High Performance V.34 28,800 BPS Internal FAX/Data Modem

User's Manual

Contents

Section One - Introduction

The 28.8 Kbps Series FAX/Data Modem products connect your computer to all popular high speed modems available today. The modem supports the V.34 protocol to supply the highest speed connections possible. It also uses V.42 or MNP 2-4 error correction for flawless connections and V.42bis or MNP 5 data compression for increased throughput.

This manual describes the hardware installation procedures for your new modem product. Additional information on AT commands and S-registers are provided so that your system can be customized for a particular operating environment.

Section Two - Installation

This section will provide step by step instructions on how to install your new 28.8 Kbps FAX/Data modem. Installation of this modem product is a two-step process consisting of actual hardware installation and communication software installation and configuration.

2.1 Unpacking Your Modem

Before you begin your installation, be certain that you have all the items listed below. This package contains:

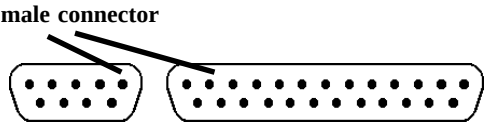
- A modem
- A telephone cable
- User's manual
- Software for the modem
- Software user's manual

2.2 Hardware Installation

Installation of this modem requires opening and manipulating your PC. Exercise caution at all times when working with AC powered and static-sensitive equipment. Turn off and unplug your PC before installation. Discharge any static electricity from your body by touching any metal surface.

1. Turn off and unplug your computer from the AC outlet.
2. Determine how many serial ports are built into your computer (examine the back of your computer). Refer to Figure 2-1 to identify common serial ports.
3. If you have **one or more** serial ports on the back of your computer, reconfigure your modem. Your modem is shipped

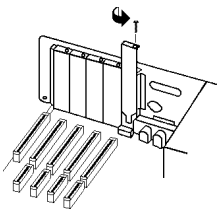
Figure 2-1 Common Serial Ports



set to COM1 on IRQ4. Reconfigure the modem to either **COM3/IRQ5 or COM4/IRQ2** (refer to Table 2-1 in Section 2.4).

4. Remove your computer's cover (refer to your computer's owner manual).
5. Select any available half-card slot, and then remove the slot cover (refer to Figure 2-2).
6. Carefully slide the internal modem into the slot you have chosen, applying even pressure until the modem is completely seated in the slot.
7. Fasten the retaining bracket with the screw from the slot cover. Make sure the modem is properly aligned. Store the slot cover for future use.
8. Replace the computer cover and plug in your computer.
9. Connect the telephone cable from the modem (**"LINE"** connector) to the telephone wall jack.
10. Optionally, connect your telephone to the modem's **"PHONE"** connector.
11. Turn your computer on. Your modem is now installed.

Figure 2-2 Expansion Slots



2.3 Software Installation/Configuration

You are now ready to install and configure the communication software. Refer to your software manual for installation procedures. Your software must be configured to communicate with the modem on the same COM port and IRQ line used by the modem.

If you are using Microsoft Windows 3.x and have changed the modem's operating setting from the default COM1/IRQ4 to COM3/IRQ5 or COM4/IRQ2 to avoid a conflict, you must use Windows' **Control Panel** (in the "Main" Group within Program Manager) to configure Windows to recognize the new settings before installing any software. In Control

Panel, double-click on **Ports**. Click once on the icon for the Com port you have set your modem to. Click the **Settings** button. Click the **Advanced** button. The **Base I/O Port Address** should already be set by Windows to the COM port address used by the modem (refer to Table 2-1). Change the **Interrupt Request Line (IRQ)** to match the IRQ on the modem. If you have set the modem to COM4/IRQ2, *do not select IRQ2*. You will need to set the IRQ in Control Panel to *IRQ9* for Windows to recognize the modem. (In an operating system designed for 286 or better machines, IRQ 9 is equivalent (redirected) to IRQ2.)

