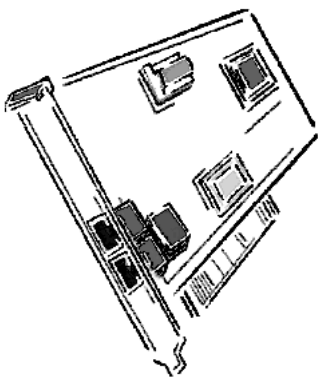
FAX / MODEM

USER'S GUIDE



Ver 1.0

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FCC Compliance Statement

This device complies with Part 15 and 68 of the FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and

2. this device must accept any interference received, including interference that may cause undesired operation.

FCC Warning Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 and 68 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can emit radio frequency energy and, if not installed or used in accordance with the instructions, may cause interference to radio communications. However, television reception interference can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver
- Connect the equipment into an outlet different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

☞ *Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment*

The information contained in this manual has been verified at the time of this manual's printing. The manufacturer reserves the right to make any change and improvement in the product described in this manual at any time and without notice.

Version 1.0

Table of Contents

Section One - Introduction

Your new 56Kbps modem is a high speed PC communication peripheral that combines Data, Fax, Voice and Speakerphone functions into a single device. This high performance modem connects your computer to all popular modems and fax machines available today.

This manual provides installation and operating instructions for your modem. Also included in this manual are listings and descriptions of the standard **AT** command set, S-registers, and troubleshooting tips. Be certain to read ***Section Two - Installing the Modem*** thoroughly before performing the actual installation. Our customer support experience has shown that many costly and time-consuming calls can be avoided with closer attention to the installation information provided here.

1.1 System Requirements

- Pentium 166 MHz with MMX
- AMD K6 or K6-2 233 MHz
- Cyrix 6x86MX 266 MHz
- 16MB RAM
- 256K L2 cache
- Windows 95 OSR2, Windows 98

1.2 Modem Compatibility

Your modem is compatible with the following standards:

- V.90 (56Kbps down stream only)
- K56 flex (56kbps download stream only)
- V.34 (33600 bps)
- V.32bis (14400 bps)
- V.32 (9600 bps)
- V.23 (1200/75 bps)
- V.22bis (2400 bps)
- V.22 (1200 bps)
- V.21 (300 bps)
- Bell 212A (1200 bps)
- Bell 103 (300 bps)
- V.17 (14400 bps FAX)
- V.29 (9600 bps FAX)
- V.27ter (4800 bps FAX)
- V.21 Channel-2 (300 bps FAX)
- V.42bis (data compression)
- V.42 (error correction)
- MNP 5 (data compression)
- MNP 2-4 (error correction)
- TIA/EIA 602 AT Command set

- V.8 Start-up sequence
- V.8 bis Start-up sequence
- TIA/EIA 695 Voice command
- V.80(Video Ready mode)
- Plug and Play PCI Spec. V1.0a
- TIA/EIA578 Class 1 Fax Command Set

Section Two - Installing The Modem

This section explains how to connect your modem to your computer.

2.1 Unpacking Your Modem

In addition to this manual, your modem package contains the following items:

- One modem
- manual include in Disc
- Modem software & driver disc
- One telephone cable

NOTE: Contact your dealer if any of the above items are missing from your package.

2.2 Modem Installation

The following steps provide instructions for installing your modem.

2.2.1 Hardware Installation

CAUTION: Before removing the cover from your computer, turn off and unplug the computer and all attached peripherals. Discharge any static electricity from your body by touching any metal surface before removing the modem from its antistatic bag.

1. Turn off and unplug your computer from the AC outlet.
2. Remove the computer's cover according to its owner's manual.
3. Select any available PCI bus slot.
4. Remove the bracket and save the screw.
5. Carefully insert the modem into the selected slot. Apply even pressure until the modem is firmly seated.
6. Secure the bracket with the screw saved earlier. Store the bracket for future use.

7. Replace the computer cover and plug in your computer. Reconnect all cables.
8. Connect the telephone able into the modem's **"LINE"** connector (see Figure 2-1). Attach the other end into the telephone wall jack.

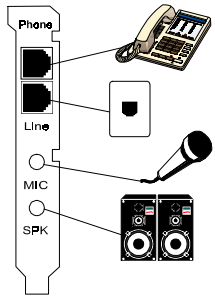


Figure 2-1

This completes the internal modem installation.

NOTE: The back of your modem should look like Figure 2-1.

2.2.2 Setting Up Modem Under Windows

This internal modem supports the Plug and Play feature. It allows your computer to set the optimal configuration for the modem and communication software automatically.

PART A WIN 98

Please follow the procedure below to install the modem driver:

1. Turn ON computer power after completing hardware installation.
2. Windows 98 will automatically detect the Plug and Play modem and setup a "**Motorola SM56 PCI Speakerphone Modem**" message under Add New Hardware Found as shown below.

Auto detect **"PCI Communication Device"**

Click **"Next"**

select
"Search for the best driver for your device"

Click **"Next"**

Direct to CD-ROM
(ex. E:\Drivers\W98)

Click **"Next"**

search to
"Motorola SM56 PCI Speakerphone Modem "

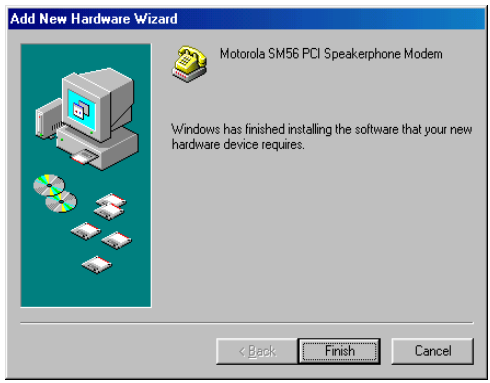
Click **"Next"**

Direct to CD-ROM
(ex. E:\Drivers\W98)

Click **"OK"**

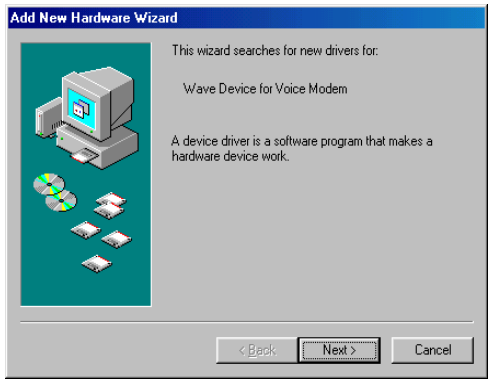
Click **"OK"**

Click **"Finish"**



Add to
"Wave Device for Voice Modem"

Click **"Next"**



select
"Search for the best driver for your device"

