R<loc> reads from location <loc>.

&&S Speaker Codec Loopback

This command provides a loopback from the microphone to the speaker.

The following command is for testing purposes only.

&Fn Load Factory Settings

This command loads the configuration stored and programmed at the factory. This operation replaces all of the command options and the S-register settings in the active configuration with factory values.

&F5: Recall factory settings appropriate for ETC mode as active configuration.

AT Commands Reference S-Registers

S-registers generally affect how the AT commands perform. Contents of the registers can be displayed or modified when the modem is in command mode.

To display the value of an S-register:

TYPE: ATSn? where n is the register number.
PRESS: Enter

To modify the value of an S-register:

TYPE: ATSn = r

where n is the register number, and r is the new register value.

PRESS: Enter

S0 Auto Answer Ring Number

This register determines the number of rings the modem will count before automatically answering a call. Enter 0 (zero) if you do not want the modem to automatically answer at all. When disabled, the modem can only answer with an ATA command.

Range: 0—255

Default: 0

Units: rings

S1 Ring Counter

This register, Ring Counter, is read only. The value of S1 is incremented with each ring. If no rings occur over a six second interval, this register is cleared.

Range: 0—255

Default: 0

Units: rings

S2 AT Escape Character (user defined)

This register determines the ASCII valued used for an escape sequence. The default is the + character. The escape sequence allows the modem to exit data mode and enter command mode when on-line. Values greater than 127 disable the escape sequence.

Range: 0—255

Default: 43

Units: ASCII

S3 Command Line Termination Character (user defined)

This register determines the ASCII values as the carriage return character. This character is used to end command lines and result codes.

Range: 0—127, ASCII decimal

Default: 13 (carriage return)

Units: ASCII

AT Commands Reference S-Registers (continued)

S4 Response Formatting Character (user defined)

This register determines the ASCII value used as the line feed character. The modem uses a line feed character in command mode when it responds to the computer.

Range: 0—127, ASCII decimal

Default: 10 (line feed)

Units: ASCII

S5 Command Line Editing Character (user defined)

This register sets the character recognized as a backspace and pertains to asynchronous only. The modem will not recognize the backspace character if it is set to a value that is greater than 32 ASCII. This character can be used to edit a command line. When the echo command is enabled, the modem echoes back to the local DTE the backspace character, an ASCII space character, and a second backspace character. This means a total of three characters are transmitted each time the modem processes the backspace character.

Range: 0—32, 127

Default: 8 (backspace)

Units: ASCII

S6 Wait Before Dialing

This register sets the length of time, in seconds, that the modem must wait (pause) after going off-hook before dialing the first digit of the telephone number. The modem always pauses for a minimum of two seconds, even if the value of S6 is less that two seconds. The wait for dial tone call progress feature (W dial modifier in the dial string) will override the value in register S6. This operation, however, may be affected by some ATX options according to country restrictions.

Range: 2—65

Default: 2

Units: seconds

S7 Connection Completion Time-Out

This register sets the time, in seconds, that the modem must wait before hanging up because carrier is not detected. The timer is started when the modem finishes dialing (originate), or goes off-hook (answer). In originate mode, the timer is reset upon detection of an answer tone if allowed by country restriction. The timer also specifies the wait for silence time for the @ dial modifier in seconds. S7 is not associated with the W dial modifier.

Range: 1—255

Default: 50

Units: seconds

AT Commands Reference S-Registers (continued)

S8 Comma Dial Modifier Time

This register sets the time, in seconds, that the modem must pause when it encounters a comma (,) in the dial command string.

Range: 0—65

Default: 2

Units: seconds

S10 Automatic Disconnect Delay

This register sets the length of time, in tenths of a second, that the modem waits before hanging up after a loss of carrier. This allows for a temporary carrier loss without causing the local modem to disconnect.

The actual interval the modem waits before disconnecting is the value in register S10.

Range: 1—254

Default: 20

Units: .1 seconds

S11 DTMF Dialing Speed

This register determines the dialing speed which is prefixed for each country.

Range: 50—150

Default: 95

Units: .001 seconds

S12 Escape Guard Time

This register sets the value (in 20 ms increments) for the required pause after the escape sequence (default 1 s).

Range: 0—255

Default: 50

Units: .02 seconds

S28 V.34 Modulation Enable/Disable

This register enables/disables V.34 modulation.

0 = disabled, 1—255 = enabled

Range: 0—255

Default: 1

AT Commands Reference S-Registers (continued)

S30 Inactivity Timer

S30 specifies the length of time (in minutes) that the modem will wait before disconnecting when no data is sent or received. This function is only applicable to buffer mode.

