APPENDIX 5

USER'S MANUAL OF EUT

The enclosed manual is for the EUT. As you will notice on the preceding page of this manual is the **FCC WARNING** about radio and television interference as per the requirement set forth in Part 15 of the FCC Rules.

Specification

MODEM OPERATION

Line Rate	0.3, 1.2, 2.4, 4.8, 7.2, 9.6, 12, 14.4, 16.8, 19.2, 21.6, 24, 26.4, 28.8, 31.2, 33.6, 56 Kbps
DTE Rate	115200 bps maximum
Operation	Half or full-duplex over 2-wire dial-up line, asynchronous
Linking	Auto dial/answer, auto bauding, MNP10 auto fall-back/forward
Flow Control	RTS/CTS, XON/XOFF (software selectable)
Compatibility	Bell 103; 212A, ITU-T V.21; V.22; V.23; V.22bis; V.32; V.32bis; V.34; V.90; K56flex (56K model only)
Error Correction	ITU-T V.42, MNP4 (auto-match)
Data Compression	ITU-T V.42bis, MNP5 (auto-match)
Receive Sensitivity	-36 dBm
Command Set	Hayes AT and Escape sequence
Memory	1 configuration profiles
Diagnostics	Power on self-test, V.54 loop test

FAX OPERATION

Speed	14400 bps
Compatibility	Group 3 with T.30 protocol over ITU-T V.17; V.21 ch2; V.27ter; V.29
Command Set	TR-29 Class 1

VOICE OPERATION

Operation	
PVS	Telephone answering machine (TAM), voice mail system, Simultaneuos Voice and Data (SVD), Optional
Sampling Rate	7.2 Khz using 2, 3 or 4 bits ADPCM; 11.025Khz linear PCM

GENERAL

Line Interface	2 x RJ-11 for line and telephone
Voice Interface	2 x mini phone jack for microphone input and audio output
Ambient Temp.	0 to 50
Relative Humidity	10 to 95% non-condensing
Dimensions	1.6w x 10.7h x 13.0d cm

Installing The PC Card Fax/Modem

The following instructions explain how to install the fax/modem into a PC computer. If you will be installing the fax/modem into a different computer, refer to the manual that came with your computer or contact your computer dealer for instructions.

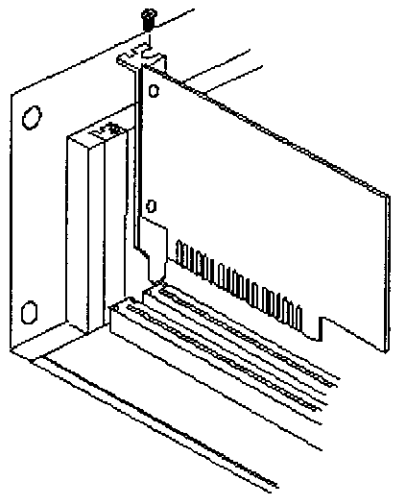
1. Turn off the computer. No power must be applied to your computer when you install the internal fax/modem, or the computer could be damaged.

2. Make sure you can freely access the back of the personal computer. Remove the computer cover.

3. Select any available PCI slot into which you can install the internal fax/modem.

4. Unscrew and remove the slot cover.

5. Hold the internal fax/modem above the slot you have selected, and carefully slide the fax/modem into the slot, applying even pressure to both ends of the fax/modem. Stop inserting the fax/modem when its gold-plated edge connector is aligned and fully seated into the base of the computer.



6. Connect the sound card cable with JP1 and the sound card.(Optional)
7. Connect the wake up ring cable with JP5 and the mother board.(Optional)
8. Use the screw that was holding the slot cover to secure the fax/modem in the slot.
9. Use the cover-mounting screws to secure the computer cover. This completes the hardware installation of your fax/modem.

Connecting To The Telephone Line

Use the following procedure to connect your fax/modem to the telephone line:

1. Locate an available RJ-11 modular jack telephone outlet.

2. Take one end of the modular cord supplied with the fax/modem and plug it into the LINE modular jack on the back of the fax/modem.

3. Plug the other end of the modular cord into the modular jack on the wall outlet, as you would any modular telephone.

Connecting To Your Telephone Set

Your fax/modem also conveniently provides a second modular jack that lets you connect your telephone to the same telephone line that the fax/modem is using. This lets you manually dial data calls or make voice calls when you are not using your fax/modem. Also if you do not have speaker phone and microphone, handset of telephone set can function as an input/output device for voice to verify the connection.

Use the following procedure to connect your telephone to your fax/modem:

1. Connect the telephone's modular cord into the PHONE jack on the back of your fax/modem.
2. Lift your telephone's handset and listen for a dial tone.