A modem setting which skips one or more COM port assignments requires special attention in the Windows 3.x Control Panel. For example, if your computer is equipped with two serial ports (COM1 and COM2) and have set the modem to COM4 instead of COM3, the Control Panel settings for COM4 may say **Default**. In this case, Windows 3.x will operate the modem as the third serial device and recognize it as "COM3" (This unusual COM port reassignment does not occur in future releases of Windows). The correct COM4 address (2E8) has been placed into the Control Panel COM3 position. Configure the COM3 entry in Control Panel by changing the IRQ box to match the IRQ that has been set on the modem. (When running any Windows 3.x-based communication or fax programs, select COM3 as the COM port for the modem.)

We suggest the following communication parameters when you first use your data communication software. Consult the software manual for information on using these and other parameters/features.

38,400 bps; 8 data bits; no parity; 1 stop bit; RTS/CTS flow control set to "on;" initialization string: AT&F

We suggest that a "**Generic Class 2**" modem type should be selected in your fax software.

2.4 COM Port and Interrupt Settings

If your computer is equipped with one or more serial ports, you will need to change the COM Port setting on the modem (to either COM 3 or 4), or disable the PC's built-in COM port.

An IRQ (interrupt request) is a signal generated by an I/O device that notifies the computer of incoming data. Your internal modem is capable of accessing IRQs 2, 3, 4, and 5. **I/O devices in your computer cannot share an IRQ with another device at the same time.** Since IRQs can not be shared at the same time, COM 3 is generally configured to use IRQ 5, and COM 4 to use IRQ 2. This avoids sharing of IRQs with COM 1 (IRQ4) and COM 2 (IRQ3).

To change the default COM Port or IRQ settings from COM 1/IRQ 4 to another setting, locate the Switch Block on your internal modem (Figure 2-3). Refer to Table 2-1 to configure the Switch Block to the COM Port and IRQ combination needed for your application. **Any time the COM or IRQ setting for the modem is changed, the settings in the software must be changed to match.**

Figure 2-3 Switch Block SW1 Location

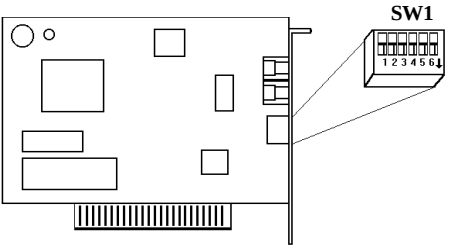


Table 2-1 SW1 Settings

COM Port	IRQ	SW1-1	SW1-2	SW1-3	SW1-4	SW1-5	SW1-6
1 (3F8) default	**4**	**ON**	**ON**	**OFF**	**OFF**	**ON**	**OFF**
2 (2F8)	3	OFF	ON	OFF	ON	OFF	OFF
3 (3E8)	5	ON	OFF	OFF	OFF	OFF	ON
	4*	ON	OFF	OFF	OFF	ON	OFF
4 (2E8)	2(9)**	OFF	OFF	ON	OFF	OFF	OFF
	3*	OFF	OFF	OFF	ON	OFF	OFF

* Use these IRQs only if your software can not address IRQ 5 or IRQ 2

** When using Windows with the modem set for IRQ2, select IRQ9 in Control Panel

2.5 Using the Fax Capabilities of the Modem

Your modem has built-in advanced FAX functions. The commands to control these functions are software driven and are not normally accessible to the user. Consult your FAX software manual about procedures on using FAX features.

2.6 Testing Your Modem After Installation

In order to test your modem you should be familiar with your communication software. Load and set up your communication software and enter into "terminal mode." Make sure that the COM Port and IRQ settings of the modem match the software. Type **AT** on your terminal screen and press **ENTER**. You may see "AATT" or nothing on the screen. In either case, the modem should respond with an **OK** or **0**. If it does not, please refer to Section 2.4 for information on COM Ports and IRQ's or Section 6 for troubleshooting information.

2.7 Using Your Modem

The communication software included with your modem product provides a user friendly interface to access the fax and data functions of your modem. ***This software should be sufficient for all of your communication needs***. There may be times when you need to access the modem manually via modem commands. Read Section 3 for a summary description of the modem command set before manually accessing the modem. You may want to read the software manual first, however, as the software may already provide a user friendly method of accessing the functions you need (i.e. dialing or answering calls).