Range: 0—255

Default: 0

Units: minutes

S32 Synthetic Ring Volume

This register specifies a synthetic ring volume in dB with an implied minus sign.

Range:

Default: 16

S33 Synthetic Ring Frequency

This register specifies a synthetic ring frequency. Valid ranges are 0-5, with 0= disabled and 1-5 corresponding to 5 ring frequencies.

Range: 0-5

Default: 0

S35 Data Calling Tone

Data Calling Tone is a tone of certain frequency and cadence as specified in V.25 which allows remote Data/FAX/Voice discrimination. The frequency is 1300 Hz with a cadence of .5 s on and 2 s off.

0 = disabled, 1 = enabled

Range: 0—1

Default: 0

S36 Negotiation Fallback (default 7)

This register specifies the action to take in the event of negotiation failure when error control is selected.

S36 = 0, 2 Hang up.
S36 = 1, 3 Fall back to an asynchronous connection.
S36 = 4, 6 Attempt *MNP*. If *MNP* fails, hang up.
S36 = 5, 7 Attempt *MNP*. If *MNP* fails, fall back to asynchronous connection.

AT Commands Reference S-Registers (continued)

S37 Dial Line Rate (default 0)

S37 = 0	maximum modem speed
S37 = 1	reserved
S37 = 2	1200/75 bits/s
S37 = 3	300 bits/s
S37 =4	reserved
S37 = 5	1200 bits/s
S37 = 6	2400 bits/s
S37 =7	4800 bits/s
S37 = 8	7200 bits/s
S37 = 9	9600 bits/s
S37 = 10	12000 bits/s
S37 = 11	14400 bits/s
S37 = 12	16800 bits/s
S37 = 13	19200 bits/s
S37 = 14	21600 bits/s
S37 = 15	24000 bits/s
S37 = 16	26400 bits/s
S37 = 17	28800 bits/s
S37 = 18	31200 bits/s
S37 = 19	33600 bits/s

S42 Auto Rate (default 1, range 0—1)

This command is used for testing and debugging only.

V.32bis and V.22bis auto rate is disabled. Retrain operation is disabled or enabled in data mode, and fallback is disabled in data mode.

0 = auto rate disabled, 1 = enabled.

Range: 0—1

Default: 1

S43 Auto Mode (default 1, range 0—1)

This command is used for testing and debugging only.

V.32bis startup auto mode operation disabled.

0 = auto mode disabled, 1 = enabled.

Range: 0—1

Default: 1

AT Commands Reference S-Registers (continued)

S48 LAPM Error Control and Feature Negotiation (default 7)

S48 = 7 Negotiation enabled.
S 48 = 128 Negotiation disabled; forces immediate fallback options specified in S36.

The following chart lists the S36 and S48 configuration settings necessary to negotiate certain types of connections.

	S48=7	S48 =128
S36 = 0, 2	LAPM or hangup	do not use
S36 = 1, 3	LAPM or async	async
S36 = 4, 6	LPAM, *MNP*, or hangup	*MNP* or hangup
S36 = 5, 7	LAPM, *MNP*, or async	*MNP* or async

S89 Timer to Control Sleep Mode

This command displays the number of seconds of inactivity (no characters sent from the DTE, no RING) in the off-line command state before the modem places itself into standby mode. A value of zero prevents standby mode.

Note: If a number between 1 and 4 is entered for this register, it will set the value to 5, and the inactivity before standby will be 5 seconds. This is done for compatibility with previous products which allowed time-outs down to 1 s.

Range: 0, 5—255

Default: 10

S90 Local Phone Status

This register tells the status of the Local Phone. It is read only.

0 = local phone on-hook

1 = local phone off-hook

S91 Line Transmit Level

This register is effective only for Japan. It specifies the line transmit level in dB with an implied minus sign.

Range: 6—15

Default: 15

Units: 1 dB

AT Command Set Result Codes

Table 2 shows the Result Codes.

