
**High Performance
V.34+/V.42bis
33,600 BPS
Plug & Play Internal
Voice/FAX/Data Modem**

*With Advanced
Speakerphone functions*

User 's Manual

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Section One - Introduction

The 33.6 Kbps Series Plug and Play (PnP) Speakerphone/FAX/Data Modem products connect your computer to all popular high speed modems available today. The modem incorporates Plug and Play configuration for ease of installation. It features speakerphone capabilities for hands-free communication. This manual describes the hardware installation procedures for your new modem product. Additional information on AT commands and S-registers is 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 33.6 Kbps Speakerphone/FAX/Data modem. Installation of this modem is a two-step process consisting of: 1) hardware installation and, 2) communication software installation and configuration.

2.1 Unpacking Your Modem

Be certain that you have all the items listed below. This package contains:

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

2.2 What You Need

You will need:

1. A phillips-head screw driver
2. **A)** A Plug and Play enabled Operating System (e.g., Windows 95),
or
B) A Plug and Play Revision 1.0a compliant PC.

Proceed to Section 2.3 now if you have everything required.

If you do not have a Plug and Play 1.0a compliant system or Windows 95 running on your system, you will need to manually configure your modem.

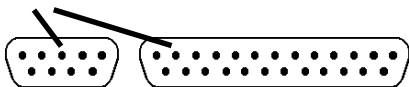
2.2.1 Manually Configuring The Modem

To manually configure your modem:

1. 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.

Figure 2-1 Common Serial Ports

male connector



2. Configure your modem using Figure 2-2, Tables 2-1 and 2-2 according to the number of COM ports found on your system:

A. No COM port:

configure your modem as COM1/IRQ4; *or*

B. One COM port:

configure your modem as COM2/IRQ3; *or*

C. Two COM ports:

configure your modem as COM3/IRQ5; *or*

D. Three COM ports:

configure your modem as COM4/IRQ9(2)

Figure 2-2 Jumper block locations

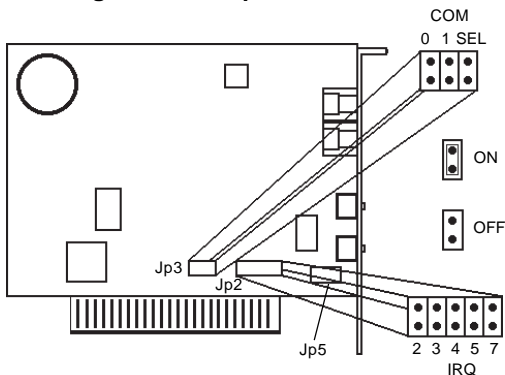


Table 2-1 COM port settings

COM Port	J3 (0)	J3 (1)	J3 (SEL)
1 (3F8)	ON	ON	ON
2 (2F8)	OFF	ON	ON
3 (3E8)	ON	OFF	ON
4 (2E8)	OFF	OFF	ON
PnP	OFF	OFF	OFF

Table 2-2 IRQ settings

IRQ	J2 (2)	J2 (3)	J2 (4)	J2 (5)	J2 (7)
9 (2)	ON	OFF	OFF	OFF	OFF
3	OFF	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	OFF	OFF	OFF	ON	OFF
7	OFF	OFF	OFF	OFF	ON
PnP	OFF	OFF	OFF	OFF	OFF

Table 2-3 SPK settings

JP5	SPEAKER TYPE
ON	STEREO
OFF	MONO

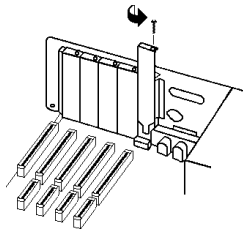
2.3 Hardware Installation

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.