2.8 Where To Go From Here

You should familiarize yourself with the functions available from the included software by reading its manual. You will be accessing most, if not all, of the modem's functions from this software. You may also use any other commercially available communication software with the modem. Read Section 3 ONLY if you are interested in accessing the modem manually, and not through the included software. Section 4 and 5 contain reference material, and can be skipped. If you have difficulties getting your modem to work, read ***Section 6, Troubleshooting*** to find answers to

commonly asked questions and problems.

Section Three - AT Command Set

3.1 Executing Commands

Commands are accepted by the modem while it is in Command Mode. Your modem is automatically in Command Mode until you dial a number and establish a connection. Commands may be sent to your modem from a PC running communication software or any other terminal devices.

Your modem is capable of data communication at rates of: **300, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600,** and **115200** bps. Make sure your COM port baud rate settings in your communications software is set to one of the above speeds.

3.2 Command Structure

All commands sent to the modem must begin with **AT** and end with **ENTER.** All commands may be typed in either upper or lower case, but not mixed. To make the command line more readable, spaces may be inserted between commands. If you omit a parameter from a command that requires one, it is just like specifying a parameter of **0**. Example:

ATH [ENTER]

This command causes your modem to hang up.

3.3 Basic AT Commands

In the following listings, all default settings are printed in **bold text.**

Command	Function
A	Manually answer incoming call.
A/	Repeat last command executed. **Do not** precede **A/** with AT or follow with **ENTER**.
B0	CCITT mode
B1	**Bell mode**
B2	Autoscan mode
B3	CCITT V.23 mode only
B4	300 bps connection only
B5	1200 bps connection only

B6	2400 bps connection only
B7	4800 bps connection only
B8	9600 bps connection only
B9	14400 bps connection only
B10	16800 bps connection only
B11	19200 bps connection only
B12	21600 bps connection only
B13	24000 bps connection only
B14	26400 bps connection only
B15	28800 bps connection only
D_	0 - 9, A-D, # and *
	L last number redial
	P pulse dialing
	T touch-tone dialing
	W wait for second dial tone
	, pause
	@ wait for five seconds of silence
	! flash
	; return to Command Mode after dialing
DS=n	Dial one of the four telephone numbers (n=0-3) stored in the modem's non-volatile memory.
E0	Commands are not echoed
E1	**Commands are echoed**
+++	Escape Characters - Switch from Data Mode to Command Mode
H0	Force modem on-hook (hang up)
H1	Force modem off-hook (make busy)
I0	Display product-identification code
I1	Factory ROM checksum test
I2	Internal memory test
I3	Firmware ID
I4	Reserved ID
L0	Low speaker volume
L1	**Low speaker volume**
L2	Medium speaker volume
L3	High speaker volume
M0	Internal speaker off
M1	**Internal speaker on until carrier detected**
M2	Internal speaker always on
M3	Internal speaker on until carrier detected and off while dialing
O0	Return to Data Mode

O1	Return to Data Mode and initiate an equalizer retrain
O2	Same as O1 with speed fall forward
O3	Same as O1 with speed fall backward
P	Set Pulse dial as default
Q0	**Modem sends responses**
Q1	Modem does not send responses
Sr?	Read and display value in register r.
Sr=n	Set register r to value n (n = 0-255).
T	**Set Tone Dial as default**
V0	Numeric responses
V1	**Word responses**
X0	Hayes Smartmodem 300 compatible responses/blind dialing
X1	Same as X0 plus all CONNECT responses/blind dialing
X2	Same as X1 plus dial tone detection
X3	Same as X1 plus busy detection/blind dialing
X4	**All responses and dial tone and busy signal detection**
Y0	**Modem does not send or respond to break signals**
Y1	Modem sends break signal for four seconds before disconnecting
Z0	Reset and retrieve active profile 0
Z1	Reset and retrieve active profile 1

