

Zoltrix High Speed Fax/modems Installation Manual

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Check out the Zoltrix WWW Site at <http://www.zoltrix.com>
or call the Zoltrix BBS to download details on AT Commands,
S-Registers, additional drivers, and much more! 510-657-7413

FCC Warning

This device complies with Part 15 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

Information to the User

This equipment has been tested and found to comply with the limits for a class B digital device pursuant to part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try 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 receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help and for additional suggestions.

The user may find the following booklet prepared by the Federal Communica-

Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004-000-00345-4.

FCC Warning

The user is cautioned that changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

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INTERNAL FAX/MODEM INSTALLATION

1.1 Before You Start

If you've never installed an add-in board in your computer before, please follow the instructions in this section carefully. Read the entire section before beginning.

1.1.1 Electro-static Discharge (ESD)

Some of the components on your board are sensitive to static electricity (Electro-Static Discharge), so before you handle the fax/modem, you need to discharge any static electricity that you may have been generated. This can be done by touching any unpainted metal surfaces of your computer's chassis or by grasping a cold water pipe. This is called "grounding". Ground yourself before you take the board out of the static-shielded bag and everytime you intend to handle the board.

The board should be kept in the static-shielded bag anytime it is not installed in your computer. Never bring the board close to anything plastic where high levels of ESD (Electro-Static Discharge) may exist. Because ESD can even reside on the outside of the static-shielded bag, you should never place the board on top of the bag.

Also, please read through the User's Manual for your computer for any precautions that should be followed for your particular computer.

1.1.2 Safety Precautions

Some general safety precautions you should follow are:

1. **Turn OFF the computer before you begin. Also, turn OFF any external devices that are connected to your computer, such as printers.**
2. Handle the board **gently** by the edges. Some of the component leads under the board have very sharp edges and may cause serious injury.

1.2 Necessary Equipment

Make sure that you have the following equipment at hand before you begin.

- The Fax/Modem Board
- A modular telephone cable
- An IBM PC/386 or compatible computer with an available expansion slot
- A modular telephone outlet
- A small, flat-blade screwdriver
- A small pair of pliers or tweezers
- A telephone set (Optional)

Chapter 2

EXTERNAL FAX/MODEM INSTALLATION

2.1 Before You Start

If you've never installed an external modem in your computer before, please follow the instructions in this section carefully. Read the entire section before beginning.

2.2 Necessary Equipment

Make sure that you have all necessary equipment at hand before you begin.

- * The External Fax/Modem
- * A modular telephone cable
- * A RS-232 cable
- * An IBM PC/386 or compatible computer with an available external serial port
- * A modular telephone outlet
- * A telephone set (Optional)

2.3 Installation Steps

The steps to install your modem are shown in order in this section. For some steps, you may need to refer to your computer's User's Manual.

2.3.1 Selecting the external serial Port

Before installing the modem, refer to Appendix T in the section titled "Determining What Serial Ports are Installed in Your Computer" to correctly identify what serial ports are used on your computer system.

2.3.2 Installing the Fax/Modem

The distance between the computer and the modem will be determined by the length of the RS-232 cable. A suitable location for your modem should be:

1. Near a reliable AC power source.
2. Close to a good quality telephone line wall outlet.
3. Where the LED indicators on the front panel are clearly visible.
4. Where the power switch is easily reached.
5. In a cool location that is not exposed to direct sunlight.

Please use the following procedure to connect the hardware:

1. Make sure both the modem and the computer are turned off. Also, turn off any external devices that are attached, such as a printer and monitor.
2. Connect one end of the RS-232 cable to the modem.
3. Connect the other end of the RS-232 cable to the serial port connector on the back of your computer.
4. Connect the power supply to the modem.

Chapter 3

Using the Modem

3.1 Introduction

Fax/modems can be used to transfer or receive data files, or to send and receive faxes to and from any ITU-T Group III fax machine or fax card. Both of these functions require different types of commands to be sent to the fax/modem to perform either function. This is done automatically by your software or manually through commands issued via your keyboard.

Some advanced features may require that you issue the commands manually. This process is explained in the remainder of this chapter.

3.1.1 Modem Identification

This manual was written for more than one fax/modem. For you to correctly use the commands used by your modem, you need to determine what modem chipset is used by your modem.

To determine what chipset is used in your modem:

1. Install the modem and make sure that it is functioning properly.
2. Launch your communication program or any program that allows you to enter AT Commands.
3. Enter the following command at the terminal prompt and press the [Enter] key.

AT [Enter]

4. The modem should respond with "OK". If you do not get this response, refer to the hardware and software installation manuals to ensure that you have installed the modem correctly.
5. Enter the following at the terminal prompt and press the [Enter] key.

ATI3 [Enter]

6. Use the following table to determine the chipset used in your modem:

Modem Response	Modem Type
Contains:	
RPI	Rockwell RPI-based 14,400 modem.
UMC	UMC-based 14,400 modem.
V34	Rockwell-based 28,800 V.34 or 33,600 V.34+ modem.

7. Enter the following at the terminal prompt and press the [Enter] key.

ATI0 [Enter]

This command will cause most all modems to report there top speed.

Modem Response	Modem Speed
14400	14,400 bps (V.32bis)
28800	28,800 bps (V.34)
33600	33,600 bps (V.34+)

3.1.1.5 How to Obtain the Complete AT Commands

Since this manual is written for more than one modem, the complete detailed descriptions of all the AT commands are not provided in this manual. You may obtain a complete listing of the commands from either the World Wide Web at:

<http://www.zoltrix.com/modemq&a.htm>

3.1.5 Limiting the Modem's Top Speed

If you experience problems connecting to slower modems (2400 or 1200 bps), you may need to instruct your modem to limit the top speed to attempt. This should not be necessary in most cases, but, there are some 2400 bps and 1200 bps or even 9600 bps modems that you may not connect to without using one of the following methods.

Once you know the top speed of the modem you are attempting to connect with, just add one of the following commands to the end of your INIT string.

Rockwell Based 14,400's

Command	Top Speed	Modulation
F0	Auto Detect	(Default)
F1	300 bps	(V.21 or Bell 103) See Bn command.
F4	1,200 bps	(V.22 or Bell 212a) See Bn command.
F5	2,400 bps	(V.22bis)
F6	4,800 bps	(V.32)
F7	7,200 bps	(V.32bis)
F8	9,600 bps	(V.32)
F9	12,000 bps	(V.32bis)
F10	14,400 bps	(V.32bis)

UMC Based 14,400's

Command	Top Speed	Modulation
*N0	1,200 bps	(V.22 or Bell 212a) See Bn command.
*N1	2,400 bps	(V.22bis)
*N2	4,800 bps	(V.32)
*N4	7,200 bps	(V.32bis)
*N3	9,600 bps	(V.32)
*N5	12,000 bps	(V.32bis)
*N6	14,400 bps	(V.32bis) (Default)

Rockwell Based 28,800's (V.34) & 33,600's (V.34+)

Command	Top Speed	Minimum Speed	Modulation
+MS=0,1,300,300	300 bps	300 bps	(V.21) See Bn command.
+MS=64,1,300,300	300 bps	300 bps	(Bell 103) See Bn command.
+MS=1,1,1200,1200	1,200 bps	1,200 bps	(V.22) See Bn command.
+MS=69,1,1200,1200	1,200 bps	1,200 bps	(Bell 212a) See Bn command.
+MS=2,1,2400,2400	2,400 bps	2,400 bps	(V.22bis)
+MS=9,1,4800,4800	4,800 bps	4,800 bps	(V.32)
+MS=10,1,7200,7200	7,200 bps	7,200 bps	(V.32bis)
+MS=9,1,9600,9600	9,600 bps	9,600 bps	(V.32)
+MS=10,1,12000,12000	12,000 bps	12,000 bps	(V.32bis)
+MS=10,1,14400,14400	14,400 bps	14,400 bps	(V.32bis)
+MS=74,1,14400,14400	14,400 bps	14,400 bps	(V.FC)
+MS=11,1,14400,24000	24,000 bps	14,400 bps	(V.34)
+MS=11,1,24000,33600	33,600 bps	24,000 bps	(V.34+)

Note: Refer to section 3.1.1.5 to download the complete AT command manual.

This is the highest speed that the modem would virtually transmit with data compression (57,600 bps for V.32bis, 14,400 bps modems and 115,200 bps for the V.34/28,800 bps modems). To set the DTE speed, you select that speed with the software you are using.

Because the DTE and DCE rates differ, the modem must use a process of hardware "handshaking", where the modem lets the computer know when to stop sending data and when to start sending again. This hardware handshaking must be used for all types of connections. Therefore, what is known as "Speed Buffering", must be used when a normal connection is established. "Speed Buffering" is the Normal Mode connections equivalent of the hardware handshaking done for MNP and V.42bis connections.

3.1.8 Modem Software Compatibility

Nearly all communication software execute an automatic detection sequence to determine which modem you have installed. This way the software retrieves the proper settings from an internal listing to set itself up correctly for your modem. If the modem is not recognized a listing is usually made available for the user to select from.

If your program includes such a listing that does not include this modem, you can often select another modem with the same speed. Then find the software's setup screen where you can edit the modems Initialization string and change the Initialization string to the string listed in section 3.1.3 (DEFAULT INITIALIZATION STRING). If your software does not allow you to edit the Initialization string, this may not work. You should then contact the software company to see if they have a setting for this modem.

The following lists the general guidelines to the Software and Hardware setups required for the operation described in the previous paragraphs.

