

**PCMCIA**  
**Fax Modem 56K**

**User Manual**

## FCC REGULATORY STATEMENTS

### *FCC Part 68 Registration*

This device complies with FCC Part 68 rules, and the use of this device is subject to the following restrictions:

The FCC has established rules which permit this device to be directly connected to the telephone network. Standardized jacks are used for these connections. This equipment should not be used on party lines or coin phones.

If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until repair has been made. If this is not done, the telephone company may temporarily disconnect service.

The telephone company may make changes in its facilities, equipment, operation and procedures; if such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the situation with the FCC.

If the telephone company requests information on what equipment is connected to their lines, inform them of:

- a. The telephone number to which this unit is connected.
- b. The Ringer Equivalence Number (REN).
- c. The USOC jack required.
- d. The FCC Registration number.

Items (b) and (d) are indicated on the label. The Ringer Equivalence Number (REN) is used to determine how many devices can be connected to your telephone line. In most areas, the sum of the REN's of all the devices on any one line should not exceed 5.0. If too many devices are attached, they may not ring properly.

### *FCC Part 15 Registration*

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

1. This device may not cause harmful interface, and
2. This device must accept any interface received including interface that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 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 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 harmful interference to radio or television reception, which can be determined by turning off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- (1) Reorient or relocate the receiving antenna.
- (2) Increase the distance between the equipment and receiver.
- (3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- (4) Consult an experienced radio/TV technician for help.

### *CTR 21 pan-European Certification*

This equipment has been approved in accordance with Council Decision 98/482/EC for pan-European single terminal connection to the public switched telephone network (PSTN). However, due to differences between the individual PSTNs provided in different countries, the approval does not, of itself, give an unconditional assurance of successful operation on every PSTN network termination point. In the event of problems, you should contact your equipment supplier in the first instance.

This device is designed to work with the notified networks in all EC member states. Nevertheless, some of the network services in individual countries might not be supported, but they will not affect the normal data and fax applications. For example, the metering charge service in Germany. Besides you may encounter difficulty of using PULSE dialing function in some of the countries, such as Nordic countries. This kind of network compatibility is dependent on the physical and software settings of this device. If the users are desired to use this device on those networks, they should contact the vendor or supplier first.

## **INTRODUCTION**

This PCMCIA Fax Modem 56K is a credit-card-size Type II PC card that complies with the PCMCIA 2.1 standards.

The PCMCIA Fax Modem 56K is Bell, ITU-T (formerly CCITT) compliant and Hayes AT command compatible, so that it can be used worldwide with today's popular communication software programs. You will be able to send and receive faxes to/from any Group 3 compatible fax machine. Using standard phone lines, the data communication functions of the modem will enable you to successfully hook up to the Internet, transmit E-mail, send and receive information and communicate with other PCs, Bulletin Board Services (BBS) or computer networks such as Compuserve

## **Specifications**

### **Data:**

K56flex, V.90, V.34bis, V.34, V.32bis, V.32, V.22bis, V.22, and V.21, Bell 212A and Bell 103

### **Fax:**

V.17, V.29, V.27ter, and V.21 channel 2  
Group 3 send and receive facsimile

### **Error Correction:**

V.42 and MNP 2-4

### **Data Compression:**

V.42bis and MNP 5

### **Communication software compatible commands:**

Hayes compatible enhanced "AT" command set

Fax Service Class 1 commands

**Built-in DTE interface:**

DTE speed up to 115,200 bps

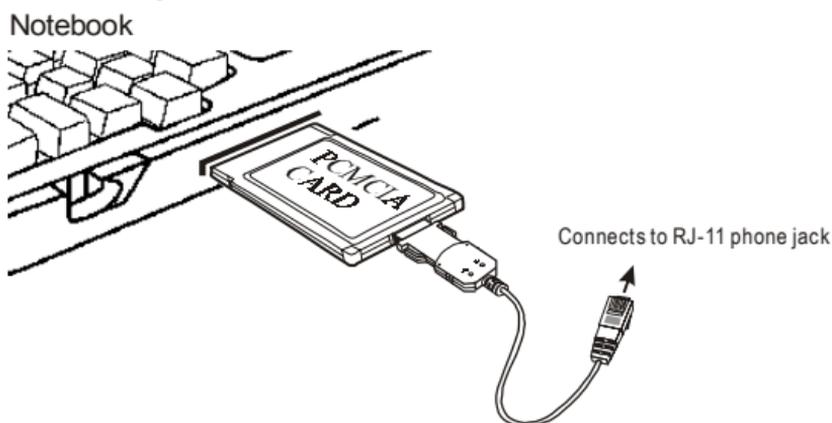
16C550 UART interface

**System Requirements**

- A notebook or desktop computer with PCMCIA type II or III slot.
- A telephone line with RJ-11 jack.
- A CD-ROM drive.
- Windows 95/98/2000/Millennium or Windows NT pre-installed.

## HARDWARE INSTALLATION

1. Locate the PCMCIA slot of your system.
2. Align the PCMCIA FAX MODEM 56K PC Card toward the PCMCIA slot. Push evenly and steadily until it is seated.



3. Connect the other end of the PC Card cable to the telephone line outlet.
4. You are now ready to continue the software installation.

### CAUTION

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.

1. *For Windows NT does not support "Hot Insert/Remove", be sure to complete the hardware installation as described above before you start Windows NT and software installation.*

# SOFTWARE INSTALLATION

## Installation for Windows 95

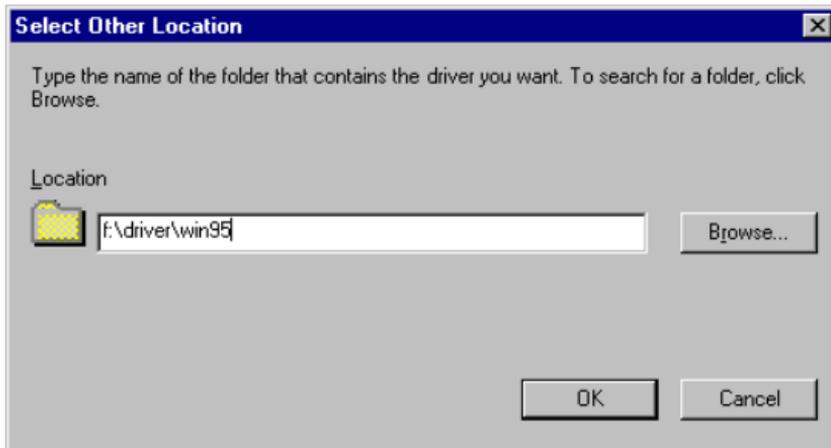
1. As soon as the PCMCIA Fax Modem 56K PC is inserted into the PCMCIA slot, Windows automatically detects the new hardware device and prompts the following message.



2. Insert the device driver compact disc into your CD-ROM drive. When the following dialog box appears, click the **Other Locations** button.



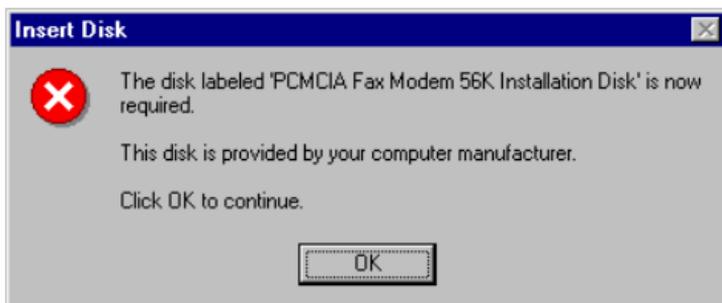
3. Type the CD-ROM drive letter followed by **driver\win95**. Or you may click the **Browse** button to select the **driver\win95** folder in your CD-ROM drive. Click **OK**.



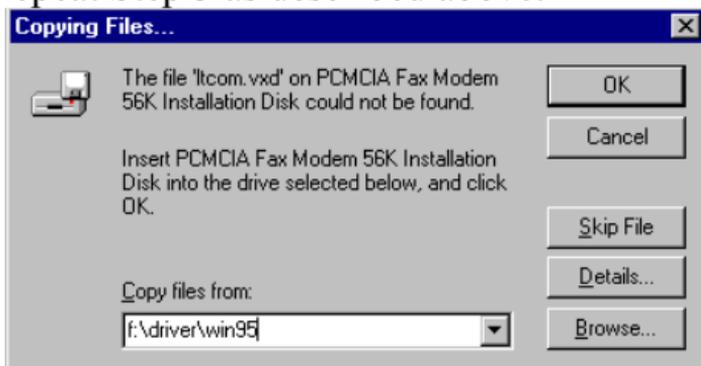
4. When the following figure appears, click **Finish**. The Installation program will continue.