AT Command Summary

The following tables summarize the commands implemented by the modem. Commands may be executed when
the modem is in COMMAND mode. COMMAND mode is entered upon under one of the following conditions:

- After power up
- At the termination of a connection
- After the execution of a command other than dial or answer commands (ATO or AT&T)
- Upon the receipt of the ESCAPE SEQUENCE (three consecutive characters matching the contents of
S register 2) while on-line mode
- Upon the on-to-off transition of DTR if &D1, &D2, or &D3 has been set

Table 1. AT Command Set Summary

Command	Description	Command	Description
A/	Repeat last command	&J	Auxiliary relay options
A	Answer command	&K	Local flow control selection
B	Communication standard setting	&M	Asynchronous communications mode
C mode	Carrier control	&Q	Asynchronous communications
D	Dial command	&S	Data set ready (DSR) option
E	Echo command	&T	Self-test commands
F	On-line data character echo command	&V	View the active configuration
H	Hook control	&W	Store current configuration
I	Request ID information	&Y	Select stored profile for hard reset
L	Monitor speaker volume	&Z	Store telephone number
M	Monitor speaker mode	\A	MNP block size
N	Modulation handshake	\B	Send break
O	Return to on-line data mode	\G	Modem port flow control
P	Select pulse dialing	\J	Adjust bits/s rate control
Q	Result code control	\K	Set break control
T	Select tone dialing	\N	Error control mode selection
V	DCE response format	\Q	Local flow control selection
W	Result code option	\R	Ring indicator off after answer
X	Result code selection and call progress monitoring	\T	Inactivity timer
Y	Long-space disconnect	\V	Protocol result code
Z	Reset and recall stored profile	\X	XON/XOFF pass through
&B	V.32 auto retrain	%B	View numbers in blacklist
&C	Data carrier detect (DCD) control	%C	Data compression control
&D	Data terminal ready (DTR)	%E	Automatic rate change
&F	Local factory settings	-C	Data calling tone
&G	V.22bis guard tone control	-V90	Enable/disable V.90 settings

Table 2. AT Testing and Debugging Command Set Summary

Command	Description	Command	Description
&&C	Write to/read from host interface	%T94	Test external DSP RAM

&&L	Line-to-line loopback	%T124	Return to on-chip DSP RAM
&&R Load	Write to/read from DSP RAM location	%T125	K56flex image to external DSP RAM
&&S	Speaker codec loopback	#UD	Unimodem diagnostics

Table 3. The S-Register Summary

Register	Default	Description
S0	0	Automatic answer ring number
S1	0	Ring counter
S2	43	AT escape character
S3	13	Command line termination character
S4	10	Response formatting character
S5	8	Command line editing character
S6	2	Wait before dialing
S7	50	Connection completion time-out
S8	2	Comma dial modifier time
S10	20	Automatic disconnect delay
S11	95	DTMF dialing speed
S12	50	Escape guard time
S14	8	General bit-mapped options status
S21	48	V.24 bit-mapped options status
S22	112	Results bit-mapped options status
S24	10	Timer to control sleep mode
S28	1	V.34 modulation enable/disable
S30	0	Inactivity timer
S32	16	Synthetic ring volume
S33	0	Synthetic ring frequency
S35	0	Data calling tone
S36	7	Negotiation fallback
S37	0	Dial line rate
S38	1	Enable/disable K56flex settings
S42*	1	Auto rate
S43*	1	Auto mode
S48	7	LAPM error control and feature negotiation
S89	10	Timer to control sleep mode
S90	10	Local phone status
S91	15	Line transmit level
S108	7	Network codec type

- S-registers 42, and 43 are for test and debugging purposes only.

Table 4. 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 bit/s
NO DIALTONE	6	No dial tone detected
BUSY	7	Busy signal detected

Result Code	Numeric	Description
NO ANSWER	8	Remote end never answered
CONNECT 2400 EC*	10	Connection at 2400 bit/s
CONNECT 4800 EC*	11	Connection at 4800 bit/s
CONNECT 9600 EC*	12	Connection at 9600 bit/s
CONNECT 14400 EC*	13	Connection at 14400 bit/s
CONNECT 19200 EC*	14	Connection at 19200 bit/s
CONNECT 7200 EC*	24	Connection at 7200 bit/s
CONNECT 12000 EC*	25	Connection at 12000 bit/s
CONNECT 16800 EC*	86	Connection at 16800 bit/s
CONNECT 300 EC*	40	Connection at 300 bit/s
CONNECT 21600 EC*	55	Connection at 21600 bit/s
CONNECT 24000 EC*	56	Connection at 24000 bit/s
CONNECT 26400 EC*	57	Connection at 26400 bit/s
CONNECT 28800 EC*	58	Connection at 28800 bit/s
CONNECT 31200 EC*	59	Connection at 31200 bit/s
CONNECT 33600 EC*	60	Connection at 33600 bit/s
CONNECT 38400 EC*	28	Connection at 38400 bit/s (DTE rate)
CONNECT 57600 EC*	18	Connection at 57600 bit/s (DTE rate)
CONNECT 115200 EC*	87	Connection at 115200 bit/s (DTE rate)
DELAYED	88	Delay is in effect for the dialed number
BLACKLISTED	89	Dialed number is blacklisted
BLACKLIST FULL	90	Blacklist is full
CONNECT 32000 EC*	70	Connection at 32000 bit/s (K56flex mode) or V.90
CONNECT 34000 EC*	71	Connection at 34000 bit/s (K56flex mode)
CONNECT 36000 EC*	72	Connection at 36000 bit/s (K56flex mode) or V.90
CONNECT 38000 EC*	73	Connection at 38000 bit/s (K56flex mode)
CONNECT 40000 EC*	74	Connection at 40000 bit/s (K56flex mode) or V.90
CONNECT 42000 EC*	75	Connection at 42000 bit/s (K56flex mode)
CONNECT 44000 EC*	76	Connection at 44000 bit/s (K56flex mode) or V.90
CONNECT 46000 EC*	77	Connection at 46000 bit/s (K56flex mode)
CONNECT 48000 EC*	78	Connection at 48000 bit/s (K56flex mode) or V.90
CONNECT 50000 EC*	79	Connection at 50000 bit/s (K56flex mode)
CONNECT 52000 EC*	80	Connection at 52000 bit/s (K56flex mode) or V.90
CONNECT 54000 EC*	81	Connection at 54000 bit/s (K56flex mode)
CONNECT 56000 EC*	82	Connection at 56000 bit/s (K56flex mode)
CONNECT 28000 EC*	100	Connection at 28000 bit/s (V.90 mode)
CONNECT 29333 EC*	101	Connection at 29333 bit/s (V.90 mode)
CONNECT 30666 EC*	102	Connection at 30666 bit/s (V.90 mode)
CONNECT 33333 EC*	103	Connection at 33333 bit/s (V.90 mode)
CONNECT 34666 EC*	104	Connection at 34666 bit/s (V.90 mode)
CONNECT 37333 EC*	105	Connection at 37333 bit/s (V.90 mode)
CONNECT 38666 EC*	106	Connection at 38666 bit/s (V.90 mode)
CONNECT 41333 EC*	107	Connection at 41333 bit/s (V.90 mode)
CONNECT 42666 EC*	108	Connection at 42666 bit/s (V.90 mode)
CONNECT 45333 EC*	109	Connection at 45333 bit/s (V.90 mode)
CONNECT 46666 EC*	110	Connection at 46666 bit/s (V.90 mode)
CONNECT 49333 EC*	111	Connection at 49333 bit/s (V.90 mode)
CONNECT 50666 EC*	112	Connection at 50666 bit/s (V.90 mode)
CONNECT 53333 EC*	113	Connection at 53333 bit/s (V.90 mode)
CONNECT 54666 EC*	114	Connection at 54666 bits/s (V.90 mode)