Software Setup

Baud Rate (DTE Rate)	57,600 bps (V.32bis 14,400 bps) 115,200 bps (V.34 28,800 bps & V.34+ 33,600bps)
Lock DTE rate	Yes (If you are using DOS BITCOM, set AUTOSPEED to NO)
FLW CTL	RTS/CTS or Hardware

***Note:** It is very important to ensure that the software locks its BAUD rate. You will not enjoy the benefits of Data Compression if the software is set to the carrier rate of the modem. Communication software refers to this feature in different ways. If you are unsure how to do this with your software, either read the manual or call tech support for your communication program.*

Hardware Setup

The modem should already be set correctly. But if you experience any difficulties, refer to section 3.1.3. With the previous Hardware & Software setups, you should be able to make a connection with virtually any other modem, regardless of the speed or error-correcting protocols supported. If, however, you experience problems, refer to the Custom Hardware Setups in sections 3.1.5 and 3.1.6.

3.1.9 Fax Software Compatibility

When installing Fax software for your fax/modem you may need to know what Fax Class is supported. Most fax software will automatically determine this, but if your software does not, use the following to determine the correct Fax Class for your fax/modem.

To determine what fax class your modem supports:

1. Install the modem and make sure that it is functioning properly.
2. Launch your communication program or any program that allows you to enter AT Commands.
3. Enter the following command at the terminal prompt and press the [Enter] key.

AT+FCLASS=? [Enter]

3.2.2 Using AT Commands

When issued to the fax modem, AT commands direct the fax modem to dial, answer, hang up, and to perform many other communication tasks.

Some of the most commonly used commands are:

AT (Attention). This is the command line prefix. (All the commands listed, except A/ and + + +, must be preceded by the command AT).

- A Answer an incoming call
- D Dial the following phone number
- E Turn echo OFF
- H Hang up
- O Return to on-line state
- Z Reset the modem to its default state
- +++ Return to the Command State
- A/ Repeat last command (Do not precede this command with AT or follow it with <Enter>)

3.2.3 The Command Line

A Command line allows you to issue a number of commands at one time rather than issuing and waiting for the modem to react to each command separately. Here are a few rules you must follow when issuing a command line to the modem.

1. Every command line must begin with the letters AT, (except the commands A/ and +++)
2. You can group several commands on one line as long as the total line does not exceed 40 characters. Remember that "DT" and <Enter> each count as one character, (do not count spaces and the AT).
3. Because all spaces are ignored in the command line, you may leave spaces between each command, and between each character of every command. You can also include punctuations in telephone numbers, and type commands in either UPPER- or lowercase. For example, the following commands are identical:

ATDT8005551234 < Enter >

or

ATDT (800) 876-5555 < Enter >

4. To cancel a dialing command in progress, press any key on the keyboard.
5. If you make an error, backspace to erase it, and retype the characters correctly.
6. To execute the command line, press the <Enter> or <Return> key on your keyboard.

3.2.4 Repeating a Command Line

If you want to repeat the last command line you entered, type the following command:

A/ (upper or lowercase A, followed by a slash)

Note: In this case you do not need to type AT first, nor do you press <Enter> at the end of the command line. This command comes in handy when you need to redial a number that got a busy signal.

3.3 Manual Dialing Commands

If both your modem and the remote modem that you are connecting with have phones connected through the phone jacks on the modem, this mode will allow you to toggle between a voice connection and a data connection. This feature is invaluable if your trying to make adjustments to optimize your communications with the remote modem. After discussing what changes you want to make you can then release the line to the modem and switch back again if you need to discuss the further modifications.

3.3.1 Switching Between Voice And Data

To switch from a voice connection to a data connection, both you and the other party must have a computer with a modem. Communication software must be loaded and in the terminal mode (this may be referred as, "Dumb Terminal", "Terminal Emulation Mode", "Local Mode", "Direct Connect Mode", "On-line Manual" or something similar). Check your software communication manual if you can't locate this mode.

3.3.2 Switching From Voice To Data

You can make the initial call either by dialing your telephone manually or by letting the modem dial for you. When you have completed your voice conversation and want to switch to a data connection, type the following command:

ATX3D <Enter>

This command instructs the modem to be the "originating modem". While you are issuing this command the other party should type the following command:

ATA <Enter>

This command instructs the modem to be the "answering modem". Either party may be the answering or originating modem, but, both parties can't be the originating or answering modem.

Both parties should now hang up their telephone handsets. If you don't hang up, data errors may occur. You will now hear the modems handshake and see the result code CONNECT along with the connection speed.

3.3.3 Switching From Data To Voice

To switch from a data connection to a voice connection, both parties would pick up their handsets, and either use the hang-up command of the software you are using or issue the Escape sequence command (+++) followed by the ATH command as soon as the modem responds OK to the Escape command. You should now hear the other party in your telephone handset.

3.3.4 Using The Modem To Establish A Voice Call

To use the modem as an auto-dialer you can either use software designed for this purpose or use regular communication software with a few modifications.

Add a record to the communication software you are using. In the phone number field, enter the voice telephone number followed by a semi-colon (;) and an H. The semicolon instructs the modem to return to the command mode after dialing the number. The H command then instructs the modem to hang-up releasing the line to your telephone.

Before selecting the record to dial, pick up the telephone handset (connected to the Phone Jack of the modem). You should hear the dial tone in the handset. Select the record to dial. You should now no longer hear the dial tone in the handset. After the modem dials the number, the modem will be returned to the command mode and then hung up. You should be able to hear the phone ringing in your handset.

3.3.8 Transferring a Call with a Hookflash

The ! can be used in a dialing command to create a "hookflash". During the hookflash, the modem hangs up for 1/2 second and then reconnects.

The following command line could be used to transfer a call to extension 333:

ATDT!333; H <Enter>

Here the modem receives the tone dialing command, issues the hookflash, and then tone dials the extension. The semicolon returns the modem to Command State so it can hang up.

3.3.9 Waiting for Silence

Some services may answer your modem's call with a prerecorded message of their own. In this case you would have to instruct the modem to wait until the message was over before proceeding with the data connection. You can do this with the @ dial modifier.

To instruct the modem to dial a number, listen for ringing, and then wait for up to fifty seconds for a 5 second silence (you can change the wait time with register S7) before proceeding you could use the following command line:

ATDT876-5555@ 5678 <Enter>

Here you instruct the modem to tone dial the number and then, if it hears ringing, to wait up to fifty seconds for 5 seconds of silence before dialing the remaining digits (this could be an extension number, a password, or an account number).

3.4 Dialing a Stored Phone Number

Your modem can dial one of up to four previously stored telephone numbers (identified as 0-3) of up to 33 digits each. This feature is useful for connecting to a frequently called remote modem without your having to dial the digits individually.

You can store the phone number in the nonvolatile RAM with the &Zn=x command. The n refers to which of the four (0-3) memory locations you want, and the x is the phone number. To store the phone number 876-5555 as the 3rd stored number, type the following command:

AT&Z3 = 8765555 <Enter>

Here the modem is instructed to store the telephone number as stored number #3. Once stored, the number is retained in the modem's nonvolatile memory until you change it. The phone number remains stored even when power to the modem is turned OFF.

To dial a previously stored phone number you would use the s=n dial string modifier, (n refers to which of the four stored phone numbers you wish to have dialed). To dial stored phone number 3, you would type the following command:

ATDs=3 <Enter>

The s=n can appear anywhere in the dialing command. For example, you might want to store a special access code or password that follows the phone number. Your command line might look like this:

ATDT8765555, s = 1 <Enter>

In the above example you command dialing the phone number. The modem then pauses for a set length of time (the "comma" forces this pause) and then dials a previously stored access code (the result of the s=1 dial modifier).

Do not confuse the s = n dial string modifier with the S command used to read or change the value of S-Registers.

3.6.1 Using the Escape Code

To return to Command State during a data connection, wait for one second of inactivity, and then quickly type three pluses (+++).

After one second of inactivity, you will see OK on the screen. You have returned to the Command State and can issue commands, but you have not lost your data connection.

3.6.2 Resuming the Data Connection

When you are in the Command State and want to resume the data connection, type the following command:

ATO <Enter>

You will see the CONNECT result code on the screen and your data connection will continue.

3.6.3 Setting Communication Parameters

Whenever you communicate via modem you use certain settings that establish agreements between the two modems. These settings are called communication parameters and cover such items as baud rate, parity, character length, and the number of stop bits.

When you are using a computer, communication parameters are set and changed by your communication software. In order to establish a data connection, your communication parameters must match those of the remote modem.

You may find that you can communicate perfectly without changing your software settings. This can be because your terminal or computer software program uses common default settings which may be the same as those of the remote modem. However, if you experience difficulty, you may have to change your communication parameters. The most common settings are either 7 data bits, Even parity, and 1 stop bit or 8 data bits, No parity, and 1 stop bit.

3.7 The Factory Profile

The factory profile is permanently stored in your modem. It cannot be changed like the stored profiles can. The factory settings may not be what the software expects, but this is a good starting point for all Initialization strings. This will ensure that the modem is set correctly without sending every command that the modem supports.

You can always return to these factory settings by issuing the following command:

AT&F<Enter>

You can return to the factory default settings, and then store them into the modem's nonvolatile ram, (if supported in your model), for use when your modem is turned on or reset, by issuing either of the following commands:

AT&F&W0<Enter> (Stored profile #0 = factory defaults)

or

AT&F&W1<Enter> (Stored profile #1 = factory defaults)

Note: Refer to section 3.1.1 for information on INITIALIZATION strings.

3.7.1 The Active Profile

The active profile contains the settings currently in effect. When you turn your modem on, or reset it, the modem reads its nonvolatile ram, if nonvolatile ram is supported in your model, and makes the active profile the same as one of the stored profiles. Normally, this will be stored profile #0, but exactly which stored profile is used is determined by the &Yn command. If nonvolatile ram is not supported by your model the active profile will be the same as the Factory Profile.

When you choose to store an active profile into the modem's nonvolatile memory, the chosen stored profile is made the same as the current active profile.