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2. Remove your computer's cover (refer to your computer's owner manual).
 3. Select any available half-card slot, and then remove the slot cover (refer to Figure 2-3).
 4. Configure JP5 (see Table 2-3) to the type of speaker you will be using.
 5. Carefully slide the internal modem into the slot you have chosen, applying even pressure until the modem is completely seated in the slot.
 6. 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.
 7. Replace the computer cover and plug in your computer.
 8. Connect the telephone cable from the modem's "LINE" connector to the telephone wall jack.
 9. Optionally, connect your telephone to the modem's "PHONE" connector, a microphone to the modem's "MIC" connector and a Speaker to the modem's "SPK" connector.
 10. Turn your computer on. Your modem is now installed.

**Figure 2-3
Expansion
Slots**



If you are installing the modem on a PnP compliant PC or if you are running Windows 95 (or any other PnP-enabled operating system), **proceed to Section 2.4 now**. If you have configured your modem using jumpers as listed in Section 2.2, **proceed to Section 2.5**.

2.4 PnP Hardware Configuration

Your modem is configured using the Plug and Play (PnP) capabilities of your computer. Plug and Play is a set of specifications that define the ability for the computer hardware and operating system to automatically configure all compliant devices that are installed, relieving the user of the need to determine

which addresses and interrupts to use for each device. Consult your PC's owner's manual to determine if it is PnP Revision 1.0a compliant. You most likely have a Plug and Play Revision 1.0a compliant system if it was purchased after June 1994 or if the BIOS is dated after June 1994.

Proceed to one of the following sections, depending on your system's configuration:

- **Section 2.4.1** if you are running Windows 95 (with or without a Plug and Play PC)
- **Section 2.4.2** if you are running Windows 3.x or DOS on a PnP PC.

2.4.1 Configuring in Windows 95

When Windows 95 starts for the first time after card installation, it detects the modem and displays the **New Hardware Found** dialog box.

Under **New Hardware Found**, when asked to "Select which driver you want to install for your new hardware," click on "Driver from disk provided by hardware manufacturer." Click "OK."

The **Install From Disk** dialog box now instructs you to "Insert the manufacturer's installation disk into the drive selected, and then click OK." Insert the modem's driver diskette into the disk drive and type **A:** (or **B:** if inserted in drive B) in the "Copy manufacturer's files from:" box. Click "OK."

Windows 95 may request its own installation disks for some files. Insert the Windows 95 disks as required. When all necessary files are copied, the modem is configured. Windows 95 will assign the modem a COM port and IRQ line. **Proceed to Section 2.5.**

2.4.2 Configuring in a PnP PC with Windows 3.x or MS-DOS

When this modem is installed in a Plug and Play system without a PnP-enabled Operating System (e.g., Windows 95), the computer's BIOS will assign a COM port and IRQ line to the modem.

2.5 Software Installation and Configuration

Before installing the software you should make

certain that the modem is properly configured within the Operating System by following the appropriate procedure outlined in the Operating System user's manual.

Example:

For Microsoft Windows 3.x users, at **PROGRAM MANAGER|MAIN|CONTROL PANEL**, click on **PORTS** and follow Windows 3.x user's manual instructions on configuring the installed modem COM port.

Note : Windows 95 automatically configures the modem using PnP and MS-DOS does not require any additional modem configuration.

You are now ready to install and configure the communication software. Refer to your software manual for installation procedures.

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&F1

The commands used by the modem are compatible with the command set used by U.S. Robotics Sportster 28.8/33.6 Kbps modem series. If necessary, you may select a "**US Robotics Sportster 28.8/33.6 Kbps**" modem type in your data communications software, and select a "**Generic Class 1**" modem type in your fax software

Note that your software must be configured to communicate with the modem on the same COM port and IRQ line used by the modem.

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 "AT", "AATT" or nothing on the screen. In all cases, the modem

should respond with an **OK** or **0**. If it does not, either the modem has not been installed properly or the software has not been properly configured. Review Sections 2.2 -2.5 and be certain that the modem and the software have been properly installed. If required, refer to Section 6 for additional troubleshooting information.