* 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 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.
For multiple AT commands in the same command line, the commands are executed in the order received from the
DTE. Should execution of a command result in an error, or a character be not recognized as a valid command,
execution is terminated, the remainder of the command line is ignored, and the ERROR result code is issued.
Otherwise, if all commands execute correctly, only the result code associated with the last command shall be
issue; result codes for preceding commands are suppressed.
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

Cn Carrier Control

The modem will accept the C1 command without error in order to ensure 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. The modem
displays the dialing string in the following format: "Dialing...xxxxxxx" where "xxxxxxx" is the last number
dialed.
P Pulse dialing. (e.g. ATDPxxx. Dialing set to pulse as default.)
T Touch-tone dialing (default). (e.g. ATDTxxx. Dialing set to tone as 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

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., ?????????)
I6 Response OK
I7 Response OK
I8 Response OK
I9: Returns country code (e.g., North America 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

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

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

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

&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). If this
signal is not present, the modem will not answer or dial.
&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: When this command is placed on the command line at the same time as another AT command, the function
of this command is ignored. To load the factory settings, this command must be issued by itself.
&F0: Recall factory setting as active configuration.
&F5: Recall factory settings appropriate for ETC mode as active configuration. This command enables
ETC operation. It is automatically set upon detection of the cellular phone, enable by the)Cn command. The following options are set with &F5:

Function	**MTC Implementation**
LAPM only error correction	\N4
Maximum block size = 64	S20=64
Modulation = V.32bis	S28=0
Transmit Level fixed per cell phone	S92
Wait for Carrier = 90 sec	S7=90
CD loss delay = 10 sec	S10=100
Auto FF/FB enabled	N/A
Startup at 9600	S40=2
Selects V.22 when applicable	B1

&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
&Pn Pulse Dial Make-to-Break Ratio Selection
This Command is effective only for Japan.
&P0 39/61 make/break ratio, 10PPS
&PI 33/67 make/break ratio, 10PPS (default)
&P2 33/67 make/break ratio, 20PPS
Result Codes:
OK n = 0, 1, 2
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

&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

&V0 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
ExtendResultCode	Enabled	X
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	V42bis/MNP5	%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
"," 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= 101
&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 powerup 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 powerup
&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

\An Select Maximum MNP Block Size
The modem will operate an MNP error corrected link using a maximum block size controlled by the parameter

supplied.
\AO 64 characters.
\A1 128 characters.
\A2 192 characters.
\A3 256 characters (DEFAULT).
Result Codes:
OK n = 0, 1, 2, 3
ERROR Otherwise

\Bn Transmit Break to Remote

In non-error correction mode, the modem will transmit a break signal to the remote modem with a length in
multiples of 100ms according to parameter specified. The command works in conjunction with the \K command.
\B1-\B9 Break length in 100ms units. (Default = 3.) (Non-error corrected mode only.)
Result Codes:
OK If connected in data modem mode.
NO CARRIER If not connected or connected in fax modem mode.