Click **"Next"**

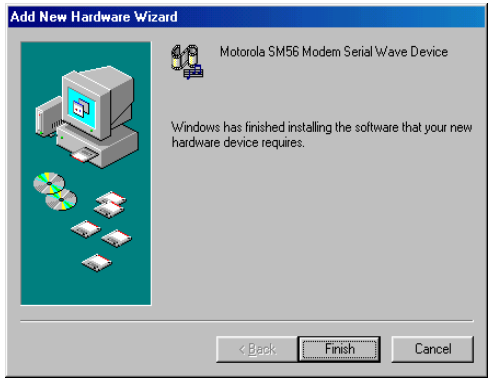
Direct to CD-ROM
(ex. E:\Drivers\W98)

Click **"Next"**

search to
"Motorola SM56 Modem Serial Wave Device"

Click **"Next"**

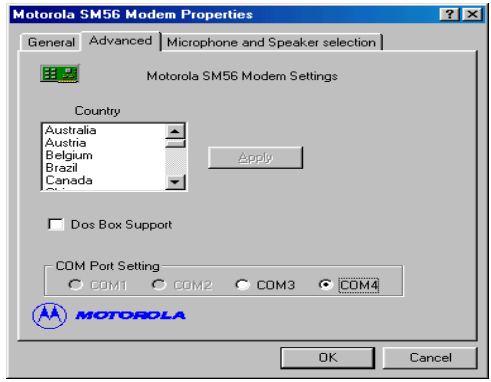
Click **"Finish"**



3. Select country (global version is necessary).
Selecting a country other than the one in which you are currently located may cause your modem to be configured in a way that violates the telecommunication regulations/laws of that country.
In addition, your modem may not function properly if the correct country selection is not made. Only select the country in which you are located.

a. Click "Start"⇒"Settings"⇒"Control Panel"⇒"Motorola SM 56 PCI Speakerphone Modem"

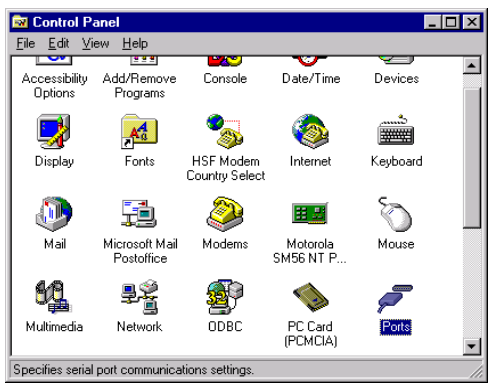
b. Click "Advanced" Folder. Select Your country or Region.



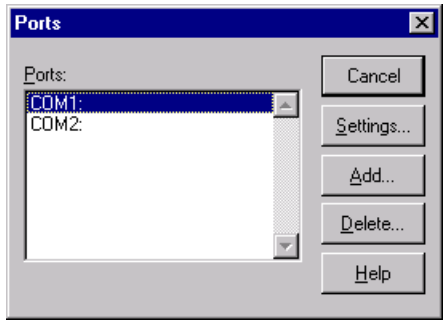
PART B WINDOWS NT 4.0

Under Windows NT 4.0

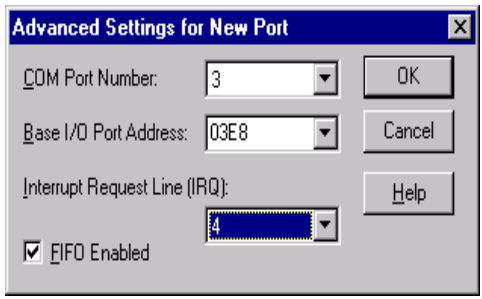
a. Please add a new COM PORT into your Windows NT 4. 0
Click"Start"⇒"Settings"⇒"ControlPanel"⇒"Ports"



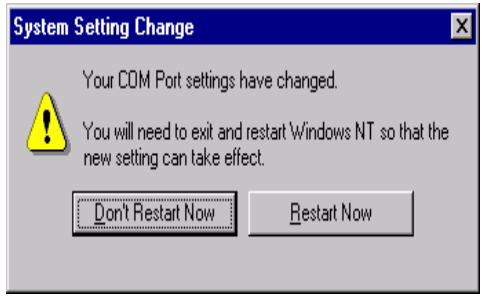
Click **"Add..."**



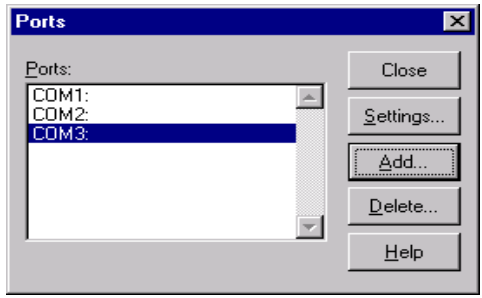
Click **"OK"**



Click **"Don't Restart Now"**



Click **"Close"**



b. Add a new modem by manual

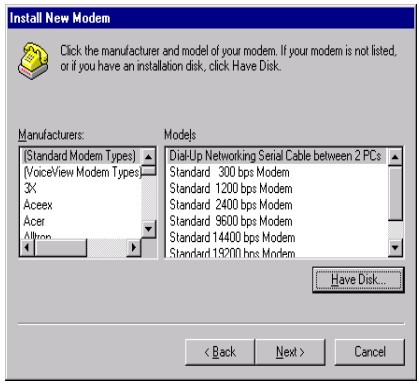
Click "Start"⇒"Setting"⇒"Control Panel"⇒"Modem"

Select

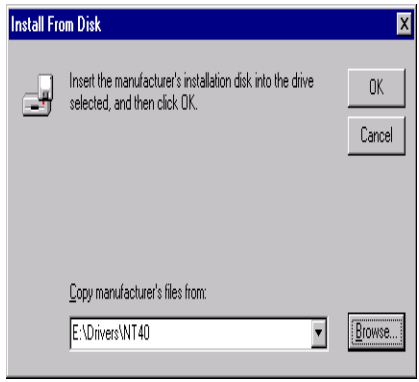
"Don't detect my modem; I will select it from a list"

Click **"Next"**

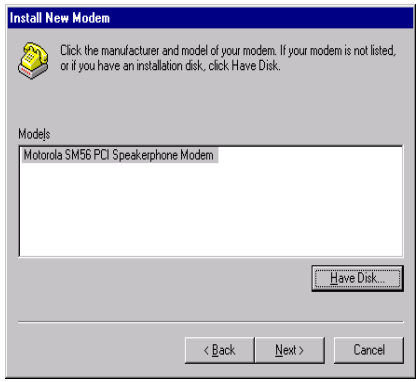
Select **"Have Disk..."**
Click **"Next"**



Direct to CD-ROM
(eg.E:\Drivers\NT40)