2.7 Using Your Modem

The software included with your modem product provides a user friendly interface to access the fax, data and voice/speakerphone 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, 28800, 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

\$	Displays basic command set
A	Manually answer incoming call.
A/	Repeat last command executed. Do not precede A/ with AT or follow with ENTER .
B_	B0 ITU-T V.25 answer mode
	B1 U.S. answer mode
D_	0 - 9, A-D, # and *
	L Last number re-dial
	P pulse dialing
	R reverse dial mode
	T touch-tone dialing
	W wait for second dial tone
	, pause
	; return to Command Mode after dialing
	/ delays for 125 msec. before dialing
	! flash
	@ wait for five seconds of silence

	\$	displays dialing commands
DSn		Dial one of the four telephone numbers ($n=0-3$) stored in the modem's non-volatile memory.
E_	E0	Commands are not echoed
	E1	Commands are echoed
+++		Escape Characters - Switch from Data Mode to Command Mode
F_	F0	Local echo on
	F1	Local echo off
H_	H0	Force modem on-hook (hang up)
	H1	Force modem off-hook (make busy)
I_	I0	Display product-identification code
	I1	Display factory ROM checksum
	I2	Internal memory test
	I3	Product ID
	I4	Current modem settings
	I5	Displays Active and Stored Profiles
	I6	Link diagnostics
	I7	Product configuration
L_	L0	Low speaker volume
	L1	Low speaker volume
	L2	Medium speaker volume
	L3	High speaker volume
M_	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
O_	O0	Return to Data Mode
	O1	Return to Data Mode and initiate an equalizer retrain
P		Set Pulse dial as default
Q_	Q0	Modem sends responses
	Q1	Modem does not send responses
	Q2	Displays result codes only in Originate Mode
Sr?		Read and display value in register r .
Sr=n		Set register r to value n ($n = 0-255$).
Sr.b=n		Set bit b of register r to value n ($n=0-1$)

S\$		Displays a list of the S registers
T		Set Tone Dial as default
V_	V0	Numeric responses
	V1	Word responses
X_	X0	Hayes Smartmodem 300 compatible responses/blind dialing
	X1	Display connect message according to AT&A, blind dial, and ignore busy tone
	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
Y_	Y0	Configuration Profile 0 active upon Power on or reset
	Y1	Configuration Profile 1 active upon Power on or reset
	Y2	Factory configuration 0 active upon power on or reset
	Y3	Factory configuration 1 active upon power on or reset
	Y4	Factory configuration 2 active upon power on or reset
	Y6	Same as I6
Z_	Z0	Reset and retrieve active profile set by the Y command
	Z1	Reset and retrieve active profile 0
	Z2	Reset and retrieve active profile 1
	Z3	Reset and retrieve factory default profile 0 (&F0)
	Z4	Reset and retrieve factory default profile 1 (&F1)
	Z5	Reset and retrieve factory default profile 2 (&F2)

3.4 Extended AT Commands

#BDR=0	Set DTE autobaud detection
#BDR=n	Set DTE rate to n X 2400(n=1-48)
#BDR=?	Returns supported speeds
#BDR?	Returns current setting
#CLS=n	Select Data, Fax or Voice modes
#MDL?	Identify modem model
#MFR?	Identify modem manufacturer
#REV?	Identify revision level