Table A-1. AT Command Summary (Rockwell chipset)

	Command	Title	Default
	A/	Re-execute Command	none
	ATA	Answer	none
*	ATBn	Set CCITT or Bell Mode	1 (US)
	ATCn	Carrier Control	1
	ATDn	Dial	T
*	ATE	Command Echo	1
	ATFn	Select Line Modulation	0
	ATHn	Switch-Hook Control	none
	ATIn	Identification	none
*	ATLn	Speaker Volume	1
*	ATMn	Speaker Control	1
*	ATNn	Modulation Handshake	1
	ATOn	Return To The On-line State	none
*	ATP	Set Pulse Dial as Default	none
*	ATQn	Result Code Display	0
	ATSn?	Reading S Registers	none
	ATSn=x	Writing To S Registers	none
*	ATT	Set Tone Dial as Default	none
*	ATVn	Result Code Form (Message Control)	1
*	ATWn	Negotiation Progress Reporting	0
*	ATXn	Extended Result Codes	4
*	ATYn	Control Long Space Disconnect	0
	ATZn	Reset	none
*	AT&Cn	DCD Option	0
*	AT&Dn	DTR Option	0
	AT&F	Restore Factory Configuration	none
*	AT&Gn	Set Guard Tone	0
*	AT&Jn	Telephone Jack Selection	0
*	AT&Kn	DTE/Modem Flow Control	3
*	AT&Ln	Line Type	0
*	AT&Mn	Communication Mode	(&Qn)
*	AT&Pn	Dial Pulse Ratio	0 (US)
*	AT&Qn	Communication Mode	5
*	AT&Rn	RTS/CTS Option	1
*	AT&Sn	DSR Option	0
*	AT&Tn	Test And Diagnostic	4
	AT&V	View Current Configuration and User Profiles	none
	AT&Wn	Store User Profile	none
*	AT&Xn	Clock Source Selection	0
*	AT&Yn	Designate Default User Profile	0
	AT&Zn=x	Store Phone Number	none
†	ATAn	Maximum MNP Block Size	2
†	ATBn	Transmit Break	3
	ATGn	Modem to Modem Flow Control	0
	ATKn	Break Control	5
†	ATLn	MNP Block Transfer Control	0
	ATNn	Operation Mode Control	3
†*	ATnCn	Compression Control	3
*	AT%En	Enable/Disable Auto Retrain	0
	AT%L	Report Received Signal Level	none
	AT%Q	Report Line Signal Quality	none
*	Command setting may be stored in one of two user profiles with the AT&Wn command.		
†	Not supported by RPI based modems.		

Note: This section applies to Rockwell based Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.

Table A-2. Result Codes (Rockwell chipset) continued

	Result Code	Numeric Value	Description
†#	COMPRESSION: MNP5	66	The modem has connected in MNP CLASS 5 and COMPRESSION message reporting has been enabled.
†#	COMPRESSION: V.42bis	67	The modem has connected in V.42bis and COMPRESSION message reporting has been enabled.
#	COMPRESSION: NONE	69	The modem has connected without data compression and COMPRESSION message reporting has been enabled.
*	PROTOCOL: NONE*	70	Modem has connected without any form of error connection. (No MNP4 or V.42)
†*	PROTOCOL: LAPM*	77	Modem has connected in the V.42 LAPM mode of error correction.
†*	PROTOCOL: ALT	70	Modem has connected in the MNP4 mode of error connection.
†	Not supported by RPI modems		
#	The COMPRESSION Result Code must be enabled with S95 bit 5.		
*	The PROTOCOL Result Code must be enabled with S95 bit 3 or W1 command.		

Note: This section applies to Rockwell based Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.

Table A-4. AT Command Summary (UMC chipset)

	Command	Title	Default
	A/	Re-execute Command	none
	ATA	Answer	none
*	ATBn	Set CCITT or Bell Mode	1 (US)
	ATDn	Dial	T
*	ATE	Command Echo	1
	ATHn	Switch-Hook Control	none
	ATIn	Identification	none
*	ATLn	Speaker Volume	2
*	ATMn	Speaker Control	1
*	ATNn	Modulation Handshake	1
	ATOn	Return To The On-line State	none
*	ATQn	Result Code Display	0
	ATSn?	Reading S Registers	none
	ATSn=x	Writing To S Registers	none
*	ATVn	Result Code Form (Message Control)	1
*	ATWn	Negotiation Progress Reporting	1
*	ATXn	Extended Result Codes	4
*	ATYn	Control Long Space Disconnect	0
	ATZn	Reset	none
*	AT&Cn	DCD Option	0
*	AT&Dn	DTR Option	0
	AT&F	Restore Factory Configuration	none
*	AT&Gn	Set Guard Tone	0
*	AT&Jn	Telephone Jack Selection	0
*	AT&Kn	DTE/Modem Flow Control	3
*	AT&Ln	Line Type	0
*	AT&Mn	Communication Mode	5
*	AT&Pn	Dial Pulse Ratio	0 (US)
*	AT&Rn	RTS/CTS Option	2
*	AT&Sn	DSR Option	0
*	AT&Tn	Test And Diagnostic	0
	AT&V	View Current Configuration and User Profiles	none
	AT&Wn	Store User Profile	none
*	AT&Xn	Clock Source Selection	0
*	AT&Yn	Designate Default User Profile	0
	AT&Zn=x	Store Phone Number	none
*	AT\An	Maximum MNP Block Size	2
*	AT\Bn	Transmit Break	3
*	AT\En	Data Echo	0
*	AT\Gn	Disable/Enable DCE flow control	0
*	AT\Jn	Baud Rate adjustment	0
*	AT\Kn	Break Control	5
*	AT\Nn	Operation Mode Control	5
*	AT\Q	DTE/Modem Flow Control	3
	AT\T	Inactivity Timer	0
*	AT\V	Extended MNP result codes	1
*	AT\X	XON/XOFF process	1
*	AT%An	Auto-reliable fallback character	none
*	AT%Cn	Compression Control	1

* Command setting may be stored in one of two user profiles with the AT&Wn command.

Note: This section applies to UMC based Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.

Table A-6 S-Register Summary (UMC chipset)

	Register	Title	Default
*	S0	Number of Rings till Auto-Answer	0
	S1	Ring Counter	0
	S2	Escape Character	43
	S3	Carriage Return Character	13
	S4	Line Feed Character	10
	S5	Back Space Character	8
*	S6	Wait For Blind Dialing	2
*	S7	Wait For Carrier After Dial	50
*	S8	Pause Time For Dial Delay	2
*	S9	Carrier Detect Response Time	6
*	S10	Lost Carrier To Hang Up Delay	14
*	S11	DTMF Tone Duration	95
*	S12	Escape Code Guard Time	50
*	S14	Bit Mapped Options	none
	S16	Bit Mapped Test Options	none
*	S18	Test Timer	0
*	S21	Bit Mapped Options	none
*	S22	Bit Mapped Options	none
*	S23	Bit Mapped Options	none
*	S25	Delay To DTR	5
*	S26	RTS To CTS Delay Interval	1
*	S27	Bit Mapped Options	none
*	S36	Negotiation Failure Treatment	7
*	S46	V.42bis Selection	138
*	S82	Break Handling	128
*	S95	Extended Result Codes	0
*	S96	Dial tone/busy detect range	0
*	S97	Energy detection threshold	48

* Register value may be stored in one of two user profiles with the AT&Wn command.

Note: This section applies to UMC based Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.

Disclaimer

The Manufacturer makes no representations or warranties, expressed, statutory or implied, regarding the fitness or merchantability of this product for any particular purpose. Further, the Manufacturer is not liable for any damages, including but not limited to, lost profits, lost savings, or other incidental or consequential damages arising out of the use of this product. The Manufacturer also reserves the right to make any improvements or modifications to the product described in this manual at any time, without notice of these changes.

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This Equipment generates and uses radio frequency energy. If not installed and used properly, in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of the F.C.C. rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

To determine if the equipment is causing interference to radio and television reception, the user should turn off the computer that the modem has been installed in. If the interference goes away, it is assumed that the modem is causing the interference. The user is encouraged to try to correct the problem by one or more of the following measures:

- * Reorient the receiving antennae
- * Relocate the computer with respect to the receiver.
- * Move the computer away from the receiver.
- * Plug the computer into a different outlet so that the computer and the receiver are on different branch circuits.
- * If necessary, consult the dealer or an experience radio/television technician for additional suggestions.

The Federal Communications Commission has a booklet available that may be of help to the user. The name of the booklet is, "Interference Handbook." It is available from the U.S. Government Printing Office, Washington, D.C., 20402, Stock Number 004-000-00450-7.

The manufacturer is not responsible for any radio interference caused by unauthorized modification or improper use of this equipment. It is the responsibility of the user to correct such interference.

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The Manufacturer makes no representations or warranties, expressed, statutory or implied, regarding the fitness or merchantability of this product for any particular purpose. Further, the Manufacturer is not liable for any damages, including but not limited to, lost profits, lost savings, or other incidental or consequential damages arising out of the use of this product. The Manufacturer also reserves the right to make any improvements or modifications to the product described in this manual at any time, without notice of these changes.

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Data Compression

A technique used to reduce the amount of data being sent without reducing the information represented. In effect, modems with data compression transmit data faster than non-compression types. Data compression can be implemented in the Hardware or Software.

DCE (Data Communication Equipment)

A term used to describe any equipment that has the capacity to establish and control the data link via the telephone network.

Data Mode

This is the mode in which data is either being sent or received from a remote device once a connection has been established.

DIGITAL

A non-continuous signal, voltages representing either a on or off condition used to represent 1 data bit.

DIRECT MODE

A direct connection is equivalent to any standard 2400 bps modem connection. The maximum throughput is equal to the connection rate, and the DTE rate must match the connection rate.

DTE (DATA TERMINAL EQUIPMENT)

Any communications equipment which acts as one of the final destinations of a communications network.