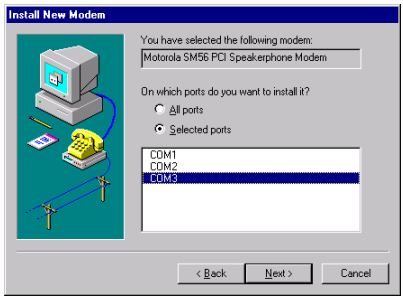


Select
"Motorola SM56 PCI Speakerphone Modem"
Click **"Next"**

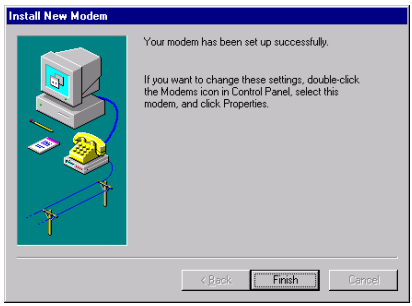


C. Please assign this modem on the new COM PORT

Click **"Next"**



Click **"Finish"**

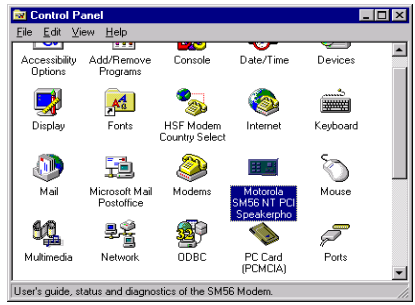


3. Select country (global version is necessary).

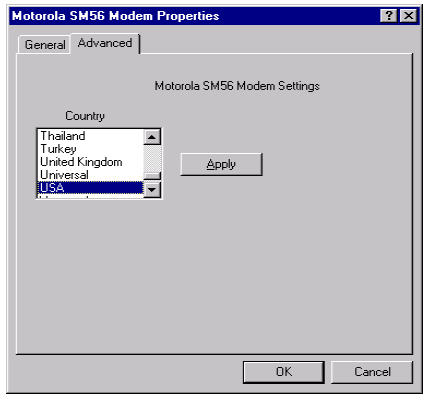
Selecting a country other than the one in which you are cu rrently located may cause your modem to be configured in a way that violates the telecommunication regulations/laws of that country.

In addition, your modem may not function properly if the correct coutry selection is not made. Only select the country in which you are located.

a. click "Start"⇒"Settings"⇒"Control Panel"⇒"Motorola SM56 PCI Speakerphone "

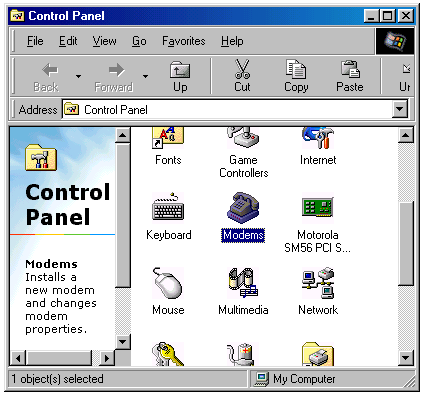


b. Click "Advanced " Folder.
Select Your Country or Region.

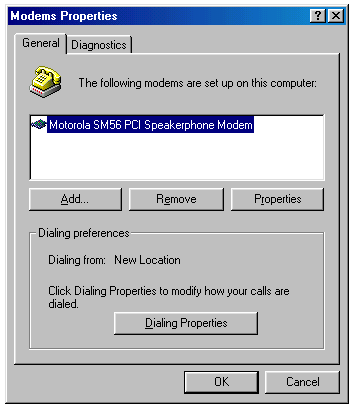


2.2.3 Checking Modem Functionality

1. Start Windows 98 ⇒ Click “Start”⇒ "Settings” ⇒ “Control Panel” ⇒ “Modems”.

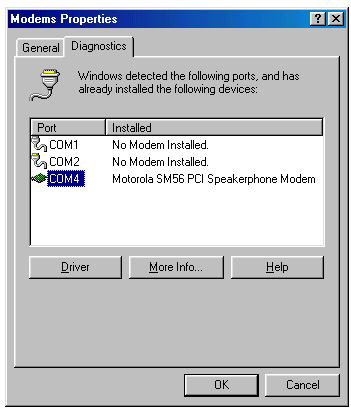


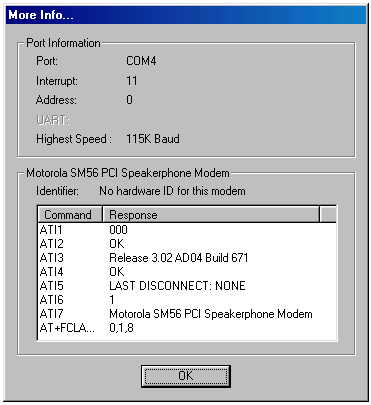
2. Click **“General”** and highlight **"Motorola SM56 PCI Speaker-phone Modem"** as shown below.



3. Click **"Diagnostic"** and highlight the designated COM as shown below.

   Click **“More Info ...”** and the system will communicate with the modem.



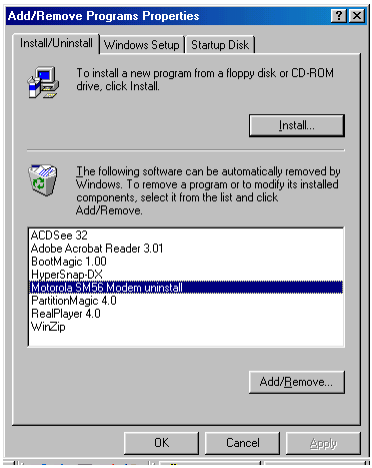


2.2.4 Uninstall Your Modem

1.Click "**Start**" ⇒ "**Settings**" ⇒ "**Control Panel**" ⇒ "**Add/Remove Programs**" .

2.. highlight **"Conexant SoftK56 Modem"**

3. click **"Add/ Remove"** and **"OK"** to remove the modem.



Section Three - Installing and Configuring Communication Software

> ***NOTE:*** Install the communication software according to the software user's manual. Be certain that your software is configured to communicate with the modem on the same COM port and IRQ line used by the modem.

You may be prompted by the software to configure certain communication parameters. We suggest the following settings:

Baud rate: 57,600 bps	Data bits: 8
Parity: None	Stop bit: 1
Flow Control: RTS/CTS	Initialization string: AT&F

The **AT** commands used by the modem are compatible with the command set used by Intel modems. Select a **Motorola** modem type if prompted by your data communications software. Select **Generic Class 1** or **Motorola** modem type when prompted by your Fax or Voice software.

3.1 Using Your Modem

Common modem functions (i.e. dialing, file transfer, faxing) are performed by using communication software in conjunction with the modem.

> ***NOTE:*** The communication software included with your modem provides a user friendly interface for all common modem functions and should be sufficient for all of your communication needs.

3.2 Where To Go From Here

If you have difficulties getting your modem to work, read ***Section Four*** to find information as well as answers to commonly asked questions and problems concerning the communication software. Sections Five through Ten contain reference material (**AT** commands, S-register, and Result-codes, etc.) and can be skipped.

> ***NOTE:*** It is important that you familiarize yourself with the functions available from the included software by

reading its manual (you may also use any other commercially available communication software). The software manual includes detailed information on all common modem functions.

Section Four - Troubleshooting Communication Software

Your modem is designed to provide reliable and trouble-free service. Should you experience any difficulty, however, the information contained in this section will assist you in determining and resolving the source of the difficulty. If you cannot resolve your difficulty after reading this chapter, contact your dealer or vendor for assistance.