\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

\Kn Break Control

Controls the response of the modem to a break received from the DTE or the remote modem or the
\B command.
The response is different in three separate states.
The first state is where the modem receives a break from the DTE when the modem is operating in data transfer
mode:
\K0 Enter on-line command mode, no break sent to the remote modem.
\K1 Clear data buffers and send break to remote modem.
\K2 Same as 0.
\K3 Send break to remote modem immediately.
\K4 Same as 0.
\K5 Send break to remote modem in sequence with transmitted data. (Default.)
The second case is where the modem is in the on-line command state (waiting for AT commands) during a data
connection, and the \B is received in order to send a break to the remote modem:
\K0 Clear data buffers and send break to remote modem.
\K1 Clear data buffers and send break to remote modem. (Same as 0.)
\K2 Send break to remote modem immediately.
\K3 Send break to remote modem immediately. (Same as 2.)
\K4 Send break to remote modem in sequence with data.
\K5 Send break to remote modem in sequence with data. (Same as 4.) (Default.)

The third case is there a break is received from a remote modem during a connection:
\K0 Clear data buffers and send break to the DTE.
\K1 Clear data buffers and send break to the DTE. (Same as 0.)
\K2 Send a break immediately to DTE.
\K3 Send a break immediately to DTE. (Same as 2.)
\K4 Send a break in sequence with received data to DTE.
\K5 Send a break in sequence with received data to DTE. (Same as 4.) (Default.)
Result Codes:
OK n = 0,1, 2, 3, 4, 5
ERROR Otherwise

\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 in MNP 2—4 error control procedure. 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
\Rn Ring indicator signal off after the telephone call is answered (Compatibility command)
\R0 ring indicator signal is off after the telephone call is answered
Result Codes:
OK n = 0
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

\V1: Enable protocol result code
\V2: Enable protocol result code
Result Codes:
OK n = 0, 1, 2
ERROR Otherwise
\Xn XON/XOFF Pass Through
\X0 Modem processes XON/XOFF flow control characters locally (DEFAULT).
\X1 Modem processes and pass XON/XOFF flow control characters.
Result Codes:
OK n = 0, 1
ERROR Otherwise
-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
%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 Enable/Disable Data Compression
Enables or disables data compression negotiation on an error corrected link.
%C0 Disables data compression
%C1 Enables both V.42 bis and MNP 5 data compression
Result Codes:
OK n = 0, 1
ERROR Otherwise

%En Enable/Disable Auto-Retrain and Fallback/Fall Forward
Provides option for the modem to automatically monitor line quality to fall back when line quality is insufficient and
to fall forward when line quality is sufficient.
%E0 Disable fallback/fall forward
%E1 Disable fallback/fall forward
%E2 Enable fallback/fall forward
Result Codes:
OK n = 0,1, 2
ERROR Otherwise
%Xn Enable/Disable re-dialing
Enables or disables re-dialing.
%X0 Disables re-dialing suppression. (Default)
%X1 Enables re-dialing suppression. Displays "No Carrier" when re-dialing.
Result Codes:
OK n = 0,1
ERROR Otherwise
+ES = 6 Enable Synchronous Buffered Mode
The synchronous buffered data mode allows an H.324 video application direct access to the synchronous data

channel. On underflow, the modem sends HDLC flag idle (0x7E) to the remote modem. This special error control
mode is overridden by any of the following commands: &F, &M, &Q, and \N.
Result Codes:
OK +ES = 6
+ES:6 +ES? or +ES = ? shows the only allowed value.
ERROR Otherwise

)CnEnable Direct Connect

This command enables direct connect operation. After a phone is enabled, the modem will operate in cellular
mode whenever the phone is detected. Otherwise, it will automatically switch to landline. ETC is automatically
set when operating in cellular mode.
)C0 Selects landline
)C1 Selects OKI/AT&T type phones (may be deleted).
)C2 Selects Motorola phones.
)C3 Selects NEC type phones.

AT Commands and S Registers 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 and S Registers for Testing and Debugging

(Continued)

ATI11 Display Diagnostic Information for the last modem connection

The "ATI11" command displays the following diagnostic information for the last modem connection. A value of
"NA" will be displayed if that parameter is not applicable for that connection.

Table 1. Diagnostic Information

Description	Example	Comments
Last Connection	V.34	56K/V.34/V.32 - The last data connection is successful. Failure - The last data connection failed.
Initial Transmit Carrier Rate	33600	
Initial Receive Carrier Rate	33600	
Final Transmit Carrier Rate	33600	
Final Receive Carrier Rate	33600	
Protocol Negotiation Result	V.42	Possible results are: V.42, MNP or noEC

Data Compression Result	V.42bis	Possible results are: V.42bis, MNP5 or no Compression.
Estimated Noise Level	10	An average of the squared error between the received constellation point and the decision point.
Receive Signal Power Level (-dBm)	20	Receive signal level in -dBm
Transmit Signal Power Level (-dBm)	10	Transmit signal level in -dBm
Round Trip Delay (msec)	60	Measured Round Trip Delay in milliseconds
Near Echo Level (-dBm)	39	Measured Near Echo Level in -dBm
Far Echo Level (-dBm)	60	Measured Far Echo Level in -dBm
Transmit Frame Count	5000	Number of HDLC frames transmitted.
Transmit Frame Error Count	10	Number of frame errors transmitted
Receive Frame Count	5000	Number of HDLC frames received.
Receive Frame Error Count	10	Number of frame errors received
Retrain and Rate Negotiate Event by the Local Modem	10	Number of retrains initiated by the local modem.
Retrain and Rate Negotiate Event by the remote Modem	10	Number of retrains initiated by the remote modem.
Call Termination Cause	0	0 - Call Terminated by Local Modem 1 - Call Terminated by Remote Modem 2 - No Answer - the Remote Modem did not answer 3 - Training Failure - the modems failed to negotiate V.34 or 56K protocols. 4 – Protocol Failure - the modems failed to negotiate V.42 protocol.
Robbed-Bit Signaling	1	56K only : 0 - the connection does not use robbed-bit signaling 1 - the connection uses robbed-bit signaling
Digital Loss	0	Digital Loss in dB.