DTMF (DUAL TONE MULTI FREQUENCY)

The method of dialing uses tones to represent the numbers to dial.

EIA (Electronics Industries Association)

The U.S. governing party which determines the industry standards for electronic industries.

Full Duplex

A transmission method in which data is sent and received simultaneously over the same line.

Frequency

The number of times that a sound wave repeats itself in a second. It is usually expressed in Hertz (Hz).

Half-Duplex

A method of data transmission in which data flow occurs in both directions, but in only one direction at a time.

Handshaking

An exchange of signals between two communication devices that establishes a connection and allows the transmission of data.

HDLC (HIGH-LEVEL DATA LINK CONTROL)

A common bit-oriented data link protocol issued by the ISO (International Standards Organization).

HERTZ (HZ)

A unit of measure of frequency. Measures the number of cycles (sound waves) that pass through a reference point per second.

IRQ (Interrupt ReQuest)

A signal within the computer's processing architecture which allows any peripheral device (such as data being receive at a serial port) to interrupt the hardware and software when the attention of the computer's microprocessor is required.

Technical Specifications

Data throughput up to 115,200 bps

Modem Operating Modes

V.34+	33,600/31,200 bps	*
V.34	28,800/26,400/24,000/ 21,600/19,200/16,800 bps	**
V.32bis	14,400/12,000/7,200 bps	
V.32	9,600/4,800 bps	
V.22bis	2,400 bps	
V.22 & Bell 212A	1,200 bps	
V.21 & Bell 103	300 bps	
V.42 Hardware based Error Correction		***
MNP 4 Hardware based Error Correction		***
V.42bis (4-1) Hardware based Data Compression		***
MNP 5 (2-1) Hardware based Data Compression		***

Integrated 16550 UART for High Speed Operation (Internal model only)

Enhanced AT Command set

NVRAM directory stored profiles

Programmable speaker volume control

Flow Control (XON/XOFF, RTS/CTS)

Speed Buffering

Automatic Format/Speed Sensing

Fax Operating Modes

Fax Send and Receive rates up to 14,400 bps

V.29 & V.27ter & V.17 Fax Transmission 14,400/9600 send and receive.

Group III Send and Receive fax compatible

Supports Class 1 or Class 2 Fax Software

*=	Only supported by 33,600 bps V.34+ model
**=	Only supported by 28,800 bps V.34 model
***=	Not supported by RPI model

After running MSD.EXE, the display will show two columns of information ranging from the type of computer you have to the type of devices that are available on your computer. Next to the COM port information is a number showing the number of COM ports that are used in your system. Now that we know how many COM ports are used, we must know which COM ports address are used. Press C to run the COM port scanner.

The following is an example of what you may see:
(The information displayed is dependent on the system being used.)

COM Port	COM1	COM2	COM3	COM4
*Port Address	03F8H	02F8H	02E8H	N/A
Baud Rate	1200	2400	57600	
Parity	None	None	None	
Data Bits	7	8	8	
Stop Bits	1	1	1	
Carrier Detect (CD)	No	No	No	
Ring Indicator (RI)	No	No	No	
Data Set Ready (DSR)	No	No	Yes	
Clear To Send (CTS)	No	No	Yes	
UART Chip Used	8250	8250	16550AF	

***WARNING:** To determine the available COM port, refer to the Port Address information. The MSD.EXE utility scans your computer sequentially for any COM ports and displays the information for the COM ports in the order that it scans it in.

This does not necessarily mean that the information it displays is for the designated COM port. For example, the information in the above chart under COM3 is actually the information for COM4. The utility had found that no device was being used in COM3 but did find a device using COM4 and therefore displayed the information from COM4 under COM3.

To determine what COM port is being used, match the information from the Port Address to the following chart:

COM1	03F8-03FF
COM2	02F8-02FF
COM3	03E8-03EF
COM4	02E8-02EF

Using this chart with the example above, we see that the address under COM1 is 03F8 and therefore correctly states the information for COM1. The address listed at COM2 is 02F8 and therefore correctly states the information for COM2. However we find that the address under COM3 is actually the address for COM4, and therefore the information in this column is actually for COM4. We can now safely conclude that COM ports 1, 2, and 4 are being used by devices in the computer.

With the above example an Internal modem may only be set to use COM port 3. Since COM port 1 uses IRQ 4, you must select another IRQ on the Internal modem. Most models support IRQ's 2,3,4,5 & 7. Check your Quick Installation Reference Card for the settings on your model. If installing an External modem, you now have to determine what RS232 jack on the back of your computer matches the COM ports found by MSD. This may take a little experimentation. You may want to try COM port 2 first. Most systems are setup with a mouse connected to COM port 1, with an RS232 jack set to COM port 2 ready for a external device.

T.3.3 Communication Settings and Line Noise

If you can connect to another number, but the screen display is incorrect (garbage characters, misplaced characters, etc...), the cause is usually one of two problems.

- A. First, your communications program may be configured incorrectly for the modem you are connecting to. Check the **Baud rate**, **Parity**, **Data Bits**, and **Stop Bits**. These settings should match that of the other computer. Also, check with the host to determine if you need to emulate a terminal when connecting.
- B. If you have an RPI modem, (refer to section 3.1.5), you will need to verify that one, but not both, of the following conditions are met:
 - 1. The software you are using supports RPI modems and is set up correctly to enable the software error-correction.
 - 2. You have obtained Rockwell's universal Windows communications driver, (WinRPI driver), and have successfully installed and enabled it. (This requires the +H11 or +H3 command added to the INIT string of the Windows communications software you are using. Refer to the readme file included with the WinRPI driver.)
- C. If all of the settings in the software are correct, you might have a "noisy" telephone line. Contact your local telephone company to have them check the line. Notify them that you are using the line for a modem. If the telephone company technician verifies a good phone line, contact the place of purchase of your fax/modem and arrange to have your it repaired or replaced.

T.4 Online Technical Support

If you have access to the World Wide Web be sure to visit Zoltrix home page at:

<http://www.zoltrix.com>

You may also want to read the updated Modem Questions and Answers located at:

<http://www.zoltrix.com/modemq&a.htm>

You may also locate the Technical Support phone numbers and e-mail address on the Tech Support Web page at:

<http://www.zoltrix.com/techsupp.htm>

Appendix T Troubleshooting

T.3 Common Problems and Their Solutions

The most common problems that are encountered are:

1. The computer, or communications software, does not recognize the modem.
{Section T.3.1}
2. The modem will not dial (NO DIALTONE), and/ or answer an incoming call).
{Section T.3.2}
3. You can connect with another computer, but the text (or graphics) that you see, is not correct.
{Section T.3.3}

T.3.1 Modem Recognition

If your modem is not being recognized by your computer (or communications software), the problem usually involves COM ports. Use the following steps to troubleshoot the problem:

1. Make sure that the COM port selected on the software is the same as the one you have selected on your modem
2. If installing an Internal modem and you have not followed the instructions at the beginning of this appendix titled, "**Determining what Serial Ports are Installed in Your Computer**", turn off your computer, remove the modem from your computer and follow the instructions in that section.
3. If using Windows 3.1 or 3.11, make sure you use the control panel to check the port addresses and IRQ's selected by Windows. Verify that the Control Panel port settings match the settings on the modem.

If you have determined that there is not a COM port conflict, then the problem usually involves **IRQ** (interrupt request level) conflicts.

1. Check to see if you have another device (such as a mouse or sound card) that shares an **IRQ** level with the modem.

If you have determined that there is an **IRQ** conflict, then use the Quick Installation Reference Card to determine how to change the **IRQ** used by your modem.

T.3.2 Line Problems

If the modem will not dial (and/or answer), and you have already determined it is not a COM port conflict, do the following:

- A. Check the telephone lines. Make sure that the telephone cord from the wall is firmly connected to the jack in the modem labeled "Line " or "Wall". If it is, unplug the cord from the modem and connect it to a telephone, (make sure that you use the same telephone cord that you used to connect to the modem). If you can't hear a dial tone when you pick up the phone, the telephone line (or outlet) is the source of the problem.
- B. Try using another telephone cord to ensure it is not defective. If you still can't hear a dial tone when you pick up the phone, the telephone outlet is bad or your phone line is out of service. If you do hear a dial tone on the telephone set, but you don't hear the dial tone when the phone is connected to the phone jack on the modem, it may well be a problem with the modem.

If this is the case and your fax/modem is still under warranty, contact the dealer (computer store) where you purchased your fax/modem from and arrange to have it repaired or replaced.

Appendix T Troubleshooting

Appendix T

Trouble-Shooting

T.1 How to Use this Section

The modem has been designed and manufactured to make telecommunications as easy and painless as possible. However, success with communications depends upon a number of things working together correctly: your computer, your modem, your software, and your telephone line. And, these individual pieces must be working correctly on the other side of the connection as well.

While correcting problems is usually quite simple, the difficulty lies in knowing where to look. This section of the manual is designed to assist you in determining the cause of problems that may occur so they can be fixed.

In addition to this section, you might also look to similar sections in your communications software manual.

T.2 Determining What Serials Ports Are Installed in Your Computer

Whether you are installing an Internal or an External modem in your system, it is a good idea to determine what serial ports are installed in your computer...if any. You may assume that you only have COM1 on your computer, when you actually have both COM1 and COM2. You also might have many other combinations of COM ports.

Most computers have a Serial I/O card installed with COM ports 1 and 2 enabled. A Serial I/O card is required when using an External modem. These cards allow you to connect external modems and a mouse...just to name a couple. Even if you don't have anything connected to the RS232 jack on the I/O card, it is still using a COM port. Every internal modem has a COM port built inside of it. The COM port and IRQ selection is made via dip switches or jumpers. (Refer to the Quick Installation Reference Card for settings.) A COM port may only be used by one device!