4.1 Modem does not respond to commands.

1. Make sure the modem is not configured with a conflicting COM port and IRQ setting . If another device in your system is also configured as the same COM port, it will not work. Similarly, IRQ settings may not overlap.
2. Make sure the communication software is configured with the correct COM and IRQ settings (same COM port and IRQ line as the modem). Your communication software will not be able to send-to and receive-from your modem any data if it does not have the correct COM and IRQ settings of the modem.
3. Make sure the modem is properly initialized by the communication software. Your modem may have been improperly initialized by the software because you have selected an incorrect modem type. Select **"Rockwell"** modem type in your data communication software (select **"Generic class 1"** and **"Rockwell"** in your Fax software, respectively). You may also be prompted to enter an initialization string by the software. Use AT&F as your initialization string.

4.2 Modem dials, but does not connect.

1. Make sure the COM port setting is identical on both the system AND the software.
2. Make sure the phone line is working properly. A noisy line will prevent proper modem operation.

4.3 Modem makes a connection, but no data appears on your screen.

1. Make sure all communication parameters (baud rate, data, stop, and parity bits) are properly configured and identical on both sides. Be certain hardware flow control (RTS/CTS - default) is enabled in both the

modem and the communication software.

2. Press the **ENTER** key several times. The remote system may be waiting to receive your data before it begins.
3. Make sure the correct terminal emulation mode is being used in the software (refer to software manual).

4.4 Modem experiences errors while online with a remote modem.

1. Make sure Call Waiting is turned off.
2. Make sure RTS/CTS hardware flow control is enabled.

Do not use XON/XOFF software flow control when transferring binary

3. Make sure the data speed is not faster than your computer's capability. Operating at higher speeds under Windows 95 requires a faster CPU (Pentium 200MHz or better).

4.5 Modem exhibits poor voice record or playback.

1. Make sure the correct modem type is selected in the Voice/Fax software. Use **"Motorola"** or similar selection. Do not select **"Cirrus Logic"** or **"Lucent"**.
2. Make sure your computer is fast enough to handle voice operations (38.4Kbps). Voice operations are CPU intensive and require a Pentium 200MHz MMX or better CPU when running under MS Windows 95.

Section Five - AT Command Set

5.1 Executing Commands

Your modem is in Command Mode upon power-on and is ready to receive and execute **"AT"** commands. The modem remains in Command Mode until it makes a connection with a remote modem. Commands may be sent to the modem from an attached terminal or a PC running a communication program.

This modem is designed to operate at common DTE speeds ranging from 115.2Kbps (or 57.6Kbps) to 300bps. All commands and data must be issued to the modem using one of the valid DTE speeds.

5.2 Command Format

All commands must begin with the **AT** prefix, followed by the command letter and ended with the **ENTER** key. Spaces are allowed in the command string to increase command line readability, but are ignored by the modem during command execution. All commands may be typed in either upper or lower case, but not mixed. A command issued without any parameters is considered as specifying the same command with a parameter of **"0"**.

Example: **ATL[ENTER]**

This command causes your modem to lower its speaker volume.

5.3 AT Commands: Basics

ATtention (AT) commands are the means by which you control and monitor a modem. Typically, the communication applications automatically issues them, and you need not know the commands and their options.

However, to custom-configure the modem for an application, or to optimiz performance, you can issue commands through the communucations application yourself. In most communications applications, there is a menu item, or option, for entering extended or custom AT commands. See your communications application documentation.

You can also configure the modem by issuing AT commands directly from a simple terminal-emulation application . One such application is HyperTerminal, which is present on computers that have windows.

To issue an AT command from the terminal-emulation application, you must ensure that the modem is in command mode (in which it can detect and respond

to commands), rather than data mode (in which it is transmitting and receiving data). To enter command mode from data mode, enter +++. You need not press the ENTER key.

When entering AT commands, the following basic rules apply:

- AT commands can be entered in uppercase, lowercase, or mixed text
- The characters AT begin all AT commands, except A/ and +++
- The key used as the ENTER key is specified in S-Register S3.
- The maximum command length is 64 characters.
- You can enter more than one AT command on a line. However, some commands must occur at the beginning or end of the command line.

5.4 +++ (Plus-Plus-Plus) Command

This command. known as the escape sequence, causes the modem to stop transmitting data (if it is doing so), and go into command mode.

Issue this command at the computer keyboard, in the communications application's terminal windows, by typing the plus sign (+) three times.

> ***NOTE:*** Do not press the ENTER key after the +++ command. It may cancel the command.

5.5 AT and AT& (Ampersand) Commands

The modem responds to the following AT and AT& command options. The letters AT (or at) must precede all commands *except* A/ and +++.

Command	Option	Function
A	**(none)**	**Answer Incoming Call**
A/	**(none)**	**Repeat Last Command** Re-issues the previous command to the modem. (Do not press Return; the command executes as soon as the / is pressed.)
D	**(none)**	**Dial a Number** Instructs the modem to dial the telephone number that you enter immediately after the ATD command. Example: ATD5554678. Note; if multipe ATD commands are used in voice mode, the modem must be forced to blind-dial after dial-tone detection.
E		**Echo Async (Keyboard) Input to Terminal**

Command	Option	Function
		Detemines whether the characters you type at the keyboard are displayed (echoed) to the terminal-emulation window (if it is active) or to the communiccations applications.
	E0	disabled
	E1	enabled
H		**Hook**
	H0	Go on Hook (disconnnect from the telephone line;hang up)
	H1	Go off Hook (connect to the telephone line)
I		**Reguest Information From Modem**
	I0	"960"
	I1	"000"
	I2	"OK"
	I3	Software Version
	I4	"OK"
	I5	Disconnect Reason
	I6	Country Code
	I7	Product Code
L		**Speaker Volume**
		This parameter is not supported.
M		**Speaker Control**
	M0	off
	M1	On During Training Only
	M2	Always on
	M3	Off during dialing, on during call progress;off during data transfer
O		**Return to On-Line Mode**
		This parameter determines whether the modem initiates a retrain after changing from escape mode to data mode, or after a semi-colon in dial strings
	O0	No retrain
	O1	Retrain
	O2	Initiate Rate Renegotiation
	O3	Rate Renegotiation with silence
P	**P**	**Pulse Dial**
Q		**Result-Code Display**
		The modem can send result codes and connect messages to the computer as a result of connecting or failing to connect; establishing a data rate; and establishing error-correction and data-compression protocols. Refer to : ATV; AT\V ATX
	Q0	Enable display
	Q1	Disable display
T	**T**	**Tone dial**
		This command instructs the modem to use DTMF tone dialing.