Extended AT Commands

&C0	**Force Carrier Detect Signal High (ON)**
&C1	Turn on CD when remote carrier is present
&D0	**Modem ignores the DTR signal**
&D1	Modem returns to Command Mode after DTR toggle
&D2	Modem hangs up, returns to the Command Mode after DTR toggle
&D3	Resets modem after DTR toggle
&E0	**Disable automatic fall forward/back**
&E1	Enable automatic fall forward/back
&F0	**Recall factory default configuration (V.42bis/ hardware flow control enabled)**
&F1	Recall factory default with software flow control enabled
&F2	Recall factory default with hardware flow control enabled (same as &F)
&F3	Same as &F1 except for Macintosh computers (&F1

	with &D0)
&F4	Same as &F2 except for Macintosh computers (&F2 with &D0)
&F5	Same as &F except V.42bis and flow control are disabled
&G0	**Guard tone disabled**
&G1	550 Hz guard tone
&G2	1800 Hz guard tone
&H	Display help screen
&L0	**Modem is set up for dial-up line operation**
&L1	Modem is set up for leased-line operation
&L2	Modem is set up for Auto-connect leased-line operation
&M0	**Asynchronous operation**
&O0	**Disable originate-only mode**
&P0	**US setting for off-hook-to-on-hook ratio**
&P1	UK and Hong Kong off-hook-to-on-hook ratio
&S0	**Force DSR Signal High (ON)**
&S1	DSR off in command mode, on in on-line mode
&T0	Ends test in progress
&T1	Perform Local Analog Loopback Test
&T3	Perform Local Digital Loopback Test
&T4	**Grant Remote Digital Loopback Test request by remote modem**
&T5	Deny Remote Digital Loopback Test request
&T6	Perform a Remote Digital Loopback Test
&T7	Perform a Remote Digital Loopback Test and Self-Test
&T8	Perform Local Analog Loopback Test and Self-Test
&V	Displays Active and Stored Profiles
&W0	Stores the active profile as Profile 0
&W1	Stores the active profile as Profile 1
&Y0	**Configuration Profile 0 active upon Power on or reset**
&Y1	Configuration Profile 1 active upon Power on or reset
&Z*n*=x	Store phone number **x** into non-volatile RAM(*n*=0-3)
%D0	Disable Clear-down signal
%D1	**Enable Clear-down signal**
%E0	Disable auto-retrain
%E1	**Enable auto-retrain**

%L*n*	Set transmit level to **-*n*** dBm Default = 12.(*n*=0-15)
%M0	**Autodetect V.34 and V.FC negotiation signals**
%M1	Autodetect V.34 negotiation signals only
%M2	Autodetect V.FC negotiation signals only
%P0	**Disable Power-on Auto-connect**
%P1	Enable Power-on Auto-connect
%S0	**Disable Call-back Security**
%S1	Enable Call-back Security with password check
%S2	Enable Password check only
\P=x	Stores password **x** (**x** = ASCII characters 1 through 127 excluding "?", maximum 7 characters) into non-volatile RAM

MNP/V.42/V.42bis Commands

%An	Set auto-reliable fallback character to n (n = 0 to 127). Requires the **\C2** setting
%C0	Disable V.42bis/MNP Class 5 data compression
%C1	**Enable V.42bis/MNP Class 5 data compression**
\A0	64-character maximum MNP block size
\A1	128-character maximum MNP block size
\A2	192-character maximum MNP block size
\A3	**256-character maximum MNP block size**
\Bn	Send a 1/10 second line break to the modem (n = 1- 9). At normal connect, the default is **3**
\C0	**Do not buffer data during LAPM/MNP handshaking**
\C1	Buffer all data for 4 seconds, until receiving 200 characters or until a packet is detected
\C2	Do not buffer data; switch to normal mode when fallback character is detected
\E0	**Do not echo data during a normal link**
\E1	Echo data during a normal link
\G0	**Disable DCE flow control**
\G1	Enable DCE flow control
\J0	**Disable serial port data rate adjustment (keep high data rate between DTE and modem, regardless of modem-to-modem data rate)**
\J1	Enable serial port data rate adjustment so serial data rate automatically adjusts to match the modem-to-modem data rate