Many problems you may experience installing an Internal modem are caused by configuring the modem's COM port to a port already used by the I/O card installed in your computer system. A symptom of this conflict is the modem's inability to dial. When using an External modem the difficulty lies in determining what COM port is assigned to the physical RS232 jack on the back of your computer. You may think the RS232 jack is COM port 2, when in fact the second port on the I/O card has been set to COM port 4. There are many different possible ways that your system may be configured.

In the case of an Internal modem installation you must first determine which COM ports are already being used by devices in the system. Remember, you cannot set the Internal modem to a COM port address used by another device in the system.

In the case of an External modem installation you must determine if a COM port is enabled on your I/O card that you may plug your modem into. And if so, what is the correct address for the COM port. Another important fact that you should know about your COM port is the type of UART installed. If you want to run your communications software at rates above 19,200 bps, the UART in the COM port must be a 16550.

To help us determine how your system is set up, we can use a diagnostic program that is available with both MS-DOS 6.0 and above or Windows 3.1 to list the addresses that are used by devices in the system. The program is named, "MSD.EXE", and can usually be found under your DOS or Windows directory.

The MSD.EXE diagnostic utility has several useful utilities but for our purposes we will only use the COM port scanning function. To start MSD.EXE, type MSD at the DOS prompt:

C:\DOS>MSD

Appendix G Glossary

ITU-T (International Telecommunications Union-Telecommunication)

Formerly called the **CCITT**, the **ITU**, which is part of the International Telecommunications Union based in Geneva, has developed a series of modem standards that have been adapted primarily by the post, telephone, and telegraph (PTT) organizations that operate telephone networks of many countries outside the United States. Because of the popularity, certain **ITU** recommendations have also been followed in designing modems for operation on communications facilities in the United States.

LAPM (Linked Access Procedure for Modems)

A error control protocol similar to MNP protocols. Defined in the CCITT V.42 recommendation, it uses CRC and ARQ to assure data reliability.

LEASED LINE

A telephone line leased from the telephone company connecting two locations directly on a semi-permanent basis.

MANUAL DIAL

The use of a telephone to dial a call.

MNP (MICROCOM NETWORK PROTOCOL)

An error correction protocol developed by **MICROCOM, INC.**

MODEM

A contraction of the words **MOD**ulator and **DEMOD**ulator. It is used to transform digital data into analog signals (modulate), at the transmitter, and transform the analog signals into digital data (demodulate), at the receiver.

MODULATION

The process or technique of impressing a data-carrying signal onto a carrier.

NON-VOLATILE MEMORY

A memory location on the modem that allows the user to change the modem default's and then store them permanently. The contents of the memory are not lost when power is removed.

NORMAL MODE

In normal mode, error correction and compression are turned off and the modem provides data buffers. This allows the terminal rate to be different from the connection rate. However, the maximum modem-to-modem throughput continues to be equal to the connection rate.

OFF HOOK

Indicates that the modem has picked up the phone line.

ON LINE

Indicates that a communications session is in progress.

PULSE DIAL

The type of dialing used by rotary-type telephones. Each digit is represented by a series of pulses.

RPI

RPI is short for **Rockwell Protocol Interface**. A software scheme to emulate V.42/V.42bis error correction and data compression.

SYNCHRONOUS

A method of communication where a group of characters are sent as a continuous stream of data at regular intervals of time.

VOLUME CONTROL

The volume of the Fax Modem can be changed in the software via the **L** (Loudness) command.

Appendix G

GLOSSARY of COMMUNICATION TERMS

Active Profile

The current modem settings of the modem. The active profile of the modem is the current values of all S-Registers and AT commands. The active profile is changed by modem software and can also be changed manually by sending AT commands to the modem directly. Once the active profile is configured to meet your special needs you may then store it permanently in the Non-Volatile Ram.

ASCII (American Standard Code for Information Inter-exchange)

A standard character set and coding scheme used to represent letters, numbers, symbols, and control characters. The IBM PC and most micro-computers use ASCII.

Analog

A continuous sound wave or signal, such as a voice, that conventional telephone lines were developed for.

ARQ (Automatic Repeat reQuest)

A term used to describe the automatic retransmission of defective data blocks for the purpose of error detection in MNP and V.42 protocols.

Asynchronous

A way of transmitting data where start and stop bits are used to frame each character. Data is sent and received at irregular periods of time.

Auto Answer

A function of the modem where it is set up to answer an incoming call.

Auto Dial

A function of the modem where it will dial a telephone number for you.

Baud

The unit of signaling speed, specifying the number of signal elements per second. Since a signal element can represent more than one bit, baud rate is not necessarily the same as bits per second.

BPS (BITS PER SECOND)

The number of bits that are transmitted in one second. This is the basic unit of measure for serial data transmission.

Carrier

A continuous frequency capable of being modulated or impressed with a second data-carrying signal.

CCITT (Consultative Committee for International Telephone and Telegraph)

See ITU-T.

Command Mode

This is the mode in which the operator, or communications software, can issue commands to the modem.

Cyclic Redundancy Checking (CRC)

A technique used to detect errors in the transmission of data by the affirmation of error codes by both the sending and receiving modem.

Appendix B Regulatory

Important F.C.C. Information

This product will be connected to the public telephone network. This network is regulated by the Federal Communications Commission (F.C.C.).

All F.C.C. rules must be followed in the use of this product.

F.C.C. Notice to the User

1. Upon request only, you must provide the following data to your telephone utility company (telco):

- (a) Notice of the intention to install or permanently remove an FCC Part 68-registered device or system, and the *F.C.C. registration number.

- * (b) The Ringer Equivalence Number (R.E.N., see device label). Note that if several devices are connected on the same line, the sum of the R.E.N. values must not add up to more than 5.0 (A or B). This R.E.N. figure is important to your Telco.

- * (c) The USOC jack type to be provided by the telco. Typically these may be RJ11C for single lines, or RJ21X for multi-lines.

*Note: These items are noted on the equipments FCC compliance label.

2. This device may not be used on telco-operated coin phone lines. Party lines and privately owned coin-phones are subject to local State regulatory policies, and possible additional special State requirements.

3. The telco has the right to make changes to their network which may affect the operation of your equipment, provided you are given adequate advance written notice to permit correct operation.

4. In case of operational problems, disconnect your unit by removing the modular or multiconnector plug from the telco's jack. If your regular phone still works properly, your modem has problems and must remain disconnected and serviced at an authorized service center. If upon the above disconnection your regular phone still has problems, notify your telco that there may be a problem with your phone lines. If there is a problem with the phone lines, you may or may not be required to pay for any repair service to the phone lines. However, if the problem is with lines that are not telco installed, you will be charged for the service.

5. Unless otherwise noted in the User's Manual (e.g. fuses, etc.), user may not, under any circumstances, in or out of warranty, attempt any service, adjustments, or repairs on this unit. It must be returned to the factory or authorized U.S. Service center for all such work. Locations can be obtained from the original place of purchase.

6. Special FCC rules apply to equipment connected behind a PBX or KTS.

FCC Radio Frequency Interference Statement

This modem has certified to comply with the limits for a Class B device, pursuant to Subpart J of Part 15 of the F.C.C. rules.

Appendix A Quick Reference

Table A-5. Result Codes (UMC chipset)

Result Code	Numeric Value	Description
OK	0	Modem successfully executed a command line.
CONNECT	1	Connection made at 300 bps.
RING	2	Modem detected an incoming call.
NO CARRIER	3	Modem lost or could not detect a remote carrier signal within the Register S7 time.
ERROR	4	Modem found an error in the command line.
CONNECT 1200	5	Modem established a connection at 1200bps.
NO DIALTONE	6	Modem did not detect a dial tone within 5 seconds after going off-hook.
BUSY	7	Modem detected a busy signal.
NO ANSWER	8	Five seconds of silence was not detected when using the @ command in the dial command line.
CONNECT 0600	9	Modem established a connection at 600 bps.
CONNECT 2400	10	Modem established a connection at 2400 bps.
CONNECT 4800	11	Modem established a connection at 4800 bps.
CONNECT 9600	12	Connection made at 9600 bps.
CONNECT 7200	13	Connection made at 7200 bps.
CONNECT 12000	14	Connection made at 12000 bps.
CONNECT 14400	15	Connection made at 14400 bps.
CONNECT 19200	16	Connection made at 19200 bps. (Indicates software rate)
CONNECT 38400	17	Connection made at 38400 bps. (Indicates software rate)
CONNECT 57600	18	Connection made at 57600 bps. (Indicates software rate)
* CARRIER 300	40	Carrier rate of 300 bps.
* CARRIER 1200	46	Carrier rate of 1200 bps.
* CARRIER 2400	47	Carrier rate of 2400 bps.
* CARRIER 4800	48	Carrier rate of 4800 bps.
* CARRIER 7200	49	Carrier rate of 7200 bps.
* CARRIER 9600	50	Carrier rate of 9600 bps.
* CARRIER 12000	51	Carrier rate of 12000 bps.
* CARRIER 14400	52	Carrier rate of 14400 bps.

* The CARRIER Result Code must be enabled with /V1 command.

Note: This section applies to UMC based Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.