Command	Option	Function
V		**Result-Code Format**
		Determines whether the modem sends short- or long- form messages to the communications application, indicating the connection status, rate and mode.
	V0	Return Numeric Code (Short Form)
	V1	Return Text (Long Form)
X		**Select Call-Progress Result Codes to Return**
	X0	No Carrier; Connect. Modem reports lack of a carrier signal; connection success/failure; modem dials without waiting for a dial tone
	X1	No Carrier; Connect; Connect <rate>. Modem reports lack of a carrier signal; connection success/failure, and the computer data rate established
	X2	No Carrier; Connect; Connect<rate>; No Dial Tone. Modem reports lack of a carrier signal; connection success/failure; the computer data rate established; and the lack of a dial tone
	X3	No Carrier; Connect; Connect <rate>; Busy-tone. Modem reports lack of a carrier signal; connection success/failure; the computer data rate established; and the presence of a busy signal
	X4	No Carrier; Connect; Connect <rate>; No Dial-tone; Busy-tone. Modem reports lack of a carrier signal; connection success/failure; the computer data rate established; the lack of a dial tone; and the presence of a busy signal
Z	**Z**	**Reset Modem Parameters to Default Configuration**
&C		**DCD Control**
	&C0	Always Asserted
	&C1	Asserted in Data Mode Only
&D		**DTR Control**
		Determines how modem responds to DTR signal from DTE.
	&D0	Ignore DTR
	&D1	Enter Command mode when DTR transitions from asserted to de-asserted
	&D2	Disconnect call when DTR transitions from asserted to de-asserted
	&D3	Reset modem parameters to default configuration when DTR transitions from asserted-to-de-asserted
&G		**Guard Tone**
	&G0	off
	&G1	550 Hz Guard Tone

Command	Option	Function
	&G2	1800 Hz Guard Tone
&I		**Dial TX Level**
	&I*n*	Level *n*, *n*=0 to15, Default =9
	&I99	Automatic Level
&P		**Pulse Cycle** Used when the modem is instructed to pulse dial.
	&P0	40/60 Make/Break Ratio
	&P1	33/67 Make/Break Ratio
	&P2	38/62 Make/Break Ratio
&R		**CTS Control**
	&R0	Normal
	&R1	Always On
&S		**DSR Control**
	&S0	Always On
	&S1	On When Modem Recognizes Remote
&T		**Test**
	&T0	Terminate Test
	&T1	Initiate Local Analog Loopback Test Disconnect the telephone line from the SM56 modem line input connector before using this command. With SM56 Build 50 or later, set S-Register 46 = 23 (ATS46=23) before executing &T1.
&TD		**Dial TX Level**
	&TD*n*	Level *n*, *n*=0 to 15
	&TD99	Automatic Level
&V		**Modem Status**
	&V0	Short Form Report
	&V1	Current or Last Connection Report
	&V2	Long Form Report

5.6 AT%(Percent) and AT\(Backslash) Commands

The modem responds to the following AT% and AT\ command options The letters AT (or at) must precede all commands *except* A/ and +++.

Command	Option	Function
%B		**Maximum Modulation Rate** Sets the rate that the modem uses when connecting in a data modulation mode for performing functions such as Internet access or file transfer
	%B0	Maximum modem rate that the modem supports
	%B1	300 BPS
	%B2	1.2 KBPS

Command	Option	Function
	%B3	2.4 KBPS
	%B4	4.8 KBPS
	%B6	9.6 KBPS
	%B7	7.2 KBPS
	%B8	12.0 KBPS
	%B9	14.4 KBPS
	%B11	16.8 KBPS
	%B12	19.2 KBPS
	%B13	21.6 KBPS
	%B14	24.0 KBPS
	%B15	26.4 KBPS
	%B16	28.8 KBPS
	%B17	31.2 KBPS
	%B18	33.6 KBPS
	%B19	32.0 KBPS
	%B20	34.0 KBPS
	%B21	36.0 KBPS
	%B22	38.0 KBPS
	%B23	40.0 KBPS
	%B24	42.0 KBPS
	%B25	44.0 KBPS
	%B26	46.0 KBPS
	%B27	48.0 KBPS
	%B28	50.0 KBPS
	%B29	52.0 KBPS
	%B30	54.0 KBPS
	%B31	56.0 KBPS
	%B32	58.0 KBPS
	%B33	60.0 KBPS
	%B34	28000 BPS
	%B35	29333 BPS
	%B36	30666 BPS
	%B37	33333 BPS
	%B38	34666 BPS
	%B39	37333 BPS
	%B40	38666 BPS
	%B41	41333 BPS
	%B42	42666 BPS
	%B43	45333 BPS
	%B44	46666 BPS
	%B45	49333 BPS
	%B46	50666 BPS
	%B47	53333 BPS
	%B48	54666 BPS
%C		**Data Compression** Determines whether the modem implements methods of Increasing the effective data rate by reducing the

Command	Option	Function
		number of bits used to represent data.
	%C0	Disable Compression
	%C1	Enable Compression
%D		**Disconnect Buffer Delay**
		Controls the delay after detection of a disconnect request before the modem disconnects from the telephone line
	%D0	Disable Delay
	%D*n*	Delay for *n* Seconds (*n* = 1 to 255)
%L		**Minimum Modulation Rate**
	%L0	Minimum modem rate that the modem supports
	%L1	300 BPS
	%L2	1.2 KBPS
	%L3	2.4 KBPS
	%L4	4.8 KBPS
	%L7	7.2 KBPS
	%L6	9.6 KBPS
	%L8	12.0 KBPS
	%L9	14.4 KBPS
	%L11	16.8 KBPS
	%L12	19.2 KBPS
	%L13	21.6 KBPS
	%L14	24.0 KBPS
	%L15	26.4 KBPS
	%L16	28.8 KBPS
	%L17	31.2 KBPS
	%L18	33.6 KBPS
	%L19	32.0 KBPS
	%L20	34.0 KBPS
	%L21	36.0 KBPS
	%L22	38.0 KBPS
	%L23	40.0 KBPS
	%L24	42.0 KBPS
	%L25	44.0 KBPS
	%L26	46.0 KBPS
	%L27	48.0 KBPS
	%L28	50.0 KBPS
	%L29	52.0 KBPS
	%L30	54.0 KBPS
	%L31	56.0 KBPS
	%L32	58.0 KBPS
	%L33	60.0 KBPS
	%L34	28000 BPS
	%L35	29333 BPS
	%L36	30666 BPS
	%L37	33333 BPS
	%L38	34666 BPS
	%L39	37333 BPS
	%L40	38666 BPS

Command	Option	Function
	%L41	41333 BPS
	%L42	42666 BPS
	%L43	60.0 KBPS
	%L44	46666 BPS
	%L45	49333 BPS
	%L46	50666 BPS
	%L47	53333 BPS
	%L48	54666 BPS
\K		**Break Handling Method**
	\K1	Destructive Expedited
	\K3	Non-destructive Expedited
	\K5	Non-destructive Non-expedited
\N		**Error-Correction Mode**
	\N0	Normal
	\N1	Direct
	\N4	LAP-M Only
	\N6	Reliable
	\N7	Auto-Reliable
\Q		**DTE Flow control**
	\Q0	Disable
	\Q1	XON/XOFF (software flow control)
	\Q3	RTS CTS (hardware flow control)
\T		**Disconnect on DTE Inactivity**
	\T0	Disable
	\T*n*	Disconnect after *n* minutes of inactivity by the computer; *n*=0 to 255
\V		**Connect Message Format**
		Determines which message the modem generates at connection time
		/V0 Display DTE Rate
		/V1 DTE with EC/DC Message
		/V2 Display DCE Rate
		/V3 DCE with EC/DC Message
		/V4 DCE with Modulation & EC/DC Message

5.7 AT* (Asterisk) Commands

The modem responds to the following AT" command options.