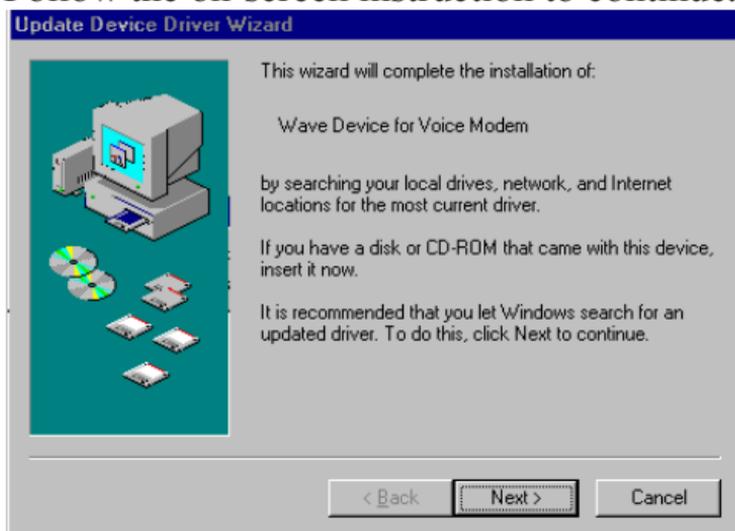
5. When the following figure appears, click **OK** to continue.



6. Repeat Step 3 as described above.



7. Follow the on-screen instruction to continue.

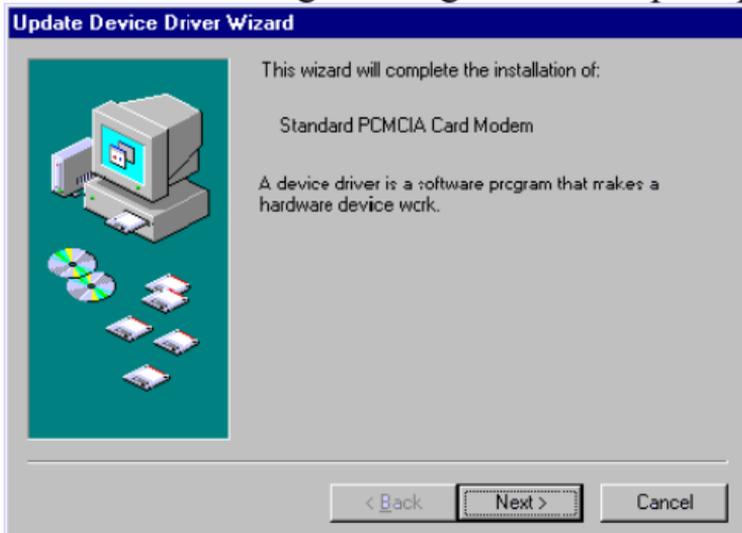


8. When finished, press **Finish** to complete the installation. *Remember to restart Windows 95 to activate the new device.*



## Installation for Windows 98

1. As soon as the PCMCIA Fax Modem 56K PC is inserted into the PCMCIA slot, Windows automatically detects the new hardware device and the following message will be prompted.



2. Insert the device driver compact disc into your CD-ROM drive. When the following dialog box appears, click **Next**.



3. Select **Specify a location** when the following figure appears. Enter the CD-ROM drive letter followed by **driver\win98**. Click **Next**. Or you may click the **Browse** button to select the **driver\win98** folder in your CD-ROM drive.





4. When the following figure appears, click **Finish**. The Installation program will continue.



5. Follow the on-screen instruction to proceed.





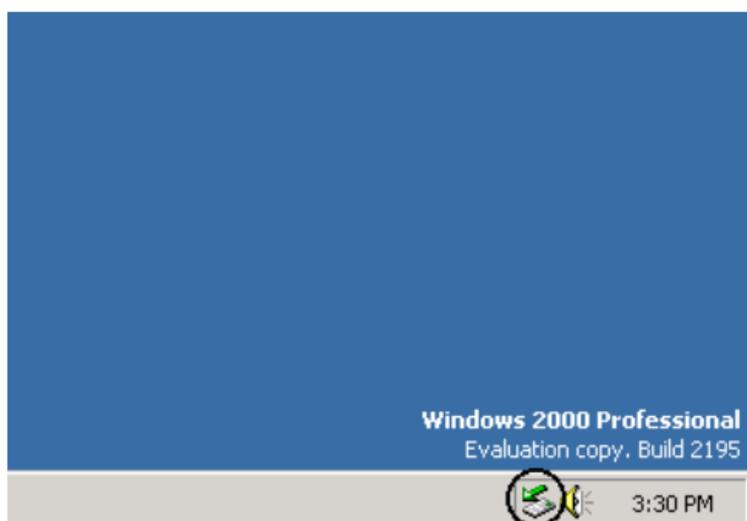
6. The installation program will proceed automatically. Click **Finish** to complete the installation.



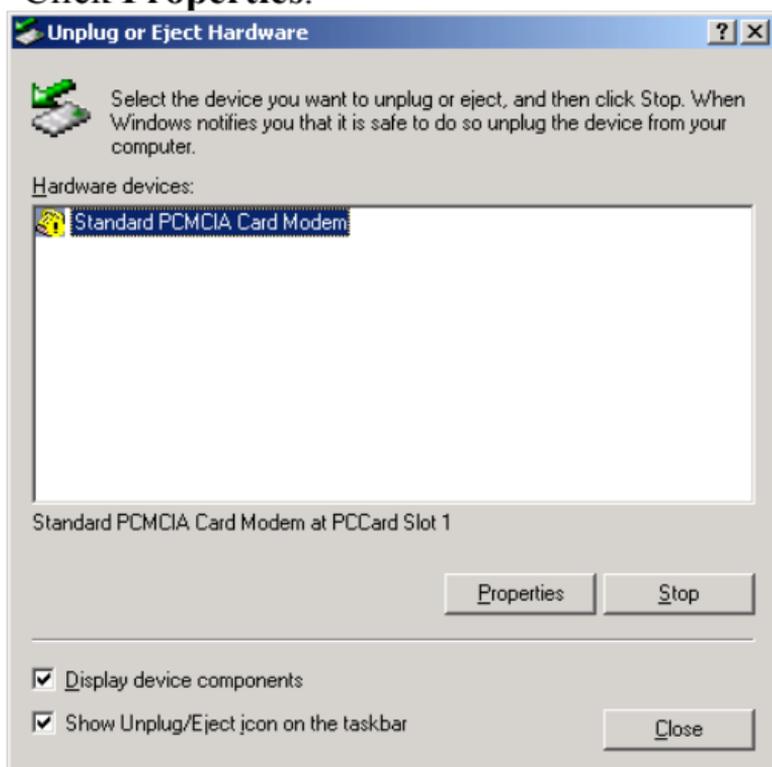
## Installation for Windows 2000

If you want to use the Microsoft built-in driver, make sure to execute **d:\Driver\Win2000\PAR.exe**. Or perform the following procedures to update the latest driver.

1. Once the PCMCIA Fax Modem 56K PC Card is plugged into your PCMCIA slot, Windows will prompt you a standard PCMCIA Card Modem has been installed and ask you if you want to restart your computer. Select **No**.
2. Double-click the small icon at the right bottom on your screen as illustrated below. If the icon does not appear at all, go to **My Computer** → **Control Panel** → **System** → **Hardware** → **Device Manager**. Select **Modems** and skip to Step 4.



3. Click **Properties**.



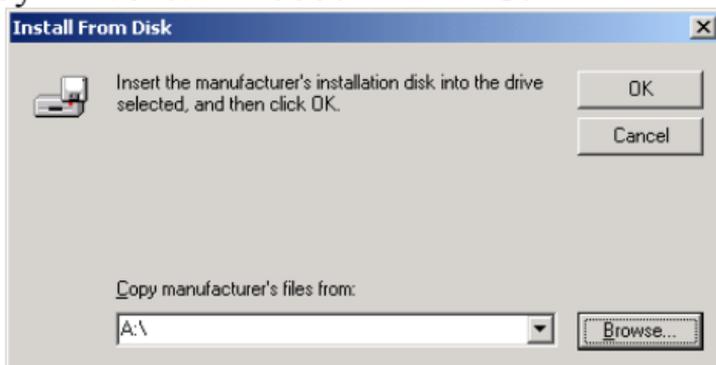
4. Select the **Driver** tab. Click the **Update Driver...** button.