Appendix A Quick Reference

Table A-3 S-Register Summary (Rockwell chipset)

	Register	Title	Default
*	S0	Number of Rings till Auto-Answer	0
	S1	Ring Counter	0
	S2	Escape Character	43
	S3	Carriage Return Character	13
	S4	Line Feed Character	10
	S5	Back Space Character	8
*	S6	Wait For Blind Dialing	2
*	S7	Wait For Carrier After Dial	50
*	S8	Pause Time For Dial Delay	2
*	S9	Carrier Detect Response Time	6
*	S10	Lost Carrier To Hang Up Delay	14
*	S11	DTMF Tone Duration	95
*	S12	Escape Code Guard Time	50
	S13	Reserved	none
*	S14	Bit Mapped Options	none
	S15	Reserved	none
	S16	Bit Mapped Test Options	none
*	S17	Reserved	none
*	S18	Test Timer	0
*	S19	Reserved	0
	S20	Reserved	none
*	S21	Bit Mapped Options	none
*	S22	Bit Mapped Options	none
*	S23	Bit Mapped Options	none
	S24	Reserved	none
*	S25	Delay To DTR	5
*	S26	RTS To CTS Delay Interval	1
*	S27	Bit Mapped Options	none
	S29	Flash Dial Tone	0
*	S30	Inactivity Timer	0
	S31	Reserved	none
	S32	XON Character	none
	S33	XOFF Character	none
*	S36	Negotiation Failure Treatment	7
*	S37	Desired Telco Line Speed	0
*	S38	Delay Before Forced Disconnect	20
	S39	Reserved	none
	S40	Bit Mapped Options (MNP)	57
	S41	Bit Mapped Options (MNP)	1
†*	S46	V.42bis Selection	none
†*	S48	V.42bis Negotiation Action	7
†*	S82	Break Handling	128
	S86	Connection Failure Cause Code	none
*	S95	Extended Result Codes	0

* Register value may be stored in one of two user profiles with the AT&Wn command.

† Not supported by RPI based fax/modems.

Note: This section applies to Rockwell based Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.

Appendix A Quick Reference

Table A-2. Result Codes (Rockwell chipset)

Result Code	Numeric Value	Description
OK	0	Modem successfully executed a command line.
CONNECT	1	Connection made at 300 bps.
RING	2	Modem detected an incoming call.
NO CARRIER	3	Modem lost or could not detect a remote carrier signal within the Register S7 time.
ERROR	4	Modem found an error in the command line.
CONNECT 1200	5	Modem established a connection at 1200bps.
NO DIALTONE	6	Modem did not detect a dial tone within 5 seconds after going off-hook.
BUSY	7	Modem detected a busy signal.
NO ANSWER	8	Five seconds of silence was not detected when using the @ command in the dial command line.
CONNECT 0600	9	Modem established a connection at 600 bps.
CONNECT 2400	10	Modem established a connection at 2400 bps.
CONNECT 4800	11	Modem established a connection at 4800 bps.
CONNECT 9600	12	Connection made at 9600 bps.
CONNECT 7200	13	Connection made at 7200 bps.
CONNECT 12000	14	Connection made at 12000 bps.
CONNECT 14400	15	Connection made at 14400 bps.
† CONNECT 16800	59	Connection made at 16800 bps. (28,800bps Modems only)
CONNECT 19200	16	Connection made at 19200 bps.
		(If modem is set to respond with connect message that indicates carrier rate, then 28,800bps Modems only. Otherwise indicates software rate)
† CONNECT 21600	61	Connection made at 21600 bps.
† CONNECT 24000	62	Connection made at 24000 bps. (28,800bps Modems only)
† CONNECT 26400	63	Connection made at 26400 bps. (28,800bps Modems only)
† CONNECT 28800	64	Connection made at 28800 bps. (28,800bps Modems only)
†† CONNECT 31200	65	Connection made at 31200 bps. (28,800bps Modems only)
†† CONNECT 33600	66	Connection made at 33600 bps. (28,800bps Modems only)
CONNECT 38400	17	Connection made at 38400 bps. (Indicates software rate)
CONNECT 57600	18	Connection made at 57600 bps. (Indicates software rate)
CONNECT 115200	19	Connection made at 115,200 bps. (Indicates software rate)
CARRIER 300	40	Carrier rate of 300 bps.
CARRIER 1200	46	Carrier rate of 1200 bps.
CARRIER 2400	47	Carrier rate of 2400 bps.
CARRIER 4800	48	Carrier rate of 4800 bps.
CARRIER 7200	49	Carrier rate of 7200 bps.
CARRIER 9600	50	Carrier rate of 9600 bps.
CARRIER 12000	51	Carrier rate of 12000 bps.
CARRIER 14400	52	Carrier rate of 14400 bps.
*† CARRIER 16800	53	Carrier rate of 16800 bps.
*† CARRIER 19200	54	Carrier rate of 19200 bps.
*† CARRIER 21600	55	Carrier rate of 21600 bps.
*† CARRIER 24000	56	Carrier rate of 24000 bps.
*† CARRIER 26400	57	Carrier rate of 26400 bps.
*† CARRIER 28800	58	Carrier rate of 28800 bps.
*†† CARRIER 31200	65	Carrier rate of 31200 bps.
*†† CARRIER 33600	66	Carrier rate of 33600 bps.

* The CARRIER Result Code must be enabled with S95 bit 2 or W1 command.

† 28,800 bps and 33,600 bps modems only.

†† 33,600 bps modems only.

Note: This section applies to Rockwell based Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.

Chapter 3 Using the Modem

3.7.2 The Stored Profiles

Two stored profiles are stored in the modem's nonvolatile memory. When you turn your computer and modem off, or reset the modem, you do not change or lose either stored profile. When you turn your modem on, or reset it with the Zn command, the modem reads its nonvolatile memory, and makes the active profile the same as one of the stored profiles.

The stored profile used when you turn on the modem is determined by the &Yn command. &Y or &Y0 (the factory default setting) cause stored profile #0 to be used when the modem is turned on. &Y1 causes stored profile #1 to be used when the modem is turned on.

If you want to change one of the stored profiles to match the current active profile, you would use one of the following commands:

AT&W0<Enter> (Stored profile #0 = current profile)

or

AT&W1<Enter> (Stored profile #1 = current profile)

Note: *Not all parameters may be stored in the modem's nonvolatile ram. The parameters that may be stored are listed in Table's A-1 & A-4.*

3.7.3 Viewing Your Stored and Active Profiles

You may wonder "What's in my two stored profiles?" or "Just what is my active profile?". The &V command provides you with a "view" of your profiles. You must be in the "Terminal Mode" to be able to send the &V command to your modem. The &V command causes your modem to display a list of AT commands and S-Register settings currently in effect (Active Profile) and both stored profiles.

Following is a typical response to the &V command:

ACTIVE PROFILE:

B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T4 &X0 &Y0
S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006
S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S36:007 S37:000 S38:020 S44:020
S46:138 S48:007 S95:003

STORED PROFILE 0:

B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R1 &S0 &T4 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:105 S41:135 S46:138 S95:003

STORED PROFILE 1:

B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C0 &D0 &G0 &J0 &K3 &Q5 &R1 &S0 &T4 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S36:007 S37:000 S40:105 S41:135 S46:138 S95:000

TELEPHONE NUMBERS:

0= 1=
2= 3=

OK

Following is a typical response to the &V command for models that do not support nonvolatile ram:

ACTIVE PROFILE:

B1 E1 L1 M1 N1 Q0 T V1 W0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q6 &R1 &S0 &T5 &X0 &Y0
S00:000 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002 S09:006
S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S36:007 S37:000 S38:020 S44:020
S46:138 S48:007 S95:000

Chapter 3 Using the Modem

The S registers are summarized in Tables A-3 & A-6 along with their default values. Registers denoted with an '**' in the tables may be stored in one of two user profiles by entering the AT&Wn command. One of these profiles may be loaded at any time by using the ATZn command.

3.5 Answer Mode

3.5.1 Answering a Call

When the modem is in the data mode, Auto-Answer will answer an incoming call provided the computer is on and your software is properly loaded.

Note: Your modem is not factory set to Auto-Answer telephone calls.

You can enable the Auto-Answer mode by setting register S0 to one or greater. Your terminal or computer must be in the On-Line mode with its DTR signal true or the &D0 command (DTR forced ON) must have been issued. See the discussions covering Selecting the Number of Rings and Disabling Auto-Answer.

When the modem answers the call, it sends a high-pitched carrier tone to the modem on the other end, which begins the handshaking process.

After handshaking, you will see one of the CONNECT result code messages on your screen, and the data connection will begin.

3.5.2 Selecting the Number of Rings

Register S0 allows you to select the number of rings after which the modem will Auto-Answer. For example, to instruct the modem to answer after four rings, type the following command:

ATS0=4 <Enter>

3.5.3 Disabling Auto-Answer

If you want to disable the Auto-Answer feature (perhaps you will be away from your phone for a while), you can do so by setting register S0 to 0.) If you are using communications software, and it is programmed to Auto-Answer, it will do so regardless of the modem's settings.

Note: The modem can answer a call even if Auto-Answer is disabled. Your computer must be turned ON, your computer's software loaded, and you must be in the terminal mode. When you hear the telephone ring, type the command ATA <Enter>. The modem will answer the call.

3.5.4 Sending And Receiving Files

You can use your modem, your computer and communications software to transmit (upload) and receive (download) files. These processes are handled through your communications software. See your-communications software manual for more information.

3.6 Issuing Commands During The Data Connection

The modem has two operational states: Command State and Data State. When you first turn your terminal ON, or load your computer's communications software, and start giving commands to the modem, the modem is in Command State. However, once you make a connection with another modem and start passing information over the telephone lines, you are in the Data State and can no longer issue AT modem commands.

If your connection with the other computer is broken for any reason, you will automatically return to Command State so that you can issue new commands. However, you may want to return to Command State temporarily without losing your data connection (e.g. to change a communications

parameter). The modem provides a special Escape Code that lets you do this.

Chapter 3 Using the Modem

3.3.5 Hanging Up

If you are using a communications program, use the "hang up" or "disconnect" command in the program to disconnect the call.