The letters AT (or at) must precede all commands *expect* A/ and +++.

Command	Option	Function
***DD**		**Dial wait**
		Specifies the time interval to wait when the modem encounters a W or w while processing a dial string
	*DD0	2 Seconds
	*DD1	3 Seconds

Command	Option	Function
	*DD2	4 Seconds
	*DD3	6 Seconds
	*DD4	12 Seconds
	*DD5	15 Seconds
	*DD6	20 Seconds
	*DD7	30 Seconds
	*DD8	40 Seconds
***LS**		**Low-Speed Operation Protocol** Lets you select a communications protocol to communicate with very low-speed or older modems.
	***L**S0	Bell 103
	*LS1	ITU-T V.21 (international standard)
	*LS2	Bell 103 or ITU-T V.21 (Auto determination)
***MM**		**Modulation Mode**
	*MM0	V.34 Auto Modulation
	*MM1	V.21
	*MM2	Bell 103
	*MM4	V.22/Bell 212
	*MM5	V.22bis
	*MM6	V.23
	*MM10	V.32 Only
	*MM11	V.32 bis
	*MM12	V.34 Only
	*MM13	K56flex™ Only
	*MM14	K56flex™ Auto-modulation
	*MM15	V.90 Only
	*MM16	V.90 Auto

5.8 AT + (Plus) Commands

The modem responds to the following AT+ command options.

The letters AT (or at) must precede all commands *expect* A/ and +++.

AT commands that begin with :

- **+D** control data compression
- **+F** control fax application operation
- **+V** control voice application operation

These commands are primarily used by software applications

Command	Option	Function
+A8E		**V.8 Configuration**
	+A8=*a,b,c,d*	
	a options:	Specifies V.8 origination negotiation options
	0	Disable
	1	Enable computer-controlled V.8 orgination negotiation

Command	Option	Function
	6	Enable computer-controlled V.8 orgination negotiation with +A8x indications
	b options:	Specifies V.8 answer negotiation options
	0	Disable
	1	Enable computer-controlled V.8 answer negotiation
	5	Enable computer-controlled V.8 answer negotiation with +A8x indications
	C options:	Specifies the V.8 CI Signal Call Function Octet options
	00h – FFh, default=00h	
	d options:	Specifies V.8 control options
	0	Disabled
	1	Enabled, modem control
	2	Enabled, computer control
+A8T		**V.8bis Signal and Message Control**
	+A8T=*a,b,c,d,e,f*	
	a options:	Specifies V.8 bis Signal to Transmit
	0	None
	1	Initiating MRe
	2	Initiating MRd
	3	Initiating Cre, low power
	4	Initiating Cre, high power
	5	Initiating Crd
	6	Initiating Esi
	7	Responding MRd, low power
	8	Responding MRd, high power
	9	Responding CRd
	10	Responding ESr
	b options:	Specifies V.8bis Transmit message 1 hexadecimal octet coded string
	c options:	Specifies V.8bis Transmit message 2 hexadecimal octet coded string
	d options:	Specifies V.8bis signal detection
	0	Enable detection of initiating V.8bis signal
	1	Enable detection of responding V.8bis signal
	2	Enable detection of both V.8bis signals
	e options:	Specifies V.8bis message detection
	0	Disable detection
	1	Enable detection
	f options:	Specifies the V.8bis message delay
	0	No delay between transmitting signal and messages
	1	1.5 second delay between transmitting signal and any messages

Command	Option	Function
+DR		**Data Compression Reporting**
	+DR=0	Disabled
	+DR=1	Enabled
+DS		**Data Compression Control**
	+DS=*p,q,r,s*	
	p options:	Specifies compression on/off direction
	0	No compression
	1	Tx direction only
	2	Rx direction only
	3	Both directions; accept any direction
	q options:	Specifies negotiation
	0	Do not disconnect if V.42bis is not negotiated per Direction option
	1	Disconnect if V.42bis is not negotiated per Direction option
	r options:	Specifies maximum dictionary size
	512-65535	Default=2048
	s options:	Specifies maximum string size
	6-250	Default = 32
+EB		**Break Handling Control**
	+EB=p,q,r	
	p options:	Specifies break selection
	0	Ignore break
	1	Non-expedited, non-destructive
	2	Expedited, non-destructive
	3	Expedited, destructive
	q options:	Specifies break length control
	0	Transmission of V.42 L-SIGNAL does not indicate break length
	1	Transmission of V.42 L-SIGNAL indicates break length
	r options:	Specifies the default break-length
	0	Break is not transmitted to the computer
	1 – 254, default=100	Break length, in 0.01-second increments
+ER		**Error-Control Reporting**
	+ER=*a*	
	a options:	Specifies the modem's error-cotrol reporting activity
	0	Disabled
	1	Enabled : modem issues one of the following messages to the computer, before it issues a connect message. The specifies the Error Correction protocol negotiated: +ER:NONE +ER:LAPM +ER:ALT
+ES		**Error-Correction (EC) Control**

Command	Option	Function
	+ES=*p,q,r*	
	p options:	Specifies the originate-modem's Request Error Correction
	0	Direct mode
	1	Normal mode
	2	LAP-M Only
	3	LAP-M or MNP
	4	MNP Only
	6	Initiate Sync Access modem when connection is established
	q options:	Specifies the answer-modem's Fallback Error Correction
	0	EC optional, fallback to Normal mode
	1	EC optional, fallback to Direct mode
	2	EC required (LAP-M or MNP)
	3	EC required (LAP-M only)
	4	EC required (MNP only)
	r options:	Specifies the originate-modem's Fallback Error Correction mode
	0	Direct mode
	1	Normal mode
	2	EC optional, fallback to Normal mode
	3	EC optional. Fallback to Direct mode
	4	EC required (LAP-M or MNP)
	5	EC required (LAP-M only)
	6	EC required (MNP only)
	8	Initiate synchronous access mode when connected
+ESA		**Synchronous Access Mode Configuration**
	+ESA=*a,b,c,d,e,f*	
	a options:	Specifies the Idle in Transparent sub-mode
	0	Computer transmits 8 bit SYN sequence on idle. Computer does not hunt for synchronization sequence
	b options:	Specifies the Idle in Framed sub-mode
	0	Computer transmits HDLC flags on idle
	c options:	Specifies under-run and over-run in Framed sub-mode
	0	Computer transmits Abort on an under-run within a frame
	1	Computer transmits a Flag on an under-run within a frame, and notifies the modem of any under-run or over-run
	d options:	Specifies half-duplex control. Not available
	e options:	Specifies the Cyclic Response Code (CRC) type
	0	Disable. No CRC generation or checking.
	1	In Framed sub-mode, the computer generates 16-bit CRC in the Transmit direction and the