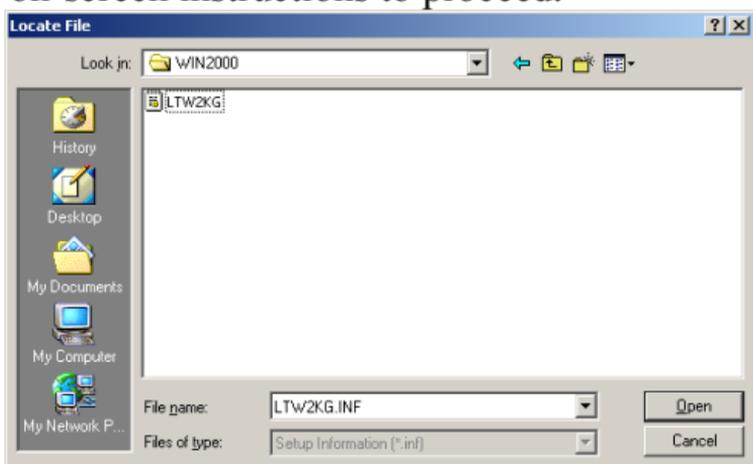
5. Click **Next** to continue.
6. Select **Display a list of the known drivers for this device so that I can choose a specific driver** as illustrated below. And click **Next**.



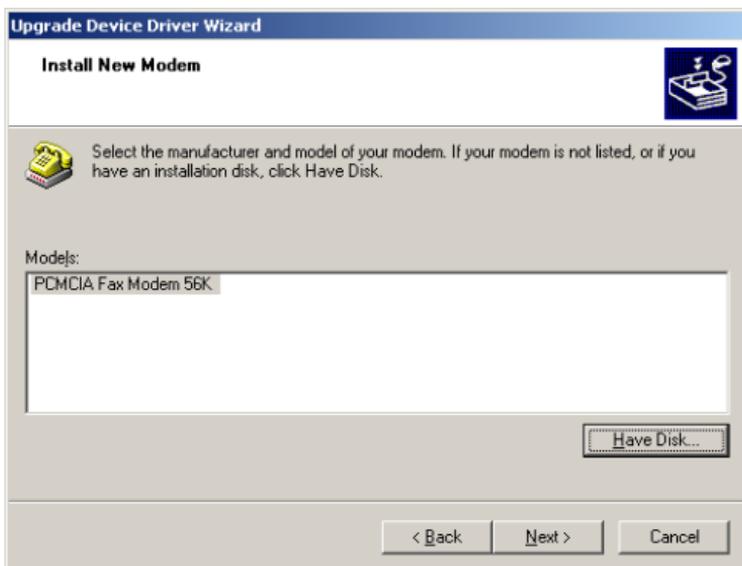
7. Click **Have Disk** when the **Update Device Driver Wizard** dialog appears.
8. Load the CD that contains the device driver has into your CD drive. Click **Browse** and direct the proper file location with the disk drive followed by **Driver\Win2000\LTW2KG**.



9. Select **LTW2KG**, and click **Open**. Follow the on-screen instructions to proceed.



10. When the following figure appears, click **Next**.



11. When Windows prompt you to continue the installation. Select **Yes**.



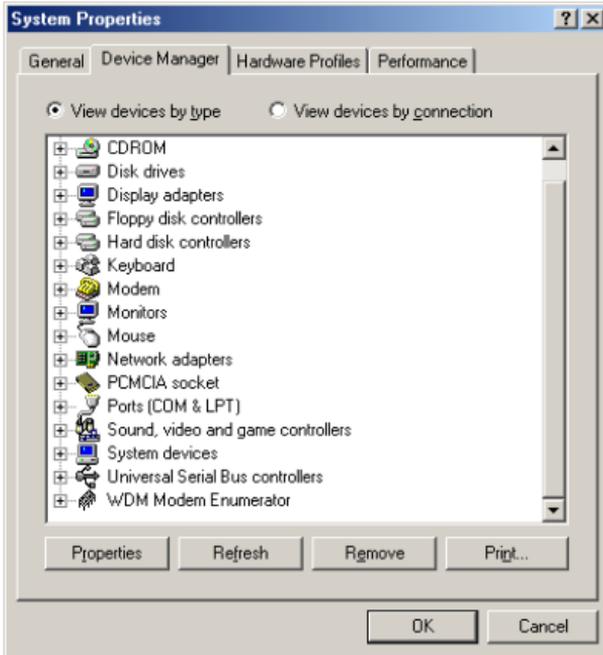
12. Remember to restart your computer to activate this new device.

## Installation for Windows Millennium

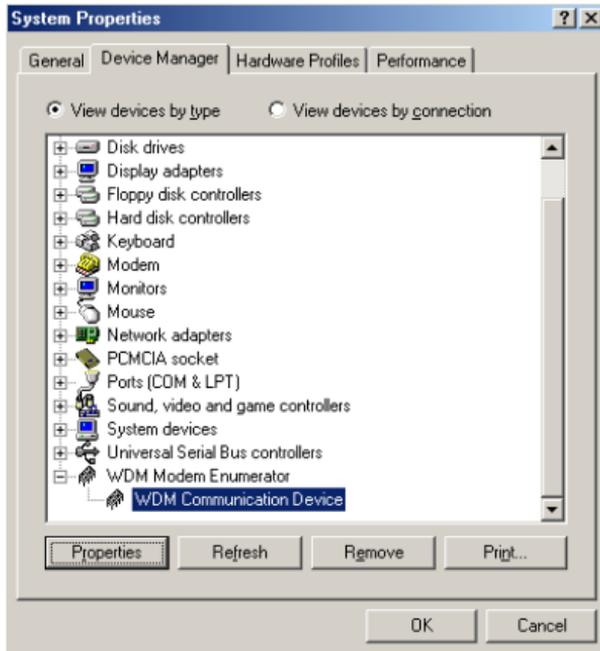
If you want to use the Microsoft built-in driver, make sure to execute **d:\Driver\WinME\PAR.exe**. Or perform the following procedures to update the latest driver.

1. Once the PCMCIA Fax Modem 56K PC Card is plugged into the PCMCIA slot of your system, Windows will automatically detect the Lucent Win Modem.

2. To update WDM Communication Device driver, right-click **My Computer**→**Properties**→**Device Manager**.



3. Click **WDM Modem Enumerator** to expand.



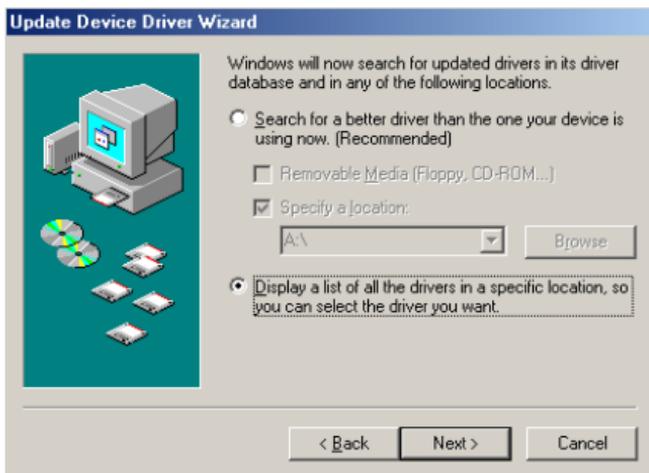
4. Load the device driver into the CD-ROM drive of your system. Click **Properties→Driver→Update Driver.**



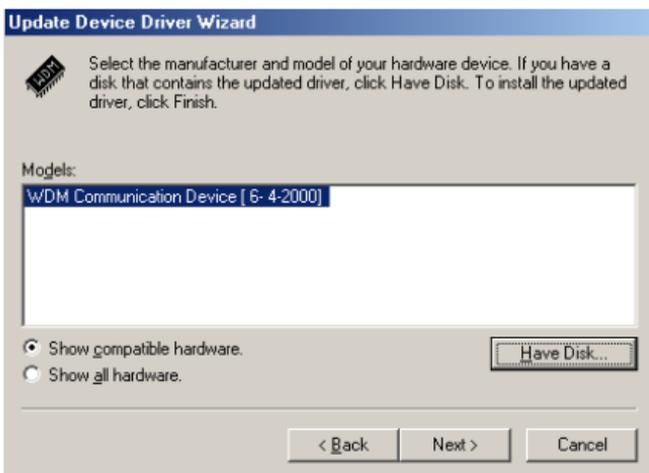
5. Select **Specify the location of the driver (Advanced)** and click **Next.**



6. Select **Display a list of all the drivers...** and click **Next.**



7. Click the **Have Disk...** button. Click **Browse** to select the CD-ROM drive where you put the device driver. (for example: D:\) Enter the CD-ROM driver letter followed by Driver\WinME.