S-Registers Reference

S-Registers Definitions

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
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 than 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

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: 0.1 seconds

S11 DTMF Dialing Speed
This register determines the dialing speed which is prefixed for each country.
Range: 50—150
Default: 95
Units: 0.001 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: 0.02 seconds

S14 General Bit Mapped Options Status
Indicates the status of command options. Only bit 2 and bit 5 are used, read only.
Bit 3 Result codes (Vn)
0 = Numeric (V0)
1 = Verbose (VI) (Default)
Bit 6 Pulse dial PPS selection (&Pn)
0 = 10 PPS (&p0, &p1) (Default)
1 = 20 PPS (&p2)
Default: 8 (00001000b)

S21 V.24/General Bit Mapped Options Status
Indicates the status of command options. Only bits 3, 4 and 5 are used, read only.
Bits 3-4 DTR behavior (&Dn)
0 = &D0 selected
1 = &D1 selected
2 = &D2 selected (Default)

3 = &D3 selected
Bit 5 DCD behavior (&Cn)
0 = &C0 selected
1 = &C1 selected (Default)
Default: 48 (00110000b)

S22 Results Bit Mapped Options Status

Indicates the status of command options. Only bits 4, 5 and 6 are used, read only.
Bits 4-6 result codes (Xn)
0 = X0 selected
4 = X1 selected
5 = X2 selected
6 = X3 selected
7 = X4 selected (Default)
Bit 7 Pulse dial make/break ratio (&Pn)
0 = 33/67 make/break ratio (&P1, &P2) (Default)
1 = 39/61 make/break ratio (&P0)
Default: 112 (01110000b)

S24 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

S28 V.34 Modulation Enable/Disable

This register enables/disables V.34 modulation.
0 = disabled, 1—255 = enabled,
Range: 0—255
Default: 1

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.
S37 Dial Line Rate (default 0)
S37 = 0 maximum modem speed
S37 = 1 reserved
S37 = 2 1200 bits/s and 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

S38 56K Dial Line Rate (default 1)
There are 2 new S-registers for 56K . S38 sets the maximum 56K downstream speed that the modem attempts to
connect. To disable 56K, set S38 to 0. S37 register is used to control the upstream V.34 rate. (ref. V.34 Data/Fax
Document).
S38 = 0 56K disabled
S38 = 1 56K enabled - automatic speed selection - maximum modem speed
S38 = 2 32000 bits / s
S38 = 3 34000 bits / s
S38 = 4 36000 bits / s
S38 = 5 38000 bits / s
S38 = 6 40000 bits / s
S38 = 7 42000 bits / s
S38 = 8 44000 bits / s
S38 = 9 46000 bits / s
S38 = 10 48000 bits / s
S38 = 11 50000 bits / s
S38 = 12 52000 bits / s
S38 = 13 54000 bits / s
S38 = 14 56000 bits / s
S40 ETC Startup Autorating (default 0, range 0—---2)
S20=0 Startup with normal autorating.

S20=1 Startup at initial rate of 4800 or below.
S20=2 Startup at initial rate of 9600 or below.
Range: 0—2
Default: 0

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
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
S92 Direct Connect Transmit Level (default 20)

Sets the transmit level, in dBm for direct connect. This value may have different settings for different phones.

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
CONNECT 42000 EC*	75	Connection at 42000 bits/s, 56K rate
CONNECT 44000 EC*	76	Connection at 44000 bits/s, 56K rate
CONNECT 46000 EC*	77	Connection at 46000 bits/s, 56K rate
CONNECT 48000 EC*	78	Connection at 48000 bits/s, 56K rate
CONNECT 50000 EC*	79	Connection at 50000 bits/s, 56K rate
CONNECT 52000 EC*	80	Connection at 52000 bits/s, 56K rate
CONNECT 54000 EC*	81	Connection at 54000 bits/s, 56K rate
CONNECT 56000 EC*	82	Connection at 56000 bits/s, 56K rate
CONNECT 58000 EC*	83	Connection at 58000 bits/s, 56K rate
CONNECT 60000 EC*	84	Connection at 60000 bits/s, 56K rate

* 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)

+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

+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

Manufacturer Identification (+FMI?)
Read Syntax: **AT+FMI?**
This parameter reports the manufacturer identification. Typically, the text consists 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 consists 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
consists 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 nonverbose
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>

AT Voice Command Set

The AT Voice Command set follows a modified IS-101 architecture. The commands are sent through the comm
port, but the data path is sent either through the comm port or through a DMA channel using the wave driver.
Tables 1 and 2 show a summary of the AT Voice Command Set.