A method used with computers in the "dumb terminal mode" is to return to the Command State by typing an escape sequence. Typing three plus signs is the standard escape sequence,

+++

(see 3.6 Issuing Commands During the Data Connection below), and to hang-up then type the "hang-up" command as follows:

ATH <Enter>

3.3.6 Dialing from a Business Phone System

When you dial from a business phone, you typically must instruct the modem to dial a number for an outside line, to wait for a dial tone, and then to dial the telephone number of the remote modem. A typical command line might look like this:

ATDT9,876-5555 <Enter>

Here the modem dials 9 for an outside line, pauses to wait for a dial tone (the comma in the command line causes the pause), and then dials the number.

By default, the comma causes a two-second pause. However, you can create a longer or shorter pause by changing the value for register S8.

You can also create a longer pause by including several commas in a row in the command line. If there is no dial tone by the time the pause ends, the modem will go ahead and dial the number anyway, but the connection will not succeed.

A better way to dial would be to insert a W in the command line to instruct the modem to wait until it hears the dial tone (for a specific maximum amount of time). The command line would look like this:

ATD9W876-5555<Enter>

Here the modem dials 9 for an outside line and then waits for a dial tone (the default maximum wait time is 50 seconds, but you can change this value in register S7). If no dial tone is detected in the specified time, the modem hangs up.

Note: *Your office phone system must allow the use of a regular telephone (not a proprietary phone) to use your modem from your business.*

3.3.7 Returning to Command State After Dialing

Occasionally you may want the modem to dial a number and then to return to Command State to send additional commands before establishing a data connection. You will find this feature useful when dialing an electronic service such as telephone banking. You can dial the number of the bank, then after the call is answered, you can enter your access code.

To cause the modem to return to Command State after dialing, include a ; (semicolon) at the end of the command line.

For example, to dial a bank for electronic banking, you might type the following command:

ATDT 876-5555; <Enter>

Here, the modem tone dials the number. If the remote modem answers, you see the OK Result Code, and can enter addition commands. For example, to instruct the modem to dial your access code or account number, you could enter the second command line as follows:

ATDT 12345678 <Enter>

If the connection is successful, you will see the CONNECT Result Code on your screen.

Chapter 3 Using the Modem

3.2.5 Result Codes

When a command is issued, the screen will usually respond with a message. This message is called a "Result Code". It tells you the result of the command you've executed; whether the command has been executed, whether you have connected to another modem, whether the modem received a busy signal, and so forth.

Result codes (Tables A-2 & A-5) can be displayed by either a number representing a result code or by verbal responses for a more descriptive code. Your modem has been defaulted to show the verbal response codes. However, you can alter the result code responses in the following ways:

1. The Xn command instructs the modem to give you less detailed responses. The default is X4.
2. The V0 command instructs the modem to respond with numerical (digits) instead of verbal result codes.
3. The Q1 command disables generation of result codes.
4. The W dial string modifier instructs the modem to wait for a DIAL tone before continuing dialing.
5. The @ dial string modifier instructs the modem to include the NO ANSWER result code in the X4 mode.

3.2.6 Dialing With AT Commands

The Terminal mode allows you to instruct the modem to dial a remote modem by issuing the D command followed by the phone number. You can also include dial string modifiers in your command line to give the modem additional instructions. The following dial modifiers are available:

T	Dial using DTMF tones
P	Pulse/rotary dial (factory default)
,	Pause
W	Wait for dial tone
@	Wait for silence
!	Hookflash
/	Wait 0.125 seconds
;	Return to the Command Mode after dialing

Note: Download the complete AT command manual from the Zoltrix BBS at (510) 657-7413

3.2.7 Simple Dialing

To command the modem to dial a remote modem from an ordinary tone dialing telephone, enter the dialing command followed by the phone number. For example, type the following command:

ATDT 876-5555 <Enter>

Note: For rotary/pulse dialing telephone systems you must use:

ATDP 876-5555 <Enter>

Note: If all of your typed characters appear double (for example, you see AATTDD), you need to disable command echo by reconfiguring your communication software (refer to the software manual) or issuing the ATE0 <Enter> command.

After you issue the dialing command you will hear the modem dialing and the remote telephone ringing. If the remote modem answers the call, the two modems will send high-pitched carrier tones to one another which establishes the transmission speed and other parameters for the data connection. This process is called handshaking.

If the call is answered, you should see the message, "CONNECT", followed by the connection speed. If the other phone line is busy, you will see "NO CARRIER" or "Busy" displayed (this is dependent upon the current X setting). If the other modem does not answer, you will see the message, "NO CARRIER".

After a connection has been established, with one of the "CONNECT" messages displayed, the modem is ready to immediately begin transmitting and receiving data. This may vary from typing messages to each other, sending or receiving files, logging on to an information service, or any other data communication task you wish to perform.

Chapter 3 Using the Modem

The modem will respond with something similar to the following examples:

Modem Response	Fax Class supported by Fax/Modem
[0,1]	Class 1
[0,2]	Class 2
[0,1,2]	Class 1 and Class 2

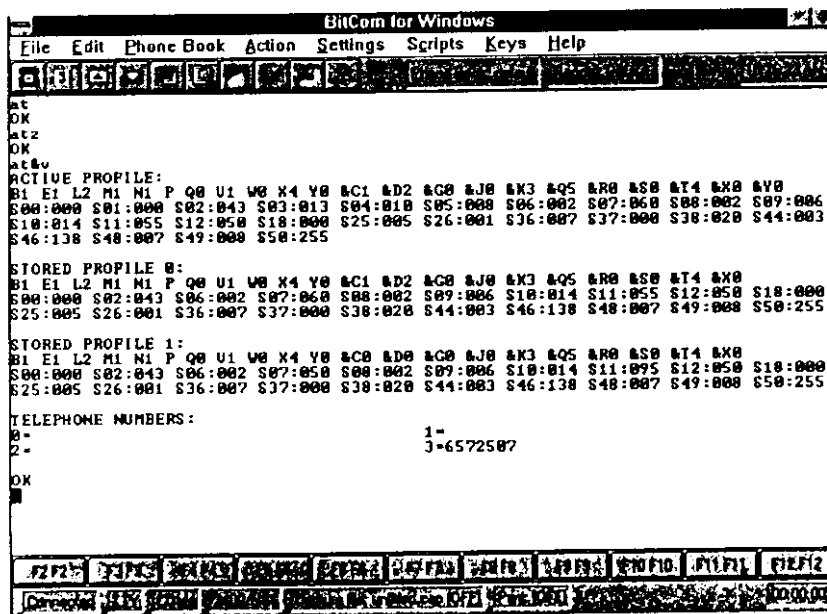
If there is a listing of fax/modems to select from and this modem is not listed, select a "generic class 1" or "generic class 2" fax/modem. If a Initialization string is required you can use the following:

AT&F&C1&D2

3.2 Issuing AT Commands

3.2.1 Getting Started with the Terminal Mode

With your modem installed, your computer powered ON, and your computer's communications software loaded in its terminal mode, you can enter commands to the modem.



```
BitCom for Windows
File Edit Phone Book Action Settings Scripts Keys Help
-----
at
OK
atz
OK
atdv
ACTIVE PROFILE:
B1 E1 L2 M1 M1 P Q0 U1 V0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R0 &S0 &T4 &X0 &Y0
S00:000 S01:000 S02:043 S03:013 S04:010 S05:000 S06:002 S07:060 S08:002 S09:006
S10:014 S11:055 S12:050 S18:000 S25:005 S26:001 S36:007 S37:000 S38:020 S44:003
S46:130 S48:007 S49:000 S50:255
STORED PROFILE 0:
B1 E1 L2 M1 M1 P Q0 U1 V0 X4 Y0 &C1 &D2 &G0 &J0 &K3 &Q5 &R0 &S0 &T4 &X0
S00:000 S02:043 S06:002 S07:060 S08:002 S09:006 S10:014 S11:055 S12:050 S18:000
S25:005 S26:001 S36:007 S37:000 S38:020 S44:003 S46:130 S48:007 S49:000 S50:255
STORED PROFILE 1:
B1 E1 L2 M1 M1 P Q0 U1 V0 X4 Y0 &C0 &D0 &G0 &J0 &K3 &Q5 &R0 &S0 &T4 &X0
S00:000 S02:043 S06:002 S07:050 S08:002 S09:006 S10:014 S11:095 S12:050 S18:000
S25:005 S26:001 S36:007 S37:000 S38:020 S44:003 S46:130 S48:007 S49:000 S50:255
TELEPHONE NUMBERS:
0-
2- 1-
3-6572507
OK
```

Sample Terminal Mode Display

If available in your communication's software, select the "terminal mode" (sometimes referred to as, "terminal emulation mode", "dumb terminal mode", "local mode", or "direct connect mode"). This mode allows you to send commands directly to the modem. Some software packages start immediately in the terminal mode as soon as you load the program.

Chapter 3 Using the Modem

3.1.6 Custom INIT Strings and Modem Configurations for Hardware V.42bis modems

Note: *This section does not apply to RPI Fax/modems. Please refer to Section 3.1.1 to determine your fax/modem type.*

Because some modems do not recognize the V.42bis handshaking sequence or you may want to make a special type of connection. Use the following Init strings to ensure that the modem will make a successful connection. A common customization is to add the command to limit the modems top speed to the end of the string (ie. F5 or *N1 to limit the attempted speed to 2400 bps).

1) V.42bis Auto

This configuration is the configuration used to attempt all possible connections. The modem will first attempt a V.42bis connection, if the remote modem does not support V.42bis, the modem will attempt an MNP5 connection, if the remote modem does not support MNP5 the modem will attempt an NORMAL connection (No error correction or compression).

UMC Based 14,400's	AT&F&C1&D2W1
Rockwell Based 28,800's (V.34) & 33,600's (V.34+)	AT&F&C1&D2W2

2) MNP5

This configuration will bypass the V.42bis and V.42 negotiation and attempt MNP5 first. If the remote modem does not support MNP5 the modem will attempt an NORMAL connection (No error correction or compression). Use this selection if you know that the remote modem is only a MNP modem and does not support V.42/V.42bis.