\Kn	Set break control (n= 0-5). Default is **5**
\N0	Normal data-link only
\N1	Direct data-link only
\N2	MNP data link only
\N3	MNP or Normal data link
\N4	V.42 data link only
\N5	V.42 or MNP data link only
\N6	**V.42/MNP/Normal data link**
\O	Initiate reliable link during a normal link
\Q0	Turn off flow control
\Q1	XON/XOFF software flow control
\Q2	CTS signal unidirectional hardware flow control
\Q3	**RTS/CTS signal bi-directional hardware flow control**
\Q4	Unidirectional XON/XOFF software flow control (modem to host)
\Tn	Inactivity timer (n = 0 to 90 minutes). Default is **0**
\U	Accept reliable link during a normal link
\V0	Report DCE speed but do not send extended responses
\V1	**Report DCE speed with extended responses**
\V2	Report DTE speed but do not send extended responses
\V3	Report DTE speed with extended responses
\X0	**Process XON/XOFF but don't pass through**
\X1	Process XON/XOFF and pass through
\Y	Switch to reliable link from normal link
\Z	End the reliable connection and switch to normal operation

Section Four - S Registers

Your modem has 29 registers, designated S0 through S28. Table 4-1 shows the registers, their functions, and their default values. Some registers can have their values changed by commands. If you use a command to change a register value, the command remains in effect until you turn off or reset your modem. Your modem then reverts to the operating characteristics specified in its non-volatile memory. Refer to Section 3 for information on how to use the AT commands to manipulate the S registers.

Table 4-1 S - Registers

Register	Function	Range/units	Default
S0	Auto-answer Ring	0-255/rings	0
S1	Ring counter	0-255/rings	0
S2	Escape code character	0-127/ASCII	43
S3	Carriage return character	0-127/ASCII	13
S4	Line feed character	0-127/ASCII	10
S5	Backspace character	0-32, 127/ASCII	8
S6	Dial tone wait time	2-255 /seconds	2
S7	Remote carrier wait time	1-255/seconds	50
S8	Comma pause time	0-255/seconds	2
S9	Carrier detect response time	1-255/0.1 second	6
S10	Carrier loss time	1-255/0.1second	14
S11	Touch-tone dialing speed	50-255/0.001 second	95
S12	Escape character guard time	0-255/0.02 second	50
S13	Reserved		
S14	Echo, response, dialing, originate/answer	Bit-mapped register	138
S15	Reserved		
S16	Modem tests	Bit-mapped register	0
S17	Reserved		
S18	Length of modem tests	0-255 /seconds	0
S19-20	Reserved		
S21	CTS, DTR, DCD, DSR and Long Space Disconnect	Bit-mapped register	4
S22	Speaker and response	Bit-mapped register	117
S23	Remote Digital Loopback Request, data rate, parity	Bit-mapped register	55
S24	Sleep mode timer	0-255/ seconds	0
S25	DTR delay	0-255 /0.01 second	5
S26	RTS/CTS delay interval	0-255 /0.01 second	1
S27	Asynchronous/Bell CCITT Modes	Bit-mapped register	73
S28	Make/break ratio	Bit-mapped register	0

Section Five - Result Codes

BASIC RESPONSE CODES

OK	0	NO DIALTONE	6
CONNECT	1	BUSY	7
RING	2	NO ANSWER	8
NO CARRIER	3	CONNECT 2400	10
ERROR	4	CONNECT 4800	11
CONNECT 1200	5	CONNECT 7200	12

CONNECT 9600	13	CONNECT 26400	64
CONNECT 12000	14	CONNECT 28800	65
CONNECT 14400	15	CONNECT 38400	66
CONNECT 16800	60	CONNECT 57600	67
CONNECT 19200	61	CONNECT 115200	68
CONNECT 21600	62	CONNECT 1200/75	48
CONNECT 24000	63	CONNECT 75/1200	49