Table 2. The Result Code Summary

Result Code	Numeric	Description
OK	0	Command executed
CONNECT	1	Modem connected to line
RING	2	A ring signal has been detected
NO CARRIER	3	Modem lost carrier signal, or does not detect carrier signal, or does not detect answer tone
ERROR	4	Invalid command
CONNECT 1200 EC*	5	Connection at 1200 bits/s
NO DIALTONE	6	No dial tone detected
BUSY	7	Busy signal detected
NO ANSWER	8	No quiet answer
CONNECT 2400 EC*	10	Connection at 2400 bits/s
CONNECT 4800 EC*	11	Connection at 4800 bits/s
CONNECT 9600 EC*	12	Connection at 9600 bits/s
CONNECT 14400 EC*	13	Connection at 14400 bits/s
CONNECT 19200 EC*	14	Connection at 19200 bits/s
CONNECT 7200 EC*	24	Connection at 7200 bits/s
CONNECT 12000 EC*	25	Connection at 12000 bits/s
CONNECT 16800 EC*	86	Connection at 16800 bits/s
CONNECT 300 EC*	40	Connection at 300 bits/s
CONNECT 21600 EC*	55	Connection at 21600 bits/s
CONNECT 24000 EC*	56	Connection at 24000 bits/s
CONNECT 26400 EC*	57	Connection at 26400 bits/s
CONNECT 28800 EC*	58	Connection at 28800 bits/s
CONNECT 31200 EC*	59	Connection at 31200 bits/s
CONNECT 33600 EC*	60	Connection at 33600 bits/s
CONNECT 38400 EC*	28	Connection at 38400 bits/s
CONNECT 57600 EC*	18	Connection at 57600 bits/s
CONNECT 115200 EC	87	Connection at 115200 bits/s
DELAYED	88	Delay is in effect for the dialed number
BLACKLISTED	89	Dialed number is blacklisted
BLACKLIST FULL	90	Blacklist is full

* EC only appears when the Extended Result Codes configuration option is enabled. EC is replaced by one of the following symbols, depending upon the error control method used:

V42bis—V.42 error control and V.42bis data compression.
V42—V.42 error control only.
MNP 5—*MNP* class 4 error control and *MNP* class 5 data compression.
MNP 4—*MNP* class 4 error control only.
NoEC—No error control protocol.

AT FAX Command Set

Class 1 FAX Commands

The Lucent Technologies HSM Data/FAX Complete Chip Set supports FAX commands conforming to EIA standard 578. These commands are given here with short descriptions; complete explanations are given in the standard, available from the Electronic Industry Association.

The AT FAX Command Set Summary	
Command	**Description**
+FCLASS?	Service class indication
+FCLASS = ?	Service class capabilities
+FCLASS = n	Service class selection
+FTS = <n>	Transmission silence
+FRS = <n>	Receive silence
+FTM = <m>	Transmit FAX data with <m> carrier
+FRM = <m>	Receive FAX data with <m> carrier
+FTH = <m>	Transmit HDLC data with <m> carrier
+FRH = <m>	Receive HDLC data with <m> carrier
+FTM = ?	Transmit FAX modulation
+FRM = ?	Receive FAX modulation
+FTH = ?	Transmit HDLC Data modulation
+FRH = ?	Receive HDLC Data modulation
+FMI = ?	Manufacturer Identification
+FMM = ?	Product Identification
+FMR = ?	Version/Revision Information

AT FAX Commands Reference

+FCLASS? Service Class Indication

This command causes the modem to display the current setting. The modem can operate either as a Class 0 data modem or a class 1 FAX modem.

Typical responses:

+FCLASS? 000 if in data mode; 001 if in FAX class 1, 008 if in voice mode, and 080 if in *VoiceView*† mode.

+FCLASS=? Service Class Capabilities

This command causes the modem to display the classes it supports.

Typical responses:

+FCLASS = ? 0, 1, 8, 80

+FCLASS=n Service Class Selection

This command sets the modem for class n operation, where n is either a 0 or 1.

Parameters: 0, 1, 8, 80

Default: 0

Command options:

+FCLASS = 0 Select data mode.

+FCLASS = 1 Select Facsimile Class 1.

+FCLASS = 8 Select voice mode.

+FLCASS = 80 Select *VoiceView* mode.

+FTS=<n> Transmission Silence

This command causes the modem to stop transmitting data and pause for 10 * n ms. At the end of this period, the modem then responds **OK**. You can specify any number from 0 through 255 as the value of n; for example, a value of 5 specifies a period of 50 ms.

n = 0—255 (10 ms intervals)

+FRS=<n> Receive Silence

This command causes the modem to listen and wait for a 10 * n ms period of silence on the line. At the end of this period, the modem then responds **OK**. You can specify any number from 0 through 255 as the value of n; for example, a value of 5 specifies a period of 50 ms.

n = 0—255 (10 ms intervals)

† *VoiceView* is a registered trademark of Radish Communications Systems, Inc.