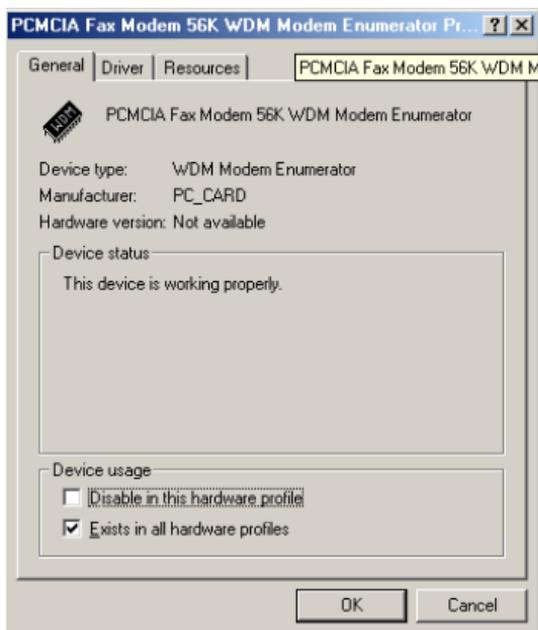
8. Click **Next**.



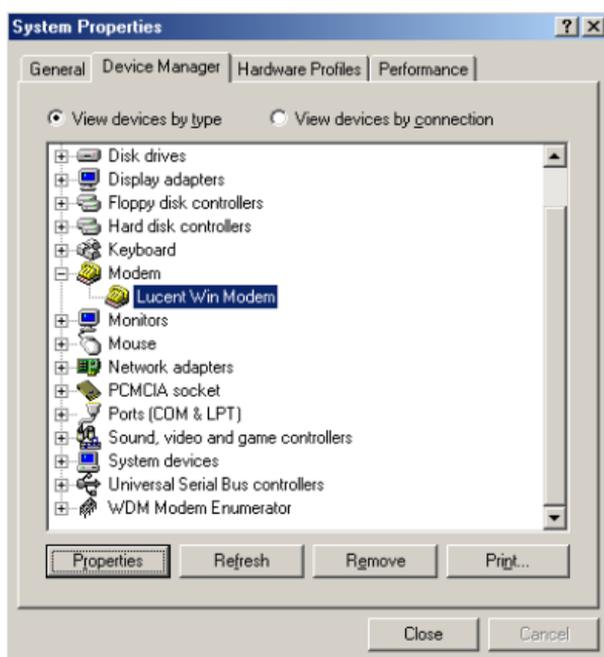
9. Click **Next** to proceed.



10. Click **OK** to finish the installation.



11. Go back to step 2. Click **Modem** to expand.



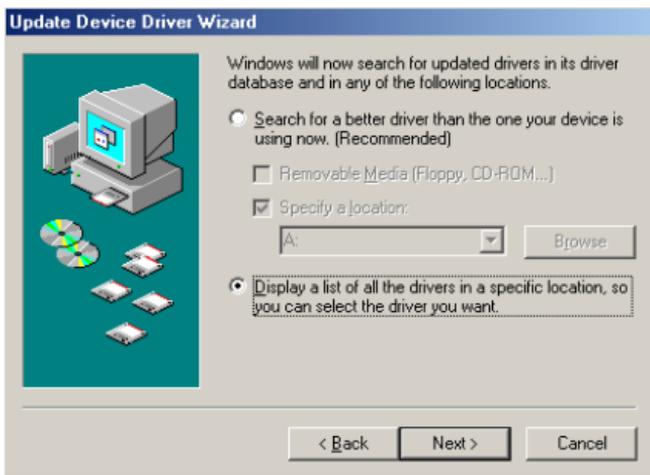
12. Load the device driver into the CD-ROM drive of your system. Click **Properties**→**Driver**→**Update Driver**.



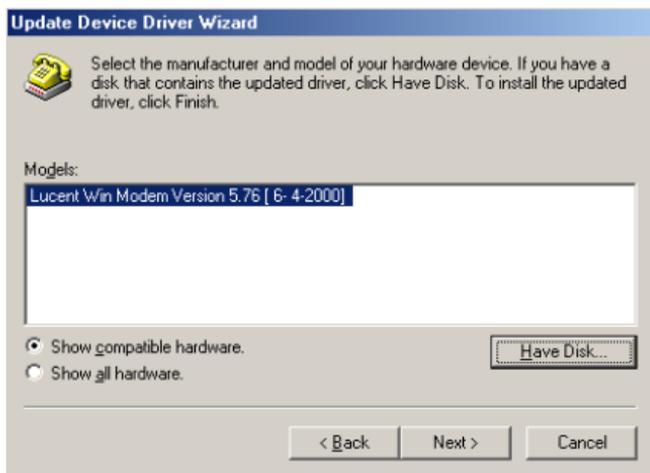
13. Select **Specify the location of the driver (Advanced)** and click **Next**.



14. Select **Display a list of all the drivers...** and click **Next**.



15. Click the **Have Disk...** button. Click **Browse** to select the CD-ROM drive where you put the device driver. (for example: D:\) Enter the CD-ROM driver letter followed by Driver\WinME.



16. Click **Next**.



17. Click **Next** to proceed.



18. Click **Finish** to complete the installation.



19. To verify if the PCMCIA Fax Modem 56K exists in your system, go to **Device Manager**. **PCMCIA Fax Modem 56K** and **PCMCIA Fax Modem 56K WDM Modem Enumerator** should be found. If not, contact your dealer for technical support.



## Installation for Windows NT

1. Before you start Windows NT, make sure the PCMCIA Fax Modem 56K PC Card has been properly inserted into the free PCMCIA slot of your computer.
2. Load the device driver compact disk in the CD-ROM drive.
3. Start Windows NT.
4. Go to **My Computer**.
5. Click the CD-ROM drive. Click the **driver\winnt** folder. Or you may click the

**Browse** button to select the CD-ROM drive and the **driver\winnt** folder.

6. Double-click **setup.exe**. The installation program will proceed automatically.

*Note: If Softex or Card Wizard was already installed in your system, Windows will appear message for PC Card malfunctioning. Ignore this message and install the WinNT driver. Remember to reboot after the installation.*

## CHECKING COUNTRY/REGION

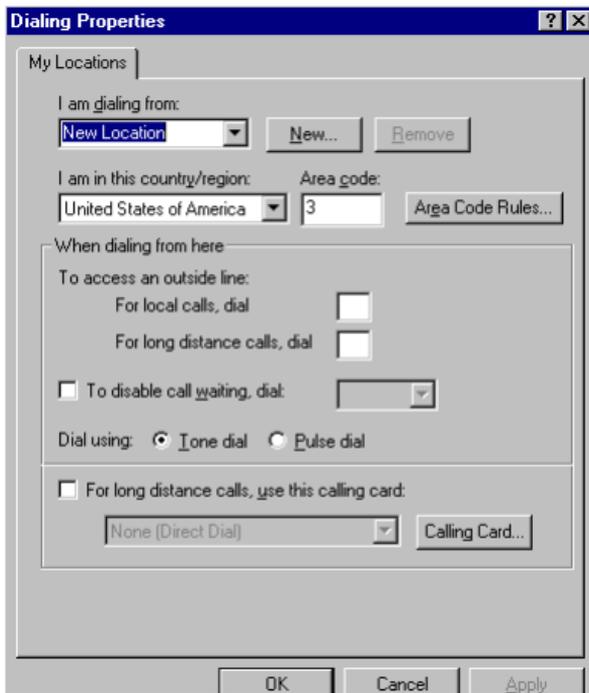
Please perform the following steps to check the country/region setting of the modem before you use the Internal Fax Modem 56K. For best performance, make sure that the Country/region is set to the country that you are using the modem in, eg. **United States of America**.

### Windows 95/98/98SE/Millennium

1. Go to  
**Start→Settings→Control Panel→Modems.**
2. When the **Modems Properties** dialog box appears, click the **Dialing Properties** button.