Summary of the AT Voice Command Set

Table 1. The AT Voice Command Set

Voice Commands

Command Description

AT+FCLASS=8 Enter voice mode
AT+VIP Initialize voice parameters
AT+VCID Caller ID
AT+VDR Distinctive ring
AT+VGT Speaker volume control
AT+FMI? Report manufacturer ID
AT+FMM? Report product model information
AT+FMR? Report product revision level
AT+VIT DTE/DCE inactivity timer
AT+VNH Automatic hang-up control
AT+VTD Set beep tone duration timer
AT+VLS Analog source/destination selection and DTMF/tone reporting
AT+VSD Set silence detection timer
AT+VRA Set ringback goes away timer
AT+VRN Set ringback never came timer
AT+VTS DTMF/tone generation
AT+VTX Enter voice transmit state
AT+VRX Enter voice receive state
AT+VSM Voice compression method
AT+VEM Event reporting and masking
AT+VGR Receive gain selection
AT+VPR Select DTE/DCE interface rate
AT+VSP Speakerphone ON/OFF
AT+VGM Microphone Gain
AT+VGS Speaker Gain

Table 2. The AT Voice Command Set Not Defined In IS-101 Specification

Command Description

ATS32 Synthetic ring volume
ATS33 Synthesized ring frequency

AT Voice Commands Reference

General AT Voice Commands

AT+FCLASS=8 Enter Voice Mode

The command AT+FCLASS=8 puts the modem in voice mode. Speakerphone and TAD modes are subsumed
under the more general heading of voice mode, and use a particular subset of voice mode commands to
implement their respective features and functions.
The modem controller will maintain the overall state of the system so as to know when voice commands are
issued in the context of using the speakerphone versus TAD or other voice contexts.

- AT+FCLASS? Returns the current DCE mode
- AT+FCLASS=? Queries the DCE for the range of modes supported

DCE returns: 0, 1, 8, 80 (data, FAX, voice, VoiceView)

AT+VIP Initialize Voice Parameters

The command AT+VIP causes the modem to initialize all the voice parameters to their default values. The
command has no effect on the +FCLASS setting.

AT+VCID=<pmode> Caller ID

With this command caller identification is enabled/disabled.

- Disable caller ID: <pmode>=0
- Enable, formatted caller report: <pmode>=1
- Enable, unformatted caller report: <pmode>=2
- AT+VCID? Returns the current caller ID pmode
- AT+VCID=? Queries the DCE for the range of supported caller ID report formats

DCE returns: 0, 1, 2

AT+VDR=<enable>,<report> Distinctive Ringing & Cadence Report

This command will enable the distinctive ringing feature. This will allow a report of DROF/DRON to follow an exact
ring cadence coming over the phone line.

- AT+VDR? Returns the current values of <enable> and <report
- AT+VDR=? Queries the DCE for the range of supported distinctive ring configurations

DCE returns: (0, 1), (0—255)

AT+VGT=<level> Speaker Volume Control

This command will enable the speaker volume control.

- <level> is 0—255
- <level>=128: Nominal volume level for sending to speaker
- <level>=<value greater than 128>: Increase volume above nominal level
- <level>=<value less than 128>: Decrease volume below nominal level

AT+VGT? Returns current value
AT+VGT=? Returns range of supported values

AT Voice Commands Reference (continued)

AT+VGR=<gain> Receive Gain Selection

This command will enable the receive microphone gain control.

- <gain> is 0—255: the only useful range is 121—134
- <gain>=128: nominal level for receive gain from microphone
- <gain>=<value greater than 128>: increase gain above nominal level
- <gain>=<value less than 128>: decrease gain below nominal level

TAD mode—This command may be used in TAD local recording to control the recording level from
the microphone.
Speakerphone mode—This command may be used to control the gain to the remote caller.
AT+VGR? Returns current value of receive gain
AT+VGR=? Returns range of supported gain values

AT+VEM=<mask> Event Reporting and Masking

The DTE can use this command to disable an event report regardless of the DCE state, or of the analog signal
source or destination configuration. Mask is Bits 0—33 (i.e., FFFFFFFFC). See the IS-101 specification for
defined bit values.

- AT+VEM? Returns the current values of the mask
- AT+VEM=? Queries the DCE for the range of supported service level events

AT+FMI?, AT+FMM?, AT+FMR DCE Identification Commands

This command will enable DCE identification.

- +FMI? = Report manufacturer ID
- +FMM? = Report product identification (model)
- +FMR? = Report version or revision level

AT+VIT = <Timer> DTE/DCE Inactivity Timer

This command sets the DCE's value for the DTE/DCE inactivity timer. The units are in one seconds.

- AT+VIT? Returns the current value of the timer
- AT+VIT=? Queries the DCE for the range of supported values

AT+VNH = <Hook> Automatic Hang-up Control

This command causes the DCE to enable or disable automatic hangups in the data and facsimile modes. See the ISO-101 specification for the detailed description of this command and its interaction with the +FCLASS and ATH commands.

- <hook> = 0 The DCE retains automatic hangups (which is the way in the other non-voice modes).
- <hook> = 2 The DCE disables automatic hangups in the other non-voice modes. The DTE only performs a logical hangup (returs the "OK" result code).

AT+VNH? Returns the current value

AT+VNH=? Returns the supported values

AT Commands Related to Speakerphone Operation

AT+VLS=<label> Analog Source/Destination Selection

This is a general purpose analog source/destination command that attaches various analog devices to the system in voice mode.

- Speakerphone on: AT+VLS=7.

Attach internal speaker and internal microphone, DCE off-hook.

- Speakerphone off: AT+VLS=0.

Detach analog devices, DCE on-hook.