AT FAX Commands Reference (continued)

+FTM=<m> Transmit FAX Data with <m> Carrier

This command causes the modem to transmit data at the modulation specified by <m>. The following table shows the values you can enter for this command and the meaning of those values.

Command Option	Modulation	Speed (bits/s)
+FTM=3	V.21 Channel 2	300
+FTM=24	V.27ter	2400
+FTM=48	V.27ter	4800
+FTM=72	V.29	7200
+FTM=96	V.29	9600
+FTM=73	V.17	7200
+FTM=74	V.17 (short train)	7200
+FTM=97	V.17	9600
+FTM=98	V.17 (short train)	9600
+FTM=121	V.17	12000
+FTM=122	V.17 (short train)	12000
+FTM=145	V.17	14400
+FTM=146	V.17 (short train)	14400

+FRM=<m> Receive FAX Data with <m> Carrier

This command causes the modem to receive data at the modulation specified by <m>.

Command Option	Modulation	Speed (bits/s)
+FRM=3	V.21 Channel 2	300
+FRM=24	V.27ter	2400
+FRM=48	V.27ter	4800
+FRM=72	V.29	7200
+FRM=96	V.29	9600
+FRM=73	V.17	7200
+FRM=74	V.17 (short train)	7200
+FRM=97	V.17	9600
+FRM=98	V.17 (short train)	9600
+FRM=121	V.17	12000
+FRM=122	V.17 (short train)	12000
+FRM=145	V.17	14400
+FRM=146	V.17 (short train)	14400

AT FAX Commands Reference (continued)

+FTH=<m> Transmit HDLC Data with <m> Carrier

This command causes the modem to transmit data framed in the HDLC protocol at the modulation specified by <m>.

Command Option	Modulation	Speed (bits/s)
+FTH=3	V.21 Channel 2	300
+FTH=24	V.27ter	2400
+FTH=48	V.27ter	4800
+FTH=72	V.29	7200
+FTH=96	V.29	9600
+FTH=73	V.17	7200
+FTH=74	V.17 (short train)	7200
+FTH=97	V.17	9600
+FTH=98	V.17 (short train)	9600
+FTH=121	V.17	12000
+FTH=122	V.17 (short train)	12000
+FTH=145	V.17	14400
+FTH=146	V.17 (short train)	14400

+FRH=<m> Receive HDLC Data with <m> Carrier

This command causes the modem to receive data framed in the HDLC protocol at the modulation specified by <m>.

Command Option	Modulation	Speed (bits/s)
+FRH=3	V.21 Channel 2	300
+FRH=24	V.27ter	2400
+FRH=48	V.27ter	4800
+FRH=72	V.29	7200
+FRH=96	V.29	9600
+FRH=73	V.17	7200
+FRH=74	V.17 (short train)	7200
+FRH=97	V.17	9600
+FRH=98	V.17 (short train)	9600
+FRH=121	V.17	12000
+FRH=122	V.17 (short train)	12000
+FRH=145	V.17	14400
+FRH=146	V.17 (short train)	14400

AT FAX Commands Reference (continued)

Manufacturer Identification (+FMI?)

Read Syntax: **AT+FMI?**

This parameter reports the manufacturer identification. Typically, the text shall consist of the name of the manufacturer, but the manufacturer may choose to provide more information (e.g., address, telephone number for customer service, etc.). The maximum text length is 80 characters. It is preferred that the first eight characters be unique.

Product Identification (+FMM?)

Read Syntax: **AT+FMM?**

This parameter reports product identification. Typically, the text shall consist of the name of the product. but the manufacturer may choose to provide more information. The maximum text length is 80 characters. It is preferred that the first eight characters be unique.

Version / Revision Information (+FMR?)

Read Syntax: **AT+FMR?**

This parameter reports the version, revision level, or other pertinent information for the device. Typically, the text shall consist of the version of the product, but the manufacturer may choose to provide more information (e.g., date code). The maximum text length is 80 characters. It is preferred that the first eight characters be unique.

Response Format (ATV)

Write Syntax: **ATV<value>**
Valid Values: 0, 1
Default Value: 1
ATV0 non-verbose
ATV1 verbose

The setting of this parameter determines whether the result codes are transmitted in a numeric form or an alphabetic (verbose) form. The following table shows the effect of the setting of this parameter on the format of the result codes.

	ATV0	ATV1
Result Code Format	<numeric code><CR>	<CR><LF> <verbose code><CR><LF>

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