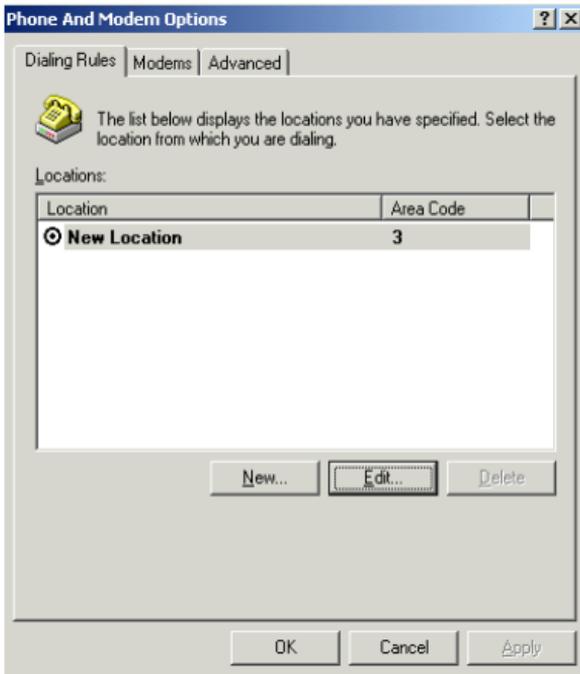


3. When the following dialog box appears, specify the country/region that you are in and click **OK**.

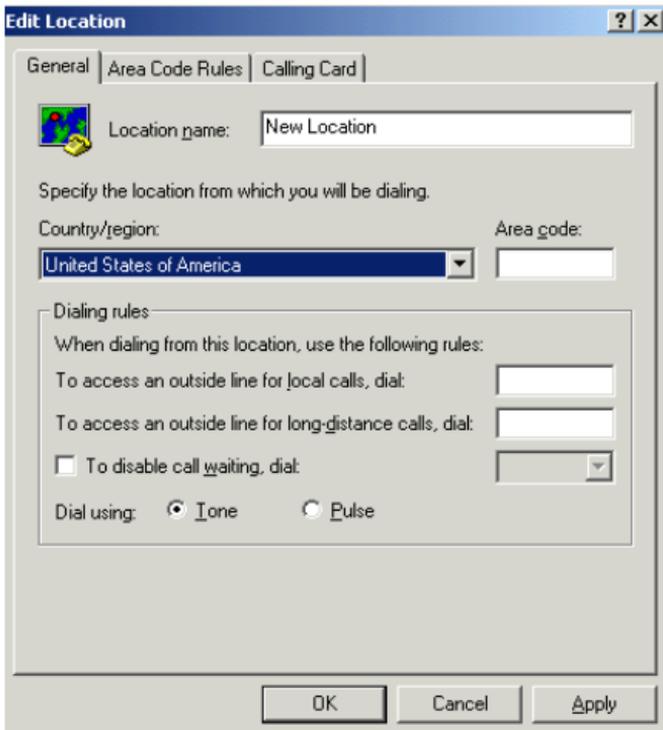


## Windows 2000

1. Go to **Start→Settings→Control Panel→Modems.**
2. When the **Phone And Modem Options** dialog box appears, click the **Edit** button.



3. When the following dialog box appears, specify the country/region that you are in and click **OK**.



## Windows NT4.0

1. Go to

## Start→Settings→Control Panel→Modems.

2. When the **Modems Properties** dialog box appears, click the **Dialing Properties** button.



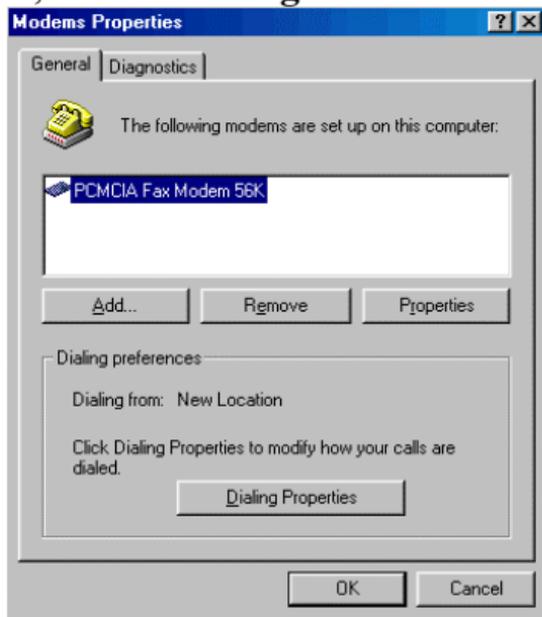
3. When the following dialog box appears, specify the country/region that you are in and click **OK**.



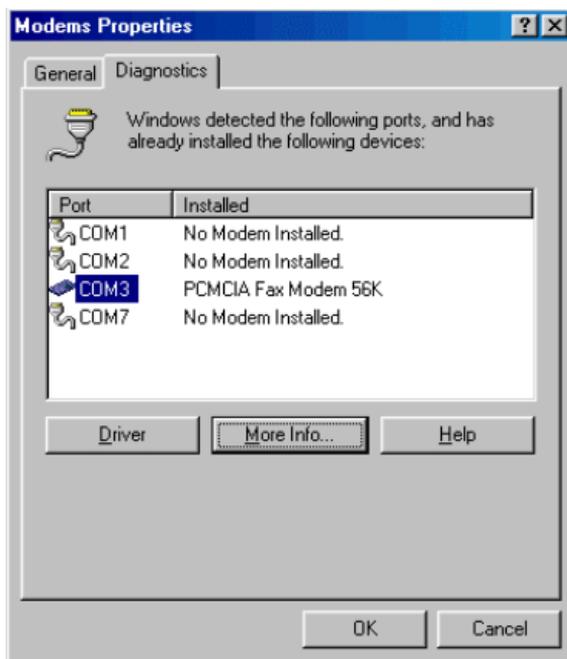
## Setup Diagnostics (for Windows 95/98)

You can perform the following steps to check if your PCMCIA FAX MODEM 56K is well installed.

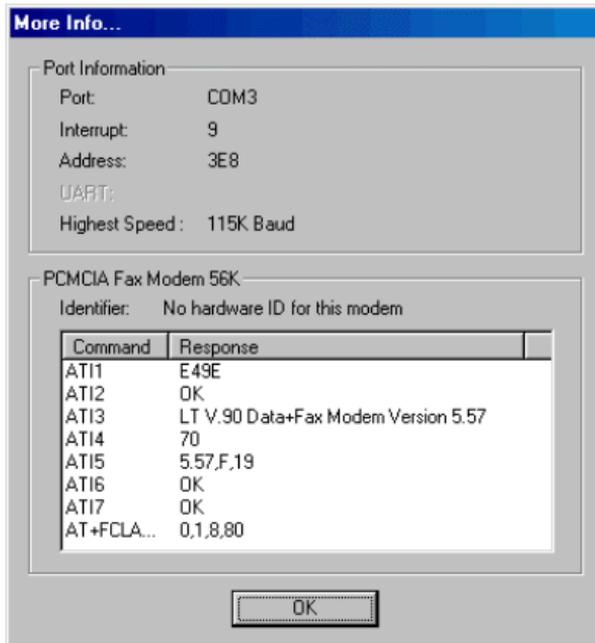
1. Go to the **Start** menu. Point to **Settings**. Click **Control Panel**. Double-click **Modems**.
2. When the **Modems Properties** dialog box appears, select the **Diagnostics** tab.



3. Select the COM port whichever is installed **PCMCIA Fax Modem 56K** and click **OK**.



4. If the screen does not at all include the PCMCIA Fax Modem 56K, stop the diagnostics procedures, and skip to the following section titled “**Uninstall**”.
5. For Windows 95/98, if the information shown below can be found on the screen, it means the modem is well installed. Click **OK** to exit.



## UNINSTALL (FOR WINDOVS 95/98)

If for some reason, you have to uninstall the driver of PCMCIA Fax Modem 56K after installation, perform the following steps.

1. Go to **My Computer**.
2. Select the CD-ROM drive whichever contains the PCMCIA Fax Modem 56K device driver.
3. Choose and double-click the *win95*, *win98* or *winnt* folder depending on the system you are working on.
4. Click *Ltremove.exe*. The PCMCIA Fax/Modem 56K device driver will automatically removed.

## APPLICATIONS

To use the PCMCIA Fax/Modem 56K for data communication, for example, to send/receive faxes or to get onto the Internet, you may use any application software that you are familiar with. Or you may also choose to use the bundled application software that comes with the PCMCIA Fax/Modem 56K. The following are examples for sending faxes and going to the Internet.