EXTENDED RESPONSE CODES

CONNECT 300/MNP	16
CONNECT 1200/MNP	17
CONNECT 2400/MNP	18
CONNECT 4800/MNP	19
CONNECT 7200/MNP	20
CONNECT 9600/MNP	21
CONNECT 12000/MNP	22
CONNECT 14400/MNP	23
CONNECT 16800/MNP	70
CONNECT 19200/MNP	71
CONNECT 21600/MNP	72
CONNECT 24000/MNP	73
CONNECT 26400/MNP	74
CONNECT 28800/MNP	75
CONNECT 38400/MNP	76
CONNECT 57600/MNP	77
CONNECT 115200/MNP	78
CONNECT 300/MNP COMPRESSED	24
CONNECT 1200/MNP COMPRESSED	25
CONNECT 2400/MNP COMPRESSED	26
CONNECT 4800/MNP COMPRESSED	27
CONNECT 7200/MNP COMPRESSED	28
CONNECT 9600/MNP COMPRESSED	29
CONNECT 12000/MNP COMPRESSED	30
CONNECT 14400/MNP COMPRESSED	31
CONNECT 16800/MNP COMPRESSED	80
CONNECT 19200/MNP COMPRESSED	81
CONNECT 21600/MNP COMPRESSED	82
CONNECT 24000/MNP COMPRESSED	83
CONNECT 26400/MNP COMPRESSED	84
CONNECT 28800/MNP COMPRESSED	85
CONNECT 38400/MNP COMPRESSED	86
CONNECT 57600/MNP COMPRESSED	87
CONNECT 115200/MNP COMPRESSED	88

CONNECT 300/V42	32
CONNECT 1200/V42	33
CONNECT 2400/V42	34
CONNECT 4800/V42	35
CONNECT 7200/V42	36
CONNECT 9600/V42	37
CONNECT 12000/V42	38
CONNECT 14400/V42	39
CONNECT 16800/V42	90
CONNECT 19200/V42	91
CONNECT 21600/V42	92
CONNECT 24000/V42	93
CONNECT 26400/V42	94
CONNECT 28800/V42	95
CONNECT 38400/V42	96
CONNECT 57600/V42	97
CONNECT 115200/V42	98
CONNECT 300/V42BIS	40
CONNECT 1200/V42BIS	41
CONNECT 2400/V42BIS	42
CONNECT 4800/V42BIS	43
CONNECT 7200/V42BIS	44
CONNECT 9600/V42BIS	45
CONNECT 12000/V42BIS	46
CONNECT 14400/V42BIS	47
CONNECT 16800/V42BIS	100
CONNECT 19200/V42BIS	101
CONNECT 21600/V42BIS	102
CONNECT 24000/V42BIS	103
CONNECT 26400/V42BIS	104
CONNECT 28800/V42BIS	105
CONNECT 38400/V42BIS	106
CONNECT 57600/V42BIS	107
CONNECT 115200/V42BIS	108

Section Six - Troubleshooting

This section describes some of the common problems you may encounter while using your modem. If you can not resolve your difficulty after reading this chapter, contact your dealer or vendor for assistance.

Modem does not respond to commands.

1. Make sure the modem is not configured with a conflicting COM port and IRQ setting (see Section 2.4). Your modem can not be configured as COM1 (default) if another device in your system is also configured as COM1. Similarly, IRQ settings may not overlap.
2. Make sure the communication software is configured to "talk" to the modem on the correct COM port and IRQ setting (same COM port and IRQ setting as the modem). Your communication software must know which address your modem is using in the system in order to pass data to it. Similarly, IRQ settings must be set correctly to receive data from the modem.
3. Make sure that your modem is initialized correctly. Your modem may have been initialized to not display responses. You may factory-reset the modem by issuing **AT&F** and press **ENTER**. The factory default allows the modem to display responses after a command has been executed.
4. Make sure the baud rate setting in your software is set to 115200, 57600, 38400, 19200, 14400, 9600, 2400, 1200, or 300 bps. An incorrect baud rate prevents the modem from operating properly.

Modem does not dial.

1. Make sure the modem is connected to a working phone line. Replace the modem with a working phone to ensure that the phone line is working.
2. Make sure the phone line is connected to the jack marked "LINE." Incorrect connection prevents the modem from operating properly. Refer to Section 2.2 for modem connection instructions.

Modem dials but does not connect.

1. Make sure the IRQ setting is identical on both the modem AND the software. Modem and software must be configured identically.
2. Make sure the phone line is working properly. Replace the modem with a regular phone and dial the number. If the line

sounds noisy, you may have difficulty connecting to the remote device.

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

1. The remote system may be waiting to receive your data before it begins. Try pressing the **ENTER** key a few times.
2. Make sure the correct data format (data bits, stop bits, and parity bits) and flow control (RTS/CTS) are being used.
3. Make sure the correct terminal emulation mode is being used (see communication software manual).
4. Make sure the modem is not sharing an IRQ or COM port with another device (see Section 2.4).