Command	Option	Function
		modem generates 16-bit CRC on the Reeive direction
	f options:	Specifies Non-Return to Zero (NRZI) options
	0	NRZI encoding and decoding are disabled.
+ETBM		**Disconnect Buffer Delay Control**
	+ETBM-*p,q,r*	
	p options:	Specifies the disconnect buffer delay with pending transmit data
	0	Discard buffered data and disconnect
	1	Attempt to transmit until all data is delivered, then disconnect Ignore timer.
	2	Attempt to transmit until all data is delivered or timer expires.
	q options:	Specifies the disconnect buffer delay with pending receive data
	0	Discard buffered data and disconnect
	1	Attempt to transmit until all data is delivereed, then disconnect. Ignore timer.
	2	Attempt to transmit until all data is delivered or timer expires.
	r options:	Disconnect buffer delay timer, in 1-second increments
	1 – 255, default=0	
+FCLASS		**Fax/Modem Mode**
	+FCLASS=0	Modem Mode
	+FCLASS=1	Fax Class 1
+FLO		**Fax Flow Control**
	+FLO=0	None
	+FLO=1	XON/XOFF
	+FLO=2	RTS/CTS
+FMI?		**Report Manufacturer ID**
+FMM?		**Report Modem ID**
+FMR?		**Report Revision Level**
+FRH		**Receive High-Level Data Link Control (HDLC)Mode**
		Sets mode and transmit/receive rate for faxes
	+FRH=3	V.21 at 300 BPS
	+FRH=24	V.27ter at 2.4 KBPS
	+FRH=48	V.27ter at 4.8 KBPS
	+FRH=72	V.27ter at 7.2 KBPS
	+FRH=73	V.27ter at 7.2 KBPS with long train time
	+FRH=74	V.27ter at 7.2 KBPS with short train time
	+FRH=96	V.29 at 9.6 KBPS
	+FRH=97	V.17 at 9.6 KBPS with long train time
	+FRH=98	V.17 at 9.6 KBPS with short train time
	+FRH=121	V.17 at 12.0 KBPS with long train time
	+FRH=122	V.17 at 12.0 KBPS with short train time
	+FRH=145	V.17 at 14.4 KBPS with long train time
	+FRH=146	V.17 at 14.4 KBPS with short train time
+FRM		**Receive Mode**

Command	Option	Function
	`	Sets the modulation mode for receiving axes
	+FRM*m*	Use mode *m*; see mode options for +FRH, above
	+FRS	Wait for Silence
	+FRS*n*	Wait (*n**10) ms; *n*=0 to 255
+FTH	**+ FTH**	**Transmit High-Level Data Link Control (HDLC) mode**
	+FTH *mode*	Use Mode *mode*; see options for +FRH, above.
+FTM	**+FTM**	**Transmit Mode**
		Sets the modulation mode for transmitting faxes
	+FTM *mode*	Use mode *mode*; see options for +FRH, above.
+FTS		**Pause Transmission**
	+FTS*n*	Pause transmission for (*n**10)ms; *n*=0 to 255
+GCAP		**Report Capabilities**
	+GCAP	Display modem Capabilities
+GCI		**Country of Installation**
	+GCI=a	Set country in which modem is installed
	00	Japan
	04	Germany
	09	Australia
	0A	Austria
	0F	Belgium
	16	Brazil
	20	Canada
	2E	Czech Republic
	31	Denmark
	3C	Finland
	3D	France
	42	Germany
	50	Hong Kong
	57	Ireland
	58	Israel
	59	Italy
	6C	Malaysia
	7B	Netherlands
	82	Norway
	8B	Portugal
	8C	Singapore
	9F	South Africa
	A0	Spain
	A5	Sweden
	A6	Switzerland
	A9	Thailand
	AE	Turkey
	B4	United Kingdom
	B5	USA
+GMI		**Request Manufacturer ID**
	+GMI?	Display modem-manufacturer information
+GMM		**Request Model ID**
	+GMM?	Display modem-model information
+GMR		**Request Software Revision Number**

Command	Option	Function
	+GMR?	Display modem-software revision number
+IFC		**Flow Control**
	+IFC=*p,q*	
	p options:	Specifies the computer's flow control method for data passing to the modem (downstream)
	0	None
	1	XON/XOFF flow control, no pass-through
	2	RTS flow control
	3	XON/XOFF flow control, with pass-through
	q options:	Specifies the modem's flow control method for data passing from the modem (upstream)
	0	None
	1	XON/XOFF flow control, no pass-through
	2	CTS flow control
+ILRR		**Computer's Local Rate Reporting**
	+ILRR=0	Disabled
	+ILRR=1	Enabled
+ITF		**Transmit Flow Control Thresholds (V.80)**
	+ITF=*a,b*	
	a options:	Specifies the threshold, in octests, at which the modem turns transmit flow-control off
	0-2047 default=255	
	b options:	Specifies the threshold, in octests, at which the modem turns transmit flow-control on
	0-2047 default =255	
+MR		**Modulation Mode Reporting**
	+MR=0	Disabled
	+MR-1	Enabled
+MS		**Modulation Control**
	+MS=*p,q,r,s,t,u*	
	p options:	Specifies the modulation mode
	V21	V.21
	V22	V.22
	V22B	V.22bis
	V23C	V.23c
	V32	V.32
	V32B	V.32bis
	V34	V.34
	K56FLEX	K56flex™
	V90	V.90
	q options:	Specifies the Automode option
	0	Disabled
	1	Enabled
	r options:	Specifies the minimum data rate in the Tx direction
	0	Use the minimum rate of the specified modulation mode

Command	Option	Function
	300 – 60000	BPS
	s options:	Specifies the maximun data rate in the Tx direction
	0	Use the maximum rate of the specified modulation mode
	300 – 60000	BPS
	t options:	Specifies the minimun data rate in the Rx direction
	0	Use the minimum rate of the specified modulation mode
	300 – 60000	BPS
	u options:	Specifies the maximum data rate in the Rx direction
	0	Use the maximum rate of the specified modulation mode
	300 – 60000	BPS
+VCID		**Caller ID Control**
		This option takes effect only where the function is supported.
	+VCID=0	Disable
	+VCID=1	Enable
	+VCID=?	Display Caller ID Status (returns 0 or 1)
+VDR		**Distinctive Ring Control and Report**
		This option takes effect only where the function is supported
	+VDR=*m,n*	Note: If Distinctive Ring is enabled, the first ring reported by the modem may be incorrect.
	m options:	Specifies control
	0	Disable
	1	Enable
	n options:	Specifies reporting
	0	Produce DROFF/DRON report, no RING
	1-255	Produce DROFF/DRON, followed by RING after delay of *n*/10 seconds
+VEM		**Event Rporting and Masking Control**
		Bit-mapped even control mask. See Event Reporting Word
	0	Automatic Gain Control
	1-255	Relative range, where 128 indicates a nominal value.
+VGT		**Transmit Volume**
	1-255	Relative range, where 128 indicates a normal value.
+VIP		**Initialize Volume Parameters**
		Set voice parameters to factory-default options
+VLS		**Select Analog Source and Destination**
	0	DCE(modem) on-hook
	1	DCE off-hook, DCE connected to telco
	8	DCE on-hook, DCE connected to speaker
	9	speakerphone with mute enabled