### Using BitWare to Send a Fax

1. Be sure BitWare has been successfully installed in your system.
2. Go to the **Cheyenne BitWare** program. Double-click the Cheyenne BitWare icon. When the opening screen appears, click the **Setup** icon.



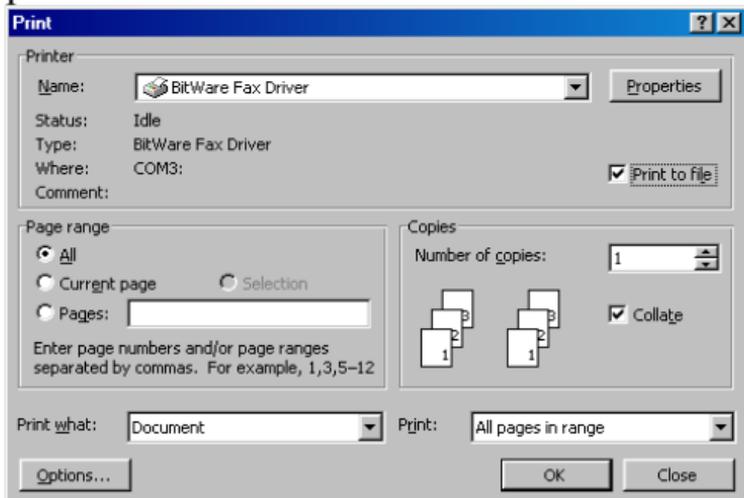
3. Select **Modem** when the **Setup** dialog box appears.



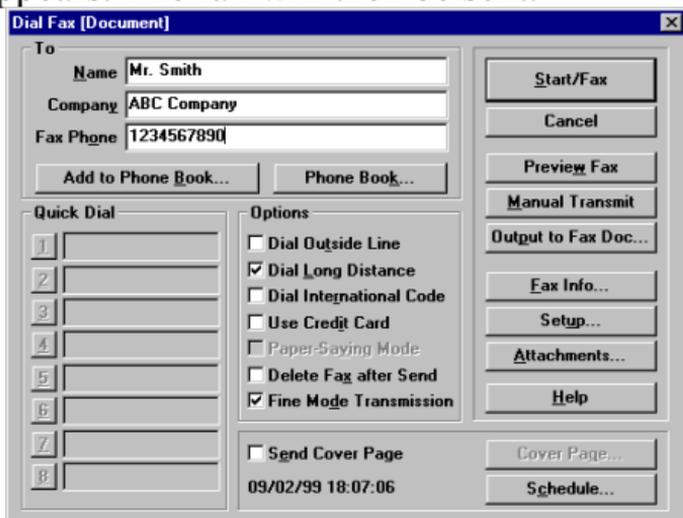
4. When the Modem Setup dialog box appears, press Auto Detect and click OK to continue. The

BitWare Fax Driver is then successfully installed. Click **Close** to finish the setup.

5. Print the file you want to fax to file and set the printer to BitWare Fax Driver as shown below.

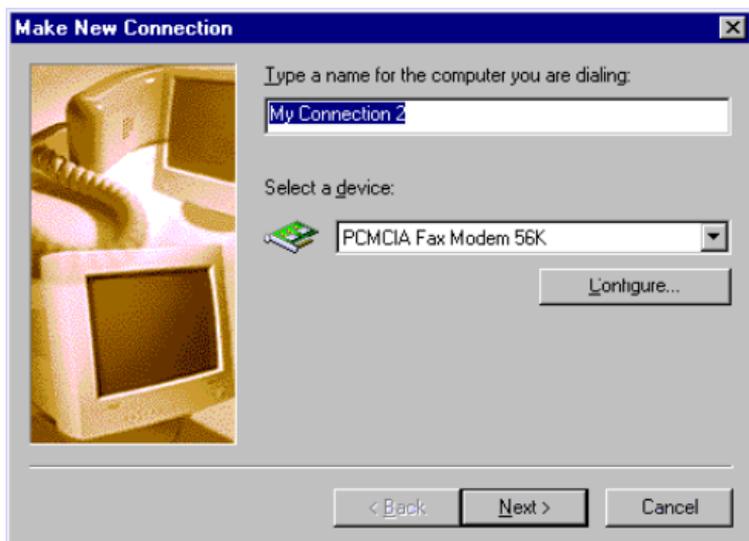


6. Click **Start** when the following dialog box appears. The fax will then be sent.

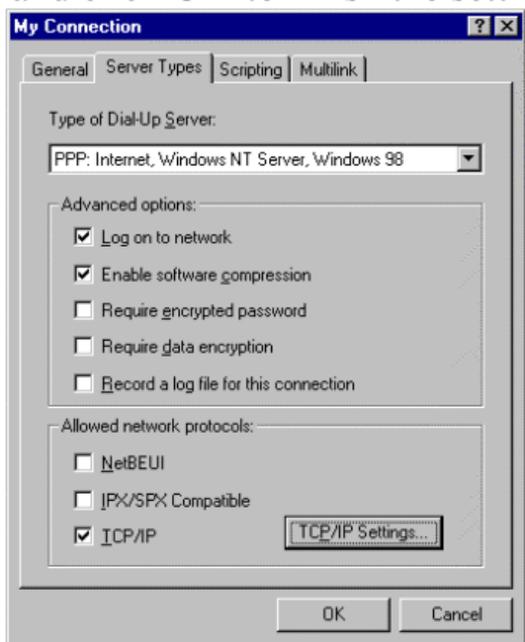


## Internet Access

1. Go to **My Computer**.
2. Select **Dial-Up Networking**.
3. Double-click **Make a New Connection**, a dialogue box appears for you to name the new connection and select the device. Name the new connection appropriately and click **Next**.



4. Enter the area code and phone number of your Internet Service Provider (ISP). Follow the on-screen instruction to proceed.
5. When finished, from the **Dial-Up Networking** window right-click your newly created connection. Select **Properties**. On the **Server Types** tab, enter the proper selections as shown below and click **OK** to finish the settings.



6. You are now ready to connect to the Internet.

## TROUBLE SHOOTING

This chapter provides information on the most common problems, the possible causes, and the solutions.

### **The modem does not respond to AT commands.**

- *Conflict of COMx: port setting with another device.*
- *Change the COMx: port of the PCMCIA Fax Modem 56K to a free port. Be sure to update your software COMx: port setting as well.*

### **The modem does not execute the command line.**

- *Make sure you are typing 'AT' at the beginning of command line.*
- *Make sure the modem is not in Data Mode. type +++ if necessary.*
- *Make sure your software is set to the same COMx: port as the modem is.*

### **The modem does not give a response after an AT command was executed.**

- *The echo and/or responses may be turned off by the ATE0Q1 commands.*
- *Use AT&V to check that.*
- *Use ATE1Q0 then Enter to change them back.*
- *Make sure the modem is in Command Mode rather than in Data Mode when you type the AT command.*

### **The modem gives an 'ERROR' response after an AT command was executed.**

- *Make sure you did not type an invalid command.*
- *Make sure your command line is 40 characters or less in length.*

### **The modem goes off-hook and disables the telephone line.**

- *The modem may be set to auto-answer mode when it rings.*

- *Type ATSO=0, then Enter at the command line to disable the auto-answer mode.*

### **The modem does not auto-answer the phone.**

- *Make sure the software is configured to auto-answer the phone.*
- *Type ATSO=n then press Enter. The n stands for the number of rings the modem will answer on.*

### **The software does not control the modem properly or can not detect the modem.**

- *Make sure the software has been set up correctly. Check the initialization and dial strings.*
- *Some TSRs (programs that stay in memory after they are loaded) may conflict with the communications software.*
- *Restart your computer without loading any TSRs.*

### **The characters on the screen are doubled.**

- *Both the modem and the software have the echo feature turned on at the same time.*
- *Turn off the software echo feature off.*
- *The remote modem is echoing your typed characters.*
- *Type ATE1 then Enter at the command line. Then turn off the software echo feature.*

### **No text appears on the screen when in data mode.**

- *The remote modem is not echoing your typed characters.*
- *Type ATE0 then press Enter at the command line. Then turn the software echo feature on.*
- *Your software may not be set to use Full Duplex or the remote modem may not be set to use Full Duplex either.*
- *C:The remote modem may be waiting for you to type a command before it will reply with text.*

### **No text appears on the screen when in command mode.**

- *If you can't see the characters you are typing, then type ATE1 then press Enter.*

**The modem does not dial a phone number after you execute the AT dial command.**

- *If you are using touch tone dialing on a phone line that requires pulses, then it may not work.*
- *Use ATDT in place of ATDP.*