&\$		Displays ampersand (&) commands
&A_	&A0	Disable ARQ result codes
	&A1	Enable ARQ result codes
	&A2	Same as &A1 plus V.32 modulation
	&A3	Same as &A2 plus error correction and data compression protocols
&B_	&B0	DTE rate adjust to DCE rate after on-line
	&B1	Constant DTE rate
	&B2	Constant DTE rate in ARQ mode, variable in non-ARQ mode
&C_	&C0	Force Carrier Detect Signal High (ON)
	&C1	Turn on CD when remote carrier is present
&D_	&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
&F_	&F0	Recall factory default configuration 0
	&F1	Recall factory default configuration profile 1 (hardware flow control enabled)
	&F2	Recall factory default configuration profile 2 (software flow control enabled)
&G_	&G0	Guard tone disabled
	&G1	550Hz guard tone
	&G2	1800 Hz guard tone
&H_	&H0	Disable TX (transmit) flow control
	&H1	Enable hardware TX (transmit) flow control (CTS)
	&H2	Enable software TX (transmit) flow control (XON/XOFF)
	&H3	Enable hardware (CTS) and software (XON/XOFF) TX (transmit) flow control
&I_	&I0	Disable software RX (receive) flow control (XON/XOFF)
	&I1	Enable software RX (receive) flow control (XON/XOFF)
	&I2	Enable software RX (receive) flow control (XON/XOFF), but do not pass XON/XOFF to remote modem or local DTE
	&I3	Enable HP ENQ/ACK software flow control, hostmode
	&I4	Enable HP ENQ/ACK software flow

		control,terminalmode
	&I5	Enable software RX (receive) folw control (XON/XOff) for non-ARQ mode
&K_	&K0	Disable V.42bis/MNP5 data compression
	&K1	Auto data compression
	&K2	Enable V.42bis/MNP5 data compression
	&K3	Disable MNP5 data compression
&M_	&M0	Normal mode (error control disabled) only
	&M4	Enable ARQ (error control) and Normal modes
	&M5	Enable ARQ mode only
&N_	&N0	Enable Automode (variable DCE connection speed)
	&N1	Setconnection speed to 300 bps
	&N2	Set connection speed to 1200 bps
	&N3	Set connection speed to 2400 bps
	&N4	Set connection speed to 4800 bps
	&N5	Set connection speed to 7200 bps
	&N6	Set connection speed to 9600 bps
	&N7	Set connection speed to 12000 bps
	&N8	Set connection speed to 14400 bps
	&N9	Set connection speed to 16800 bps
	&N10	Set connection speed to 19200 bps
	&N11	Set connection speed to 21600 bps
	&N12	Set connection speed to 24400 bps
	&N13	Set connection speed to 26400 bps
	&N14	Set connection speed to 28800 bps
	&N15	Set connection speed to 31200 bps
	&N16	Set connection speed to 33600 bps
&P_	&P0	US setting for off-hook-to-on-hook ratio
	&P1	UK and Hong Kong off-hook-to-on-hook ratio
&R_	&R0	Reserved
	&R1	Modem ignores the RTS signal
	&R2	Enable RX (receive) hardware flow control (RTS)
&S_	&S0	Force DSR Signal High (ON)
	&S1	DSR off in command mode, on in on-line mode
&T_	&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	
&U	&U0 Do not set minimum DCE connection speed	
&U1	Set connection speed to 300 bps	
&U2	Set connection speed to 1200 bps	
&U3	Set connection speed to 2400 bps	
&U4	Set connection speed to 4800 bps	
&U5	Set connection speed to 7200 bps	
&U6	Set connection speed to 9600 bps	
&U7	Set connection speed to 12000 bps	
&U8	Set connection speed to 14400 bps	
&U9	Set connection speed to 16800 bps	
&U10	Set connection speed to 19200 bps	
&U11	Set connection speed to 21600 bps	
&U12	Set connection speed to 24400 bps	
&U13	Set connection speed to 26400 bps	
&U14	Set connection speed to 28800 bps	
&U15	Set connection speed to 31200 bps	
&U16	Set connection speed to 33600 bps	
&W	&W0 Stores the active profile as Profile 0	
	&W1 Stores the active profile as Profile 1	
&Y	&Y0 Destructive break. Does not send break	
	&Y1 Destructive break. Break expedited	
	&Y2 Nondestructive break. Break expedited	
&Zn=x	Stores phone number x into non-volatile memory position n ($n=0-3$)	
&Zn=L	Stores last-dialed phone number L into non-volatile memory position n ($n=0-3$)	
&Zn?	Displays stored phone number at position n ($n=0-3$)	
&ZL?	Displays the last-dialed number	