- Microphone Control/Phone Muting:

AT+VLS=5 disables/detaches microphone analog source (leaving speaker only) when speakerphone is in operation (phone mute feature).

AT+VLS=7 restores/attaches microphone along with speaker (normal speakerphone operation).

- AT+VLS? reports the current analog source/destination configuration, along with a listing of all event codes reported from the modem to the DTE under that configuration.
- AT+VLS=? queries the DCE for the range of supported configurations and the list of unsolicited event codes that the modem will report to the DTE under each configuration. For speakerphone, the configurations supported are 0, 5, and 7—as explained above.

AT Voice Command Set Related to Telephone Answering Device

AT+VTD=<dur> Beep Tone Duration Timer

This command sets the default duration for DTMF/tone generation in 0.01 s increments. For DTMF digits, beep tone duration is the interdigit time. For tone generation, this number is the actual tone duration.

AT+VTD? Returns the current value

AT+VTD=? Returns the supported values

AT+VTS=<string> DTMF and Tone Generation in Voice Mode

This command will cause the modem to produce a sequence of DTMF tones (or other tones, such as dial tone, busy, silence, etc.) as specified in the string parameter. Specifications for the format of tone strings are detailed in IS-101.

- AT+VTS=? reports the range of frequencies supported for tone generation, as well as tone duration.

Example: (300—3000), (300—3000), (0—400).

AT+VLS=? Analog Source/Destination Selection and DTMF/Tone Reporting

Requests for the modem's DTMF/Tone reporting capabilities are made using this command. For each system
configuration in voice mode (i.e., speakerphone and answering machine), the modem reports the capabilities that
are enabled for the configuration.
Also, for each configuration, the modem indicates tone-reporting capabilities for each of the three different voice
states: voice transmit data, voice receive data, and voice command state (voice idle).
TAD supports each of the following IS-101 analog source/destination configurations:
Label # Description
0 DCE on-hook, local phone connected to Telco.
1 DCE off-hook, DCE connected to Telco.
2 DCE off-hook, local phone connected to DCE.
3 DCE off-hook, local phone connected to Telco, DCE to local phone.
4 Speaker connected to DCE, DCE on-hook (playback messages)
5 Speaker connected to DCE, DCE off-hook (call screening)
6 Microphone connected to DCE, DCE on-hook (record greeting)
7 Microphone and speaker connected, DCE off-hook (speakerphone)

AT+VSD=<sds, sdi> Silence Detection (QUIET and SILENCE)

This command sets both the **silence detection sensitivity** (<sds>) and **silence detection interval** (<sdi>).

- Larger values of <sds> indicate that the modem is to treat noisier line conditions as silence.

<sds> = 128 ; Nominal level of sensitivity; –40 dBm (default) .
<sds> > 128 ; More aggressive ; <sds>=129 is –39 dBm.
<sds> < 128 ; Less aggressive; <sds>=127 is –41 dBm.

- The <sdi> specifies the amount of time the modem shall wait before reporting silence to the DTE. It is used for
determining :
Presumed hang-up (SILENCE), after which the modem sends <DLE>-s to DTE.
Default is 5 seconds.
AT+VSD? Returns the current value
AT+VSD=? Returns the supported values

AT+VTX Enter Voice Transmit Data State

Using this command will cause the modem to begin the voice transmission process with the voice stream sent
through the comm port. Applications using the wave interface do not use the AT+VTX command.
There are two ways for the DCE to leave voice transmit state:
1. Modem receives <DLE> - <ETX> in voice stream.
2. DTE/DCE inactivity timer expires.

AT+VRX Enter Voice Receive Data State

Using this command enables the modem to begin voice receive state with the voice stream received through the
comm port. Applications using the wave interface do not use the AT+VRX command. The modem returns the
CONNECT result code to the DTE.
The DCE leaves voice receive state when:
1. Modem receives <DLE> - ! from the DTE.
2. Upon expiration of the silence detection timer, the modem passes <DLE> shielded event codes indicating presumed hang-up (<DLE>-s), or presumed end-of-message (<DLE-q>).

AT+VSM=<cml>,<vsr> Compression Method and Sampling Rate Specifications

This command enables the compression method and sampling specifications where cml = compression method

Example: (300—3000), (300—3000), (0—400).

AT+VLS=? Analog Source/Destination Selection and DTMF/Tone Reporting
Requests for the modem's DTMF/Tone reporting capabilities are made using this command. For each system
configuration in voice mode (i.e., speakerphone and answering machine), the modem reports the capabilities that
are enabled for the configuration.
Also, for each configuration, the modem indicates tone-reporting capabilities for each of the three different voice
states: voice transmit data, voice receive data, and voice command state (voice idle).
TAD supports each of the following IS-101 analog source/destination configurations:
Label # Description
0 DCE on-hook, local phone connected to Telco.
1 DCE off-hook, DCE connected to Telco.
2 DCE off-hook, local phone connected to DCE.
3 DCE off-hook, local phone connected to Telco, DCE to local phone.
4 Speaker connected to DCE, DCE on-hook (playback messages)
5 Speaker connected to DCE, DCE off-hook (call screening)
6 Microphone connected to DCE, DCE on-hook (record greeting)
7 Microphone and speaker connected, DCE off-hook (speakerphone)
AT+VSD=<sds, sdi> Silence Detection (QUIET and SILENCE)
This command sets both the **silence detection sensitivity** (<sds>) and **silence detection interval** (<sdi>).
- Larger values of <sds> indicate that the modem is to treat noisier line conditions as silence.