**When your communications software tells the modem to dial, it does not.**

- *Make sure the software dialing prefix is ATDT.*
- *Make sure the software and modem are set to the same COMx: port.*
- *The modem may not have hung up the phone line since the last call.*
- *Change to command mode and type ATH then press Enter.*

**When dialing another modem, you receive a 'CONNECT' response, but nothing else.**

- *The remote modem may be waiting for you to type a command. Or try to press Enter for logging on to the remote site.*

**The modem speaker does not make any sound when you're connecting to another modem.**

- *The software may have the speaker disabled.*
- *Change the setting in your software or use the ATMn command to turn the speaker on.*

**The modem disconnects (loses the connection) in the middle of use.**

- *The remote modem may have locked up.*
- *The telephone switch may have disconnected your call.*
- *Your software may have turned off the DTR signal.*

**The modem does not connect with another modem.**

- *There may be a problem with the remote modem if you do not hear the high pitched tone from the remote modem.*

### **Occasionally, the modem gives a burst of errors.**

- *The telephone line may be noisy or bad.*
- *Hang up the call and try to connect again for getting a better telephone line.*
- *If there are other telephones on the same line that your modem is using, someone may have picked up a telephone on that extension.*
- *Your telephone line may have the call waiting feature.*
- *Try adding '\*70,' to your ATDT dialing command line. If it doesn't help, ask your telephone company how to disable it temporarily.*

### **The modem gets errors in transmitted data randomly.**

- *Try to use V.42 or MNP1-4 if possible.*
- *Connect the modems at a slower baud rate.*

### **After you download a file, it was not stored on your disk drive.**

- *If both modems are using MNP or V.42 protocol, then the flow control may not be enabled.*
- *Configure your software to use RTS/CTS flow control. That will cause your computer to pause long enough for the file to be stored to disk.*

### **The text on the screen is not legible.**

- *Your software settings may not match the settings on the remote site.*
- *Make sure your data bits, stop bits, and parity settings match the settings that the other computer is using. The two most common settings are: 8 data bits, None parity, and 1 stop bit (8,N,1) or 7 data bits, Even parity, and 1 stop bit (7,E,1).*
- *If the telephone line is very noisy, you may see corrupted data on your screen.*

- *Due to poor telephone line conditions, the modem may have fallen back to a slower communication speed. You may need to change the baud rate setting in your software to match this slower speed. To return the modem to the higher speed, disconnect the link and re-establish again.*

**When using V.42bis or MNP5, some features are disabled.**

- *You may be using a non-streaming protocol, like Xmodem or Ymodem to transfer files. Those are fine unless you are using V.42bis or MNP5*
- *When using V.42bis or MNP5, you should use a streaming transfer protocol like Ymodem-G or Zmodem.*
- *Configure your software to use hardware flow control (RTS/CTS ON).*

**When the modem is connecting to another modem, it reports a higher connect baud rate than it is really using.**

- *The modem defaults to report the modem-to-computer baud rate when it responds with CONNECT.*
- *Go to command mode with your communication program (like TeliX) and type ATW2, then press Enter. This tells the modem to report the modem-to-modem baud rate instead.*

# APPENDIX A: AT COMMAND

## Basic AT Command Set

Command	Options	Function & Description
A/		Re-execute the last command string
<any key>		Terminate the current connection attempt when entered in handshaking state
All the following commands require an "AT" prefix		
A		Go off-hook and attempt to establish a connection without waiting for a ring
Bn		Line modulation options
	B0	Select V.22 mode for 1200 bps connection
	B1 *	Select Bell 212A for 1200 bps connection
	B2	Select V.23 1200 bps for receiving, 75 bps for transmitting in originate mode; 75 bps for receiving and 1200 bps for transmitting in answer mode
	B3	Select V.23 75 bps for receiving, 1200 bps for transmitting in originate mode; 1200 bps for receiving and 75 bps for transmitting in answer mode
	B15	Select V.21 for 300 bps connection
	B16	Select Bell 103 for 300 bps connection
Dn		Dial command, beginning the dialing sequence. The string "n" (telephone number and modifiers) listed as follows is entered after the "D" command
	L	Re-dial last number. Should be the first character following ATD, ignored otherwise
	P	Pulse dial.
	R	Reverse dial. Originate call in answer mode (go on-line in answer mode)
	S=n	Dial the phone number stored in NVRAM at location "n" (n=0, 1, 2, 3)
	T	DTMF tone dial.
	W	Wait for second dial tone. The modem waits for the second dial tone before processing the dial string
	,	Pause. Cause the modem to pause for a time before processing the next character in the dial string (specified by S8 register)
	!	Hook Flash (for call transfer). Cause the modem to go on-hook for 0.5 second then return to off-hook

	@	Wait for 5 seconds of silence after dialing number
	;	Return to command state after dialing a number without disconnecting the call
En		AT command echo options
	E0	Echo disabled
	E1 *	Echo enabled
Hn		Switch-hook control
	H0 *	Modem goes on-hook
	H1	Modem goes off-hook
Mn		Speaker control
	M0	Speaker always off
	M1 *	Speaker on until carrier present
	M2	Speaker always on
	M3	Speaker off during dialing and on until carrier present
Nn		Select negotiate handshake
	N0	When originating or answering, handshake only at the communication rate specified by S37 register and "ATBn" and no fallback
	N1 *	When originating or answering, start handshaking only at the communication standard specified by S37 register and "ATBn" During handshake, fallback to a lower speed may occur.
On		Go on-line
	O0	Return modem to a previously established state (return to data mode).
	O1	Begin a retrain sequence, then return to on-line state.
	O3	Issue a rate re-negotiation, then return to on-line state.
P		Enable pulse dialing
Qn		Result code display options
	Q0 *	Result code enabled
	Q1	Result code disabled
T		Enable tone dialing
Vn		Result code form
	V0	Display result code in numeric form (see also the result code options table)
	V1 *	Display result code in verbose (text) form
Wn		Select extended result code options
	W0	CONNECT result code reports DTE speed. Disable protocol result codes. (see also the "Result Code Options Table")
	W1	CONNECT result code reports DTE speed.

		Enable protocol result codes.
	W2 *	CONNECT result code reports DCE speed. Enable protocol result codes.
Xn		Select result codes/call progress options
	X0	Display CONNECT or "1" for all speeds. Ignore dial tone and busy tone detection.
	X1	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Ignore dial tone and busy tone detection.
	X2	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Check dial tone before proceeding dialing, ignore busy tone detection.
	X3	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Ignore dial tone before proceeding dialing, check busy tone after making dialing.
	X4 *	Display connect message and the modem's data rate, and an indication of the modem's error correction and data compression. Check dial tone and busy tone.
	X5	Same as X4.
	X6	Same as X4.
	X7	Display CONNECT or "1" for all speeds. Check dial tone and busy tone.
Zn		Recall stored profile
	Z0	Reset and recall user profile 0. Either Z0 or Z1 restores the same single profile.

\* Manufacturer default

## Extended "AT&" (Ampersand) Command Set

Command	Options	Function & Description
&Cn		Data carrier detect option
	&C0	State of carrier from remote modem is ignored. DCD circuit is always on
	&C1 *	DCD turns on when the remote modem's carrier signal is detected, and off when the carrier signal is not detected.
&Dn		Data Terminal Ready (DTR) option.
	&D0	DTR ignored
	&D1	Go to command mode on on-to-off DTR transition
	&D2 *	Hang up and go to command mode on on-

		to-off DTR transition. Auto-answer is disabled if DTR is low
	&D3	Hang up and reset from user profile 0 on the on-to-off DTR transition
&F		Recall factory default setting as active configuration
&Gn		V.22bis guard tone option
	&G0 *	No guard tone
	&G1	550 Hz guard tone
	&G2	1800 Hz guard tone
&Kn		Set local flow control
	&K0	Disable flow control
	&K3 *	Enable bi-directional hardware flow control (CTS/RTS)
	&K4	Enable bi-directional software flow control (XON/XOFF)
&Pn		Pulse dialing make/break ratio selection
	&P0	Make=39%, Break=61%, international version (Default) Make=33%, Break=67% for use in 20 pps, Japanese version
	&P1	Make=33%, Break=67%, international version Make=33%, Break=67% for use in 10 pps, Japanese version (Default)
&Qn		Async communications mode options
	&Q0	Async mode, buffered (same as "AT\N0")
	&Q5 *	Error control mode, buffered (same as "AT\N3")
	&Q8	MNP error control mode. If an MNP error control protocol is not established, the modem will fallback according to the current setting in S36 register.
	&Q9	V.42 or MNP error control mode. If neither error control protocol is established, the modem will fallback according to the current setting in S36 register.
&Sn		Data Set Ready (DSR) option
	&S0 *	DSR always on
	&S1	DSR on during handshake and on-line, off in test mode or idle mode
&Tn		Self-test commands
	&T0	Terminate any test in progress
	&T1	Local analog loopback test
	&T3	Local digital loopback (LDL) test
	&T6	Remote digital loopback test, in normal mode

&V		View active file and stored phone numbers
&W		Store active configuration into the modem's NVRAM
&Zn=x		Store telephone number n=0 to 3 x=<string> see also the dial modifier in "ATDn" command The max. number of digits per string is 40.