UMC Based 14,400's	AT&F&C1&D2W1\N3
Rockwell Based 28,800's (V.34)	AT&F&C1&D2W2S48=128

3) MNP4

This configuration will bypass the V.42bis and V.42 negotiation and attempt MNP4 first. If the remote modem does not support MNP4 the modem will attempt an NORMAL connection (No error correction or compression). Use this selection if you know that the remote modem is only a MNP modem and does not support V.42/V.42bis. This selection turns off the MNP5 compression. MNP5 may actually slow down file transfers of compressed files, therefore you may want to turn MNP5 off but still want the error correction capabilities of MNP4.

UMC Based 14,400's	AT&F&C1&D2W1\N3%C0
Rockwell Based 28,800's (V.34)	AT&F&C1&D2W2S48=128%C0

4) NORMAL (Error Correction and Data Compression OFF)

This configuration will not attempt V.42 or MNP but instead attempt a NORMAL connection. If you know that the remote modem does not support V.42 or MNP, select this configuration type. This will actually speed up the handshaking process. Many non-error-correcting modems do not interpret the V.42 and MNP signals correctly. Using this selection will eliminate the problems seen when calling non-error-correcting modems.

UMC Based 14,400's	AT&F&C1&D2W1\N0
Rockwell Based 28,800's (V.34)	AT&F&C1&D2&Q6W2

Note: *You may add additional commands to any of the preceding INIT strings, but as mentioned previously, it is recommended that you put the additional commands at the end of the INIT string.*

3.1.7 The Use and Setup of Hardware V.42bis Modems

When a V.42bis connection is established, there is a theoretical maximum compression of the data of 4-to-1. In order to compress or decompress the data and then transmit or receive it, the data must be transferred from the terminal to the modem and from the modem to the terminal, four times faster than the modem is transmitting or receiving it. Therefore, when you set up your software for use with a high-speed 14,400 bps or 28,800 bps modem with hardware V.42bis and MNP5, you must set the Data Terminal Equipment (DTE) speed to the highest possible "virtual" transmission speed.

Chapter 3 Using the Modem

You may also contact the Zoltrix BBS at (510) 657-7413 and follow the directions below.

1. Log onto the Zoltrix BBS by entering your name and following the onscreen directions.
2. When you get to the Bulletin Menu, read bulletin #4.
3. Using the AT13 response described in section 3.1.1, use the chart on Bulletin #4 to determine the filename of the ATcommand manual for your modem.

3.1.2 RPI Software V.42bis Error Correction and Data Compression

If your modem does not integrate hardware V.42/V.42bis Error Correction and Data Compression, it is likely to have V.42bis functions that are software emulated. This means that the computer executes the error correction and data compression functions. Theoretically the speed of this operation is the same as hardware V.42bis, however this is highly dependent on the speed of your computer. To achieve the 57,600 bps throughput, you must have a 486/33MHz or faster computer.

One such software V.42bis emulated modem is built around the Rockwell RPI chipset. If you have such a modem, any software that you intend to use with it requires the Rockwell RPI (Rockwell Protocol Interface) to enable Error Correction and Data Compression functions. The software provided with the modem provides RPI support. If the software you are using does not support Rockwell's RPI, you will not get the benefits of Error Correction and Data Compression.

Rockwell has written a Windows driver that will give all Windows-based communication programs the software Error Correction and Data Compression functions. To obtain this driver contact the Zoltrix BBS at (510) 657-7413 or on the World Wide Web at:

<http://www.nb.rockwell.com/ref/rpi/winrpi.html>

3.1.3 Default Initialization Strings

Your modem has been preset at the factory to optimize its performance. These factory programmed defaults allow the modem to achieve the best possible connection under the worst of telephone line conditions. This is done by programming the modem with a set of instructions called the "INIT (short for initialization) String".

The INIT string instructs the modem how to execute each communication session including implementing or not implementing error correction and data compression during the session. The factory default INIT string stored in the modem is as follows:

AT&F&C1&D2S95=3

If the program that you are using allows the entry or editing of an INIT string, consider entering AT&F&C1&D2S95=3. However, you should note the original INIT string in case you need to set it back to the programs default settings.

3.1.4 Customizing Your Modem Settings

If you want to custom configure your stored profiles, we suggest that you always use AT&F&C1&D2 as the first part of your customized INIT string and add other settings to the end. For example, if you wish to change the duration of the dial tone to 55ms by adding an S11 option to your string, the resulting string would be as follows:

AT&F&C1&D2S11=55

Notice that AT&F&C1&D2 is the first part of the string and the new option S11=55 has been appended to the end of the string.

Note: If the modem's performance suffers after the settings have been modified, issue AT&F&C1&D2S95=3&W to the modem. This will instruct the modem to restore the default init string and store it in the modems N.V. Ram (Permanent memory). If your model does not support the N.V. Ram (see section 3.7.3), change the INIT string to the default string.

Chapter 2 External Fax/Modem Installation

2.3.3 Installing Telephone Lines

The Fax/Modem has two modular telephone jacks on the back of the modem. You will need to connect your Fax/Modem to the wall outlet via a modular telephone cord.

If your wall outlet is not a modular type, you can purchase an inexpensive converter at most electronics or phone stores. It is suggested that you connect your modem to a "dedicated line". A dedicated line is a regular phone line that does not go through a switchboard, PBX, etc...

You can also connect a telephone set to your modem, enabling you to use the phone when the modem is not in use. The modem can also be used as an autodialer with your telephone set. It is recommended that you use a single line phone outlet (RJ11). However, you can use a two-line (RJ14) phone line, but the modem will only work on the first line using the center pair of wires.

To connect the telephone line to the modem follow these steps:

1. Insert one end of the phone line into the jack on the modem labeled **Line** or **Wall**.
2. Insert the other end of the phone line into the phone jack, (usually located on the wall).

If you wish to use a phone in conjunction with your modem, please follow these steps:

1. Insert the line from the phone into the modem jack labeled **Phone**.
2. Make sure that the other end of the phone line is connected to the telephone

Chapter 1 Internal Fax/Modem Installation

1.3 Installation Steps

The steps to install your modem are shown in order in this section. For some steps, you may need to refer to your computer's User's Manual.

1.3.1 Selecting the COM Port

Before installing the modem, refer to **Appendix T** in the section titled "Determining What Serial Ports are Installed in Your Computer" to correctly identify what serial ports are used on your computer system.

The Internal Fax/Modem can use COM ports 1 to 4. Please refer to the **Quick Installation Reference Card** for the instructions on how to set the COM ports and IRQ levels for your Internal modem. You may also refer to the printing on the Internal Fax/Modem for the setting of the COM ports and IRQ levels.

1.3.2 Inserting the Fax/Modem

1. Turn off the power to the computer. Also, turn off any external devices that are attached, such as a printer and monitor.
2. Take out the mounting screws on the back of your computer. Refer to your computer manual if you cannot locate them.
3. Remove the computer cover. Refer to your computer manual if you cannot determine how to remove the cover.
4. Select an empty slot. You may need to remove the metal slot cover first, using a small screwdriver.
5. Discharge any static electricity in your body by touching any bare metal surface on the chassis of the computer and remove the modem from the static-shielded bag.
6. Press the board firmly into the slot ensuring that the gold tabs on the fax/modem are aligned with the connectors in the slot.
7. Insert the screw and tighten slightly. Check to ensure that the telephone jacks in the back of the modem are unobstructed. If so, then tighten the screw securely.
8. Replace the computer cover.

1.3.3 Installing Telephone Lines

The Fax/Modem has two modular telephone jacks on the back of the modem. You will need to connect your Fax Modem to the wall outlet via a modular telephone cord.

If your wall outlet is not a modular type, you can purchase an inexpensive converter at most electronics or phone stores. It is suggested that you connect your modem to a "dedicated line". A dedicated line is a regular phone line that does not go through a switchboard, PBX, etc...

You can also connect a telephone set to your modem, enabling you to use the phone when the modem is not in use. The modem can also be used as an autodialer with your telephone set. It is recommended that you use a single line phone outlet (RJ11). However, you can use a two-line (RJ14) phone line, but the modem will only work on the first line using the center pair of wires.

To connect the telephone line to the modem follow these steps:

1. Insert one end of the phone line into the jack on the modem labeled **Line or Wall**.
2. Insert the other end of the phone line into the phone jack, (usually located on the wall).

If you wish to use a phone in conjunction with your modem, please follow these steps:

1. Insert the line from the phone into the modem jack labeled **Phone**.
2. Make sure that the other end of the phone line is connected to the telephone

Summary

Hardware Manual Summary

This manual offers you information on the setting up and installing of fax/modems. It is written for both first-time users as well as users who may already have a familiarity with fax/modems or other computer peripherals. Because this manual is used for several products, some parts of it may not apply to your purchase.

If you are not familiar with the terminology, please refer to the Glossary in Appendix G.

- Chapter 1, "***Internal Fax/Modem Installation***", provides step by step instructions on the set up of your fax/modem. Topics include selecting COM ports, connecting telephone cables, and the testing of the fax/modem.
- Chapter 2, "***External Fax/Modem Installation***", provides step by step instructions on the set up of your fax/modem. Topics include selecting COM ports, connecting telephone cables, and the testing of the fax/modem.
- Chapter 3, "***Using the Fax/Modem***", discusses the option of controlling of the fax/modem through commands other than those generated by the included software.
- Appendix A, "***Quick Reference***", lists AT commands summaries and S-Register Summaries for the various models this manual covers.
- Appendix B, "***Regulatory Information***", lists important FCC information.
- Appendix G, "***Glossary***", lists common data communication terms used in this manual.
- Appendix S, "***Specifications***", lists technical specifications of models covered by this manual.
- Appendix T, "***Troubleshooting***", discusses possible configuration problems and solutions with the modem.