V.42bis/V.42/MNP2-5 does not work

2. You must enable the hardware flow control (RTS/CTS) option in your communication software.
3. Make sure your DTE speed is set at 38400 or 57600 bps.
4. Use a streaming file transfer protocol such as Zmodem or Y-Modem-G.

High pitch tone is heard whenever you answer the phone.

1. Make sure Auto-Answer is turned off. Your modem is factory configured to NOT auto-answer. Issue **AT&F** to factory reset your modem.

Modem experiences errors while communicating with a remote modem.

1. Make sure the DTE speed is the same as the modem connection speed when in Direct Mode.
2. Make sure the remote system and your modem use the same communication parameters (speed, parity, etc.).
3. Make sure RTS/CTS hardware flow control is enabled and XON/XOFF software flow control is disabled in the communication software.
4. Make sure the data speed is not faster than your computer's capability. Most IBM compatibles are capable of 19,200 bps under DOS and Windows. Operating at higher speeds under Windows requires a faster CPU (386/486 or better).

Modem experiences bursts of errors or suddenly disconnects while communicating with a remote modem.

1. Make sure Call Waiting is turned off.
2. Make sure the phone line does not exhibit excess noise.

Section Seven - Specifications

Communication Std.	V.34, V.FC, V.32bis, V.32, V.29, V.27ter, V.22bis, V.23, V.22, V.21, V.17, Bell212/103
Data Compression:	V.42bis/MNP5
Error Correction:	V.42/MNP2-4
Host Interface:	8 bit PC bus
COM ports:	1, 2, 3, 4
IRQ lines:	2, 3, 4, 5
FAX Group:	Group III Send/Receive Standard
FAX Command set:	EIA/TIA-578 Service Class 1, EIA/TIA-SP2388 Service Class 2
Transmit level:	-12 dBm +/- 1 dB
Receiver Sensitivity:	-43 dBm
UART:	16550 compatible
Data format:	300-115200 bps
Power:	2.5 W
Temperature:	0 to 55 degrees C (Operating)

Section Eight - Support and Service

In the unlikely event you experience difficulty in the use of this product, we suggest you: (1) consult the Troubleshooting section of this guide and (2) consult with your dealer. To obtain service for this product, follow the Return Merchandise Authorization Procedure as outlined in the Warranty card.

Section Nine - FCC , DOC & Other Notices

9.1 FCC Compliance

This equipment complies with Part 68 of the FCC Rules. On this equipment is a label that contains, among other information, the FCC registration number and Ringer Equivalence Number (REN) for this equipment. You must, upon request, provide this information to your telephone company.

If your telephone equipment causes harm to the telephone network, the Telephone Company may discontinue your service temporarily. If possible, they will notify in advance. But, if advance notice isn't practical, you will be notified as soon as possible. You will be informed of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect proper

operation of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

The FCC prohibits this equipment to be connected to party lines or coin-telephone service.

In the event that this equipment should fail to operate properly, disconnect the equipment from the phone line to determine if it is causing the problem. If the problem is with the equipment, discontinue use and contact your dealer or vendor.

The FCC also requires the transmitter of a FAX transmission be properly identified (per FCC Rules Part 68, Sec. 68.381 (c) (3)).

9.2 FCC Class B Statement

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 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 the 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

Notice: 1) Shielded cables, if any, must be used in order to comply with the emission limits. 2) Any change or modification not expressly approved by the Grantee of the equipment authorization could void the user's authority to operate the equipment.

9.3 DOC Compliance Information

NOTICE: The Canadian Department of Communications label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTICE: The Load Number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the sum of the Load Numbers of all the devices does not exceed 100.

9.4 Disclaimer, Copyright, And Other Notices

The information contained in this manual has been validated at the time of this manual's production. The manufacturer reserves the right to make any changes and improvements in the product described in this manual at any time and without notice. Consequently the manufacturer assumes no liability for damages incurred directly or indirectly from errors, omissions or discrepancies between the product and the manual.

All registered trademarks are the property of their respective owners.

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