<sds> = 128 ; Nominal level of sensitivity; –40 dBm (default) .
<sds> > 128 ; More aggressive ; <sds>=129 is –39 dBm.
<sds> < 128 ; Less aggressive; <sds>=127 is –41 dBm.
- The <sdi> specifies the amount of time the modem shall wait before reporting silence to the DTE. It is used for
determining :
Presumed hang-up (SILENCE), after which the modem sends <DLE>-s to DTE.
Default is 5 seconds.

AT+VSD? Returns the current value
AT+VSD=? Returns the supported values
AT+VTX Enter Voice Transmit Data State
Using this command will cause the modem to begin the voice transmission process with the voice stream sent
through the comm port. Applications using the wave interface do not use the AT+VTX command.
There are two ways for the DCE to leave voice transmit state:
1. Modem receives <DLE> - <ETX> in voice stream.
2. DTE/DCE inactivity timer expires.

AT+VRX Enter Voice Receive Data State
Using this command enables the modem to begin voice receive state with the voice stream received through the
comm port. Applications using the wave interface do not use the AT+VRX command. The modem returns the
CONNECT result code to the DTE.
The DCE leaves voice receive state when:
1. Modem receives <DLE> - ! from the DTE.
2. Upon expiration of the silence detection timer, the modem passes <DLE> shielded event codes indicating presumed hang-up (<DLE>-s), or presumed end-of-message (<DLE-q>).

AT+VSM=<cmI>,<vsr> Compression Method and Sampling Rate Specifications
This command enables the compression method and sampling specifications where cmI = compression method

label and vsr = voice sampling rate.
- AT+VSM? returns the numeric and string labels of the compression method currently in use, and the sampling
rate currently in use.
- AT+VSM=? reports the voice compression methods supported by the DCE, and the voice sampling rates at
which they are supported: The default is 129,8000 (16-bit linear, 8.0 kHz)
- 128, 8-bit linear, (7200, 8000, 11025)
- 129, 16-bit linear, (7200, 8000, 11025)
- 130, 8-bit A-law, (8000)
- 131, 8-bit μ-law, (8000)
- 132, IMA ADPCM, (8000)

AT+VRA=<interval> Ringback Goes Away Timer
The modem uses the ringback goes away timer when originating a call.
This command sets this timer to the amount of time the modem shall wait between ringbacks before assuming that
the remote station has gone off-hook.
AT+VRA? Returns the current value.
AT+VRA=? Returns the range of supported values.

AT+VRN=<interval> Ringback Never Appeared Timer
The modem uses the ringback never appeared timer when originating a call.
The AT+VRN command sets this timer to the amount of time that the modem shall spend looking for an initial
ringback. If ringback is not detected within this interval, the modem shall assume that the remote station has gone
off-hook.
AT+VRN? Returns the current value.
AT+VRN=? Returns the supported values.

AT+VPR=<rate> Select DTE/DCE Interface Rate
The AT+VPR command returns an OK for any rate but has no action.

Events Reported to the DTE :
The modem will return OK when going off-hook in voice mode (+FCLASS=8). After answering in voice mode, the
modem may send any of the following <DLE> shielded event codes to the DTE, as appropriate:

<DLE> Shielded Codes Sent from DCE to DTE

Code	Character Description
0—9, A—D, #, *	DTMF tones
a	Answer tone
b	Busy tone
c	Fax calling tone
d	Dial tone
e	Data calling tone
h	Local phone on-hook
H	Local phone off-hook
R	Ring
s	Silence timer has expired
<ETX>	End of voice data transmission
@	CAS tone detected

<DLE> Codes Sent to DCE:
For simple actions in voice mode, the modem may send any of the following <DLE> shielded event codes
(in ASCII) to the DTE, as appropriate:

<DLE> Shielded Codes Sent from DTE to DCE

Code	Character Description
u	Bump up the volume by 1 dB

d Bump down the volume by 1 dB
<ETX> End of voice data transmission
! End receive data state

AT+VSP=<mode> Speakerphone ON/OFF (+VSP)
Default Mandatory
<mode> 0 = Off 0 or 1
This command turns the Speakerphone function ON (mode =1) or OFF (mode = 0)

AT+VGM=<gain> Microphone Gain (+VGM)
Default Mandatory
<gain> Manufacturer Specific 0 - 255
This command sets the microphone gain of the Speakerphone function. <gain> is an unsigned octet where values
greater than 128 indicate a gain larger than nominal and values smaller than 128 indicate a gain smaller than nominal.

AT+VGS=<gain> Speaker Gain (+VGS)
Default Mandatory
<gain> Manufacturer Specific 0 - 255
This command sets the speaker gain of the Speakerphone function. <gain> is an unsigned octet where values
greater than 128 indicate a gain larger than nominal and values smaller than 128 indicate a gain smaller than
nominal.

AT Voice Command Set Not Defined In IS-101 Specifications

S32 Synthetic Ring Volume
This command will provide a synthetic ring volume in dB with an implied minus sign. The default = 10.

S33 Synthetic Ring Frequency
This command will provide a synthetic ring frequency. The valid values are 0—5, with 0 = disabled and 1—5 = five
varying ring frequencies. The default = 0.

AT+VTS=!
This does a flash hook.