3.6 Fax Class 1 Commands

+FCLASS=n	Service Class
+FRH=n	Receive data with HDLC framing

+FRM=n	Receive Data
+FRS=n	Receive silence
+FTH=n	Transmit data with HDLC framing
+FTM=n	Transmit data
+FTS=n	Stop transmission and wait

3.7 Voice Commands

#VBQ?	Query buffer size
#VBS=n	Set bits per sample
#VBS?	Report current setting
#VBT=n	Beep tone timer
#VBT?	Report current setting
#VCI?	Identify compression method
#VLS=n	Voice line select
#VLS?	Report current setting
#VRA=n	Ringback goes away timer
#VRA?	Report current setting
#VRN=n	Ringback never came timer
#VRN?	Report current setting
#VRX	Voice receive
#VSD=n	Enable silence deletion
#VSD?	Report current setting
#VSK=n	Buffer skid setting
#VSK?	Report current setting
#VSP=n	Silence detection period
#VSP?	Report current setting
#VSR=n	Sampling rate selection
#VSR=?	Report current setting
#VSS=n	Silence detection tuner
#VSS?	Report current setting
#VTD=n	DTMF tone reporting
#VTD?	Report current setting
#VTS	Generate tone signals
#VTX	Switch to voice transmit mode

Section Four - S Registers

Your modem has 31 registers, designated S0 through S37. 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	0-255/ASCII	43
S3	Carriage return character	0-127/ASCII	13
S4	Line feed character	0-127/ASCII	10
S5	Backspace character	0-127/ASCII	8
S6	Dial tone wait time	2-255 /seconds	2
S7	Remote carrier wait time	1-255 /seconds	60
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 /0.1 second	7
S11	Touch-tone dialing speed	50-255 /milliseconds	70
S12	Escape character guard time	0-255 /0.02 second	50
S13	DTR reset, ARQ 1.5K buffer DTR/reset, backspace autodial, +++ hangup	Bit-mapped register	0
S14	Reserved		
S15	Disable V.42bis/MNP MNP incompatibility	Bit-mapped register	0
S16	Touch tone test	Bit-mapped register	0
S17	Reserved		
S18	Length of modem tests	0-255 /seconds	0
S19	Inactivity timer	0-255/minutes	0
S20	Reserved		0
S21	ARQ break length	0-255/.01 second	10
S22	XON character	0-127/ASCII	17
S23	XOFF character	0-127/ASCII	19
S24	Reserved		
S25	Data Terminal Ready delay	0-255 /0.01 second	5
S26	Reserved		
S27	V.21 @ 300bps,non-trellis encoding, disable V.32, dis- able 2400 Hz answer tone, 9600 result codes, disable V.32bis, enable V.23	Bit-mapped register	0
S28	V.32 handshake length	0-255/0.1 second	8
S29	V.21 answer mode timer	0-255/.01 second	20
S30-31	Reserved		
S32	Disable V.fc, V34,V34bis, Enable V.8	Bit-mapped register	0
S33	Disable 2400, 2743, 2800, 3000, 3200, and 3429 sym- bol rates, call indicate, V.8	Bit-mapped register	0