Command	Option	Function
	11	DCE on-hook, DCE connected to microphone
	13	DCE off-hook, DCE conneted to telco, speaker, and microphone (speakerphone)
+VNH		**Automatic Hang-up Control**
	+VNH=0	Retain automatic hang-ups
	+VNH=1	Disable DCE-initiated automatic hang-ups
	+VNH=2	Disable all Automatic hang-ups
+VPR		**Voice DTE-DCE Rate**
	+VPR=0	Autobaud
+VRA		**Ringback Gone Timer**
		If, after detecting ringback, no further ringbacks are detected after *n*/10 seconds, operate as if the remote device answered the call.
	+VRA=*n*	If no ringback is received, after *n*/10 seconds, assume that the remote device has answered the call; *n*=0-255
+VRN		**Ringback Never Occurred**
	+VRN=*n*	After *n*/10 seconds, operate as if ringback has never occurred; *n* = 0-255
+VRX		**Voice Receive Mode**
		Determines whether the modem generates a periodic beep, audible to both parties on the speakerphone, indicating that the call is being recorded.
		Notes: the speakerphone state does not have to be reset after recording to the line or playing a message to the line. The baud rate is not set before the StartPlay and StartRecord commands. The baud rate is not reset after the StopPlay and Stoprecord. Commands.
	+VRX or VRX=0	
		Produce Periodic DCE Tone While Recording
	+VRX=1	Disable Periodic DCE Tone Production During Recording
+VSD		**Remote Silence-Detection Properties**
	+VSD=*m,n*	Used in answering-machine mode. Specifies the volume and duration thresholds that determine whether the remote device has hung up.
	m options:	Specifies the silence-detection level
	0	Used current + VSM value; or, if current +VSM value is 0, use 128.
	127	Low Threshold (most sensitive)
	128	Medium Threshold
	129	High Threshold (least sensitive)
	n options:	Specifies the silence-detection duration
	0	Disable
	1-255	Detect *n*/10 seconds silence; *n* = 0-255
	60	Default=6 seconds
+VSM		**Speech Compression Properties**

Command	Option	Function
	+VSM=*m,n,p,q*	Specifies the voice compression parameters
	m options:	Specifies the compression method
	128	PCM
	129	ADPCM
	n options:	Specifies the sampling rate to determine whether to compress
	8000	8000 Hz
	P options:	Parameter *p* specifies compression and expansion of periods of silence. These parameters are not implemented in Release 1. 0. You may leave them blank or enter the value 0.
	0	Disable
	q options:	Parameter *q* specifies compression and expansion of periods of silence. These parameters are not implemented in Release 1. 0. You may leave them blank or enter the value 0.
	0	Disable
+VTD		**DTMF Tone Duration**
	+VTD*n*	Generate tone for *n*/100 seconds; *n* =0-255. Default=100.
+VTS		**DTMF Tone Generation Properties**
		+VTS accepts multiple options, separated by commas, of any of the following types. Use square and curly brackets as shown.
	D	Generate default DTMF Tone, default duration
	(f,n)	*t* specifies a DTMF tone; *t* = 0-9 *n* specifies tone duration *n*/100 seconds; *n* = 1-500
	(f,g,n)	*f* and *g* specify a tone pair, *f* Hz and *g* Hz; in the range *n* Specifies tone-pair duration *n*/100 seconds; n = 1-500
	Examples:	AT+VTS=4,{},[1000,1300,50],8.{*5},[,,100]5 This example specifies the following sequence: 1.Play DTMF 4 for the duration stored in + VTD 2.Play silence for the duration stored in +VTD 3.Play tone pair at 1000 Hz and 1300 Hz for 500 ms 4.Play DTMF 8 for a duration stored in +VTD 5.Play DTMF * for 50 ms 6.Play silence for 1 second 7.Play DTMF 5 for the duration stored in + VTD
+VTX		**Enter Voive-Transmission Mode** Notes: the speakerphone state does not have to be reset after recording to the line or playing a message to the line. The baud rate is not set before the StartPlay and StartRecord commands. The baud rate is not reset after the StopPlay and StopRecord.

Section Six - S Register Summary

Your modem has 16 registers, designated S0 through S89. Table 6-1 shows the registers, their functions, and their default values. Some registers can have their values changed by commands. If you use a command to change a register value, the command remains in effect until you turn off or reset your modem. Your modem then reverts to the operating characteristics specified in its nonvolatile memory. Refer to Section Five for information on how to use the AT commands to manipulate the S registers.

NOTE: The default value and range of some S-registers listed below could vary with country.

Table 6-1 S - Registers

Register	Function	Range/units	Default
S0	Auto-answer or Ring Number	0-255 /rings	0
S1	Ring count	0-255 /rings	0
S2	Select Escape character	0-255 /ASCII	43
S3	SelectCarriage-return character	0-127 /ASCII	13
S4	Select Line-feed character	0-127 /ASCII	10
S5	Select Backspace character	0-127 /ASCII	8
S6	Blind Dial	0-255 /seconds	2
S7	Call Time-out	0-255 /seconds	60
S8	Pause Delay	0-255 /seconds	2
S10	DCD Loss Disconnect	0-255/0.1 second	14
S11	Tone Length	60-255 /milliseconds	72
S12	Escape Code Guard time	0-255 /0.02 second	50
S18	Test Timer	0-255 /second	0

NOTE: Read bits from right to left..

Bit	Signal	Bit	Signal

Section Seven - Event Reporting Word

Your can use the AT+VEM command to define events on which to report. The list is encoded as a word composed of the following bits.

A 1 in a bit- position indicates an enent is reported.

A 0 in a bit- position indicates an enent is not reported.

NOTE: Read bits from right to left..

Bit	Signal	Bit	Signal
0	Caller ID (effective only where function is supported)	2	Distinctive Ring (effective only where function is supported)
3	RING	4	DTMF Detection
5	Receive Buffer Overrun	6	Fax Calling
9	Presumed Hang-Up (SILENCE) Time-Out	10	Presumed End-of-Message (QUIET) Time-Out
19	BUSY	20	DIALTONE
23	Playback Buffer Underrun	25	Fax or Data Answering Modem Detected
27	Voice Detected		