\* Manufacturer default

## Extended "AT\" (Back Slash) Command Set

Command	Options	Function & Description
\Jn		Constant DTE speed option
	\J0 *	DCE and DTE rates are independent
	\J1	Force the DTE interface speed to the DCE connection rate (line speed) after on-line
\Nn		Error control mode options
	\N0	Buffered mode, no error control (flow control is allowed).
	\N1	Direct mode, no error control (no flow control is allowed).
	\N2	MNP reliable mode. If MNP 2-4 error control establishment fails, the modem disconnects.
	\N3 *	V.42, MNP or buffer mode. The modem attempts to connect in V.42 mode. If this fails, the modem attempts to connect in MNP mode. If this fails, the modem connects in buffer mode.
	\N4	V.42 or disconnect. The modem attempts to connect in V.42 mode. If this fails, the call will be disconnected.
\Qn		Local flow control options
	\Q0	Disable flow control (same as "AT&K0")
	\Q1	XON/XOFF software flow control (same as "AT&K4")
	\Q3 *	RTS/CTS hardware flow control (same as "AT&K3")
\Tn		Set inactive timer (for buffer mode only)
	n=0 *	Disable inactive timer
	n=1 - 255	Enable inactive timer. Length in minutes
\Vn		Protocol result codes
	\V0	Disable protocol result code appended to DCE speed
	\V1 *	Enable protocol result code appended to

	DCE speed
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\* Manufacturer default

## Extended “AT%” (Percent) Command Set

Command	Options	Function & Description
%B		View numbers in blacklist. If blacklisting is in effect, this command displays the numbers for which the last call attempted in the past two hours failed. The ERROR result code appears in the countries that do not require blacklisting.
%Cn		Data compression control
	%C0	No data compression
	%C1 *	V.42bis/MNP 5 data compression enabled.

\* Manufacturer default

## Extended “AT-” (Dash) Command Set

Command	Options	Function & Description
-Cn		Data calling tone options
	-C0 *	Disable data calling tone
	-C1	Enable data calling tone (the freq. is 1,300 Hz with a cadence of 0.5 sec. ON and 2 sec. OFF)
-V90=<n>		command to enable/disable .90 and change downstream rate
	-V90=0	disable V.90
	-V90=1	enable V.90 Auto Rate (default value)
	-V90=X	controls the downstream rate
	-V90?	Shows the current value
	-V90=?	Shows the range [0-21]

• Manufacturer default

## Possible Values of V.90

“AT-V90=X”	Downstream Rate
0	V.90 disabled
1	Auto Rate (default)
2	28000 kbit/s
3	29333 kbit/s
4	30666 kbit/s
5	32000 kbit/s
6	33333 kbit/s
7	34666 kbit/s

8	36000 kbit/s
9	37333 kbit/s
10	38666 kbit/s
11	40000 kbit/s
12	41333 kbit/s
13	42666 kbit/s
14	44000 kbit/s
15	45333 kbit/s
16	46666 kbit/s
17	48000 kbit/s
18	49333 kbit/s
19	50666 kbit/s
20	52000 kbit/s
21	53333 kbit/s

## APPENDIX B: S-REGISTERS

### S-Registers, "ATSn=x"

Register	Dec.	Function & Description	Default
S0=	0 - 255	Set the number of the rings required before the modem automatically answers a call. Set "S0=0" to disable auto-answer mode	000
S1=	0 - 255	Count the incoming rings and store the value to this register. The value of this register is incremented with each ring. If no rings occur over an 8 sec. interval, this register is cleared. User can read but should not change this value	000
S2=	0 - 255	S2 holds the decimal value of the ASCII character used as the escape character. The default value (043) corresponds to an ASCII character "+". A value of 128 to 255 disables the escape process, i.e., no escape character will be recognized	043
S3=	0 - 127	Hold the decimal value of the Carriage Return <CR> character used as the command line and result code terminator. Pertain to asynchronous operation only	013
S4=	0 - 127	Hold the decimal value of the character recognized as a line feed. The line feed control character is output after the carriage return control character if verbose result code are used.	010
S5=	0 - 32, 127	Hold the decimal value of the character recognized as a backspace. The modem will not recognize the backspace character if this register is set to a value greater than 32	008
S6=	2 - 65	Set the length of time, in seconds, that the modem must wait (minimum 2 seconds even if the value is less than 2) after going off-hook before dialing the first digit of the telephone number For international version	003
S7=		Set the time, in seconds, that the modem must wait before hanging up because carrier is not detected	

	1 - 255 35 - 59	For international version For Japanese version	050 050
S8=	0 - 65	Set the time, in seconds, that the modem must pause when the “,” dial modifier is encountered in the dial string	002
S10=	1 - 255	Set the length of time, in tenths of a second, that the modem waits before hanging up after a loss of carrier	020
S11=	50 - 150	DTMF duration and inter digit delay. Set the duration and spacing, in milliseconds, in DTMF touch tone dialing	144
S12=	0 - 255	Define the maximum period, in 2-hundredths of a second, allowed between consecutive asynchronous escape character “+” (plus) for the escape sequence to be considered valid	050
S28=	0 - 255	V.34 modulation en-/disabler 0: disabled 1- 255: enabled	001
S30=	0 - 90	Inactivity timer. Set the length of time, in minutes, that the modem counts when there is no data flow in or out the DTE serial port. A connection is disengaged when the counter reaches the preset value. Set S30 =0 to disable the inactivity timer. For buffer mode only.	000
S37=		Desired DCE speed (line speed)	000
	0	Maximum modem speed	
	2	Attempt 1200/75 bps connection	
	3	Attempt to a 300 bps connection	
	5	Attempt to a 1200 bps connection	
	6	Attempt to a 2400 bps connection	
	7	Attempt to a 4800 bps connection	
	8	Attempt to a 7200 bps connection	
	9	Attempt to a 9600 bps connection	
	10	Attempt to a 12000 bps connection	
	11	Attempt to a 14400 bps connection	
	12	Attempt to a 16800 bps connection	
	13	Attempt to a 19200 bps connection	
	14	Attempt to a 21600 bps connection	
	15	Attempt to a 24000 bps connection	
	16	Attempt to a 26400 bps connection	
	17	Attempt to a 28800 bps connection	
	18	Attempt to a 31200 bps connection	
	19	Attempt to a 33600 bps connection	
S38=		56K Dial Line Rate Options. Set the	000

		max. 56K downstream speed that the modem attempts to connect	
	0	56K disabled	
	1	56K enabled, auto-speed selection, max. modem speed	
	2	32000 bps	
	3	34000 bps	
	4	36000 bps	
	5	38000 bps	
	6	40000 bps	
	7	42000 bps	
	8	44000 bps	
	9	46000 bps	
	10	48000 bps	
	11	50000 bps	
	12	52000 bps	
	13	54000 bps	
	14	56000 bps	
S48=	7, 128	<p>LAPM error control and feature negotiation.</p> <p>S48=7 Negotiation enabled  S48=128 Negotiation disabled. Force immediate fallback options specified in S36</p> <p>S36=0 or 2, and S48=7  LAPM or hang up  S36=0 or 2 and S48= 128  Don't use  S36=1 or 3, and S48=7  LAPM or async  S36=1 or 3, and S48=128  Async  S36=4 or 6, and S48=7  LAPM, MNP or hang up  S36=4 or 6, and S48=128  MNP or hang up  S36=5 or 7, and S48=7  LAPM, MNP or async  S36=5 or 7, and S48=128  MNP or hang up</p>	
S91=	6 - 15	<p>Transmitting power level adjustment (Japanese version only)</p> <p>Range: -6 dBm to -15 dBm  Default: -15 dBm</p>	010