S34 Disable 8S-2D, 16S-4D,
32S-2D, 64S-4D maps
S35-37Reserved

Section Five - Result Codes

OK	0
CONNECT	1
RING	2
NOCARRIER	3
ERROR	4
CONNECT 1200	5
NODIALTONE	6
BUSY	7
NO ANSWER	8
CONNECT 2400	10
RINGING	11
CONNECT 9600	13
CONNECT 4800	18
CONNECT 7200	20
CONNECT 12000	21
CONNECT 14400	25
CONNECT 16800	43
CONNECT 19200	85
CONNECT 21600	91
CONNECT 24000	99
CONNECT 26400	103
CONNECT 28800	107
CONNECT 31200	151
CONNECT 33600	155
CONNECT 1200/ARQ	15
CONNECT 2400/ARQ	16
CONNECT 4800/ARQ	19
CONNECT 7200/ARQ	24
CONNECT 9600/ARQ	17
CONNECT 12000/ARQ	22
CONNECT 14400/ARQ	26
CONNECT 16800/ARQ	47
CONNECT 19200/ARQ	88
CONNECT 21600/ARQ	94
CONNECT 24000/ARQ	100
CONNECT 26400/ARQ	104
CONNECT 28800/ARQ	108
CONNECT 31200/ARQ	152
CONNECT 33600/ARQ	156
CONNECT 4800/V32	38
CONNECT 7200/V32	40
CONNECT 9600/V32	33

CONNECT 12000/V32	41
CONNECT 14400/V32	45
CONNECT 4800/V32/NONE	38
CONNECT 7200/V32/NONE	40
CONNECT 9600/V32/NONE	33
CONNECT 12000/V32/NONE	41
CONNECT 14400/V32/NONE	45
CONNECT 4800/ARQ/V32	39
CONNECT 7200/ARQ/V32	44
CONNECT 9600/ARQ/V32	37
CONNECT 12000/ARQ/V32	42
CONNECT 14400/ARQ/V32	46
CONNECT 4800/ARQ/V32/MNP	39
CONNECT 7200/ARQ/V32/MNP	44
CONNECT 9600/ARQ/V32/MNP	37
CONNECT 12000/ARQ/V32/MNP	42
CONNECT 14400/ARQ/V32/MNP	46
CONNECT 4800/ARQ/V32/MNP/MNP5	39
CONNECT 7200/ARQ/V32/MNP/MNP5	44
CONNECT 9600/ARQ/V32/MNP/MNP5	37
CONNECT 12000/ARQ/V32/MNP/MNP5	42
CONNECT 14400/ARQ/V32/MNP/MNP5	46
CONNECT 4800/ARQ/V32/LAPM	39
CONNECT 7200/ARQ/V32/LAPM	44
CONNECT 9600/ARQ/V32/LAPM	37
CONNECT 12000/ARQ/V32/LAPM	42
CONNECT 14400/ARQ/V32/LAPM	46
CONNECT 4800/ARQ/V32/LAPM/V42BIS	39
CONNECT 7200/ARQ/V32/LAPM/V42BIS	44
CONNECT 9600/ARQ/V32/LAPM/V42BIS	37
CONNECT 12000/ARQ/V32/LAPM/V42BIS	42
CONNECT 14400/ARQ/V32/LAPM/V42BIS	46
CONNECT 14400/VFC	139
CONNECT 16800/VFC	143
CONNECT 19200/VFC	147
CONNECT 21600/VFC	97
CONNECT 24000/VFC	101
CONNECT 26400/VFC	105
CONNECT 28800/VFC	109
CONNECT 14400/VFC/NONE	139
CONNECT 16800/VFC/NONE	143
CONNECT 19200/VFC/NONE	147
CONNECT 21600/VFC/NONE	97
CONNECT 24000/VFC/NONE	101
CONNECT 26400/VFC/NONE	105
CONNECT 28800/VFC/NONE	109

CONNECT 14400/ARQ/VFC	141
CONNECT 16800/ARQ/VFC	145
CONNECT 19200/ARQ/VFC	149
CONNECT 21600/ARQ/VFC	98
CONNECT 24000/ARQ/VFC	102
CONNECT 26400/ARQ/VFC	106
CONNECT 28800/ARQ/VFC	110
CONNECT 14400/ARQ/VFC/MNP	141
CONNECT 16800/ARQ/VFC/MNP	145
CONNECT 19200/ARQ/VFC/MNP	149
CONNECT 21600/ARQ/VFC/MNP	98
CONNECT 24000/ARQ/VFC/MNP	102
CONNECT 26400/ARQ/VFC/MNP	106
CONNECT 28800/ARQ/VFC/MNP	110
CONNECT 14400/ARQ/VFC/MNP/MNP5	141
CONNECT 16800/ARQ/VFC/MNP/MNP5	145
CONNECT 19200/ARQ/VFC/MNP/MNP5	149
CONNECT 21600/ARQ/VFC/MNP/MNP5	98
CONNECT 24000/ARQ/VFC/MNP/MNP5	102
CONNECT 26400/ARQ/VFC/MNP/MNP5	106
CONNECT 28800/ARQ/VFC/MNP/MNP5	110
CONNECT 14400/ARQ/VFC/LAPM	141
CONNECT 16800/ARQ/VFC/LAPM	145
CONNECT 19200/ARQ/VFC/LAPM	149
CONNECT 21600/ARQ/VFC/LAPM	98
CONNECT 24000/ARQ/VFC/LAPM	102
CONNECT 26400/ARQ/VFC/LAPM	106
CONNECT 28800/ARQ/VFC/LAPM	110
CONNECT 14400/ARQ/VFC/LAPM/V42BIS	141
CONNECT 16800/ARQ/VFC/LAPM/V42BIS	145
CONNECT 19200/ARQ/VFC/LAPM/V42BIS	149
CONNECT 21600/ARQ/VFC/LAPM/V42BIS	98
CONNECT 24000/ARQ/VFC/LAPM/V42BIS	102
CONNECT 26400/ARQ/VFC/LAPM/V42BIS	106
CONNECT 28800/ARQ/VFC/LAPM/V42BIS	110
CONNECT 2400/V34/NONE	120
CONNECT 4800/V34/NONE	124
CONNECT 7200/V34/NONE	128
CONNECT 9600/V34/NONE	132
CONNECT 12000/V34/NONE	136
CONNECT 14400/V34/NONE	140
CONNECT 16800/V34/NONE	144
CONNECT 19200/V34/NONE	158
CONNECT 21600/V34/NONE	111
CONNECT 24000/V34/NONE	113
CONNECT 26400/V34/NONE	115
CONNECT 28800/V34/NONE	117

CONNECT 31200/V34/NONE	153
CONNECT 33600/V34/NONE	157
CONNECT 2400/ARQ/V34	122
CONNECT 4800/ARQ/V34	126
CONNECT 7200/ARQ/V34	130
CONNECT 9600/ARQ/V34	134
CONNECT 12000/ARQ/V34	138
CONNECT 14400/ARQ/V34	142
CONNECT 16800/ARQ/V34	146
CONNECT 19200/ARQ/V34	150
CONNECT 21600/ARQ/V34	112
CONNECT 24000/ARQ/V34	114
CONNECT 26400/ARQ/V34	116
CONNECT 28800/ARQ/V34	118
CONNECT 31200/ARQ/V34	154
CONNECT 33600/ARQ/V34	158
CONNECT 2400/ARQ/V34/MNP	122
CONNECT 4800/ARQ/V34/MNP	126
CONNECT 7200/ARQ/V34/MNP	130
CONNECT 9600/ARQ/V34/MNP	134
CONNECT 12000/ARQ/V34/MNP	138
CONNECT 14400/ARQ/V34/MNP	142
CONNECT 16800/ARQ/V34/MNP	146
CONNECT 19200/ARQ/V34/MNP	150
CONNECT 21600/ARQ/V34/MNP	112
CONNECT 24000/ARQ/V34/MNP	114
CONNECT 26400/ARQ/V34/MNP	116
CONNECT 28800/ARQ/V34/MNP	118
CONNECT 31200/ARQ/V34/MNP	154
CONNECT 33600/ARQ/V34/MNP	158
CONNECT 2400/ARQ/V34/MNP/MNP5	122
CONNECT 4800/ARQ/V34/MNP/MNP5	126
CONNECT 7200/ARQ/V34/MNP/MNP5	130
CONNECT 9600/ARQ/V34/MNP/MNP5	134
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CONNECT 14400/ARQ/V34/MNP/MNP5	142
CONNECT 16800/ARQ/V34/MNP/MNP5	146
CONNECT 19200/ARQ/V34/MNP/MNP5	150
CONNECT 21600/ARQ/V34/MNP/MNP5	112
CONNECT 24000/ARQ/V34/MNP/MNP5	114
CONNECT 26400/ARQ/V34/MNP/MNP5	116
CONNECT 28800/ARQ/V34/MNP/MNP5	118
CONNECT 31200/ARQ/V34/MNP/MNP5	154
CONNECT 33600/ARQ/V34/MNP/MNP5	158
CONNECT 2400/ARQ/V34/LAPM	122
CONNECT 4800/ARQ/V34/LAPM	126
CONNECT 7200/ARQ/V34/LAPM	130

CONNECT 9600/ARQ/V34/LAPM	134
CONNECT 12000/ARQ/V34/LAPM	138
CONNECT 14400/ARQ/V34/LAPM	142
CONNECT 16800/ARQ/V34/LAPM	146
CONNECT 19200/ARQ/V34/LAPM	150
CONNECT 21600/ARQ/V34/LAPM	112
CONNECT 24000/ARQ/V34/LAPM	114
CONNECT 26400/ARQ/V34/LAPM	116
CONNECT 28800/ARQ/V34/LAPM	118
CONNECT 31200/ARQ/V34/LAPM	154
CONNECT 33600/ARQ/V34/LAPM	158
CONNECT 2400/ARQ/V34/LAPM/V42BIS	122
CONNECT 4800/ARQ/V34/LAPM/V42BIS	126
CONNECT 7200/ARQ/V34/LAPM/V42BIS	130
CONNECT 9600/ARQ/V34/LAPM/V42BIS	134
CONNECT 12000/ARQ/V34/LAPM/V42BIS	138
CONNECT 14400/ARQ/V34/LAPM/V42BIS	142
CONNECT 16800/ARQ/V34/LAPM/V42BIS	146
CONNECT 19200/ARQ/V34/LAPM/V42BIS	150
CONNECT 21600/ARQ/V34/LAPM/V42BIS	112
CONNECT 24000/ARQ/V34/LAPM/V42BIS	114
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CONNECT 28800/ARQ/V34/LAPM/V42BIS	118
CONNECT 31200/ARQ/V34/LAPM/V42BIS	154
CONNECT 33600/ARQ/V34/LAPM/V42BIS	158

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 Sections 2.2-2.5). 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
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- 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&F1** and pressing **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.

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 Sections 2.2-2.5).

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&F1** 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), a high performance replacement Windows 3.x **comm.driv**, or Windows 95.

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 - 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.

Appendix A - Specifications

Communication Std.	V.34+ (33600 bps), 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/ARQ/MNP2-4
Host Interface:	8 bit ISA
COM ports:	1,2,3,4
IRQ lines:	9 (2), 3,4,5,7
PnP:	Revision 1.0a

FAX Group:	Group III Send/Receive Standard
FAX Command set:	EIA/TIA-578 Service Class 1, EIA/TIA-592 Class 2.0
Transmit level:	-12 dBm
Receiver sensitivity:	-40 dBm
UART:	16550 compatible
Data format:	300-115200 bps (8N1, 7E1, 7E2, 7O1, 7O2)
Power:	0.75 W
Temperature:	0-55 degrees C (operating); -20 to 80 degrees C (non-operating)
Speakerphone:	Full -Duplex

Appendix B - Notices

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)).

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.

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.

UL Notice

Caution: This internal modem adapter is to be installed in UL Listed computers only. Always disconnect the modem adapter from the telephone system during installation or when the covers are removed from the computer.

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