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**High Performance
V.90/V.34+/V.42bis
56Kbps
PCI Internal
Voice/FAX/Data/
Speakerphone
Modem**

User's Manual

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Section One - Introduction

This 56 Kbps* Plug and Play FAX/Voice/Data Speakerphone PCI Modem connects your computer to all popular high speed modems available today. The modem incorporates "V.90" (56Kbps) technology to provide increased download speeds using regular telephone lines. The modem incorporates Plug and Play for ease of installation.

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

**Note: V.90 is capable of downloading at 56Kbps. However, current FCC regulations limit its speeds to 53Kbps.*

Section Two - Installation

This section will provide step by step instructions on how to install your new 56 Kbps FAX/Voice/Data Speakerphone modem. Installation of this modem product is a three-step process consists of 1) actual hardware installation, 2) plug and play configuration, and 3) 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
- A telephone cable
- User's manual
- Software for the modem
- Software user's manual

2.2 What You Need

You will need:

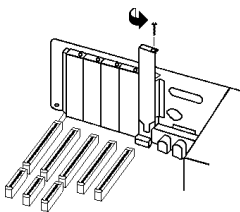
1. A phillips-head screw driver
2. A Pentium MMX or compatible computer running Microsoft Windows 95 or later.
3. An available PCI slot

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 grounded metal surface of the PC system, such as its power supply cover.

1. Turn off and unplug your computer from the AC outlet.
2. Remove your computer's cover (refer to your computer's owner's manual).
3. Select any available 32-bit PCI card slot and remove the slot cover (refer to Figure 2-1).

Figure 2-1 PCI Expansion Slots



4. Carefully slide the PCI internal modem into the slot you have chosen, applying even pressure until the modem is completely seated in the slot.
5. 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.
6. Replace the computer cover and plug in your computer.
7. Connect the telephone cable from the modem's **LINE** connector to the telephone wall jack.
8. Optionally, connect your telephone to the modem's **PHONE** connector.
9. Optionally, you may connect a microphone to the modem's **Mic** jack and an amplified speaker to the modem's **Spk** jack.

10. Turn your computer on. Your modem is now installed.

2.4 Hardware Configuration

The version of Windows 95 you have will determine which set of dialog boxes is presented to you when installing the modem in Windows 95. Proceed to one of the following sections, depending on your Windows 95's dialog box:

- **Section 2.4.1** when Windows 95 starts for the first time after card installation, it detects the modem and it displays the **New Hardware Found** dialog box
- **Section 2.4.2** when Windows 95 starts for the first time after card installation, it detects the modem and it displays the **Update Device Driver Wizard**.
- **Section 2.4.3** when Windows 98 starts for the first time after card installation, it detects the adapter and displays the **Add New Hardware Wizard**.

2.4.1 Windows 95 Release 4.00.950

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 disk that contains the modem's driver (these files will be found on the included driver diskette or the root directory of the software CD-ROM) type the drive letter where the drivers can be found in the "Copy manufacturer's files from:" box. Click "OK."

Windows 95 may request its own installation disks or CD-ROM for some files. Insert the Windows

95 disks or CD-ROM 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 Windows 95 Release 4.00.950 B

When Windows 95 starts for the first time after card installation, it detects the modem and displays the **Update Device Driver Wizard**.

Insert the disk that contains your modem drivers into the appropriate drive and click "Next." Windows will find the driver on the driver disk. Click "Finish." Windows 95 may request its own installation disks or CD for some files. Insert the Windows 95 disks or CD as required.

Windows will now find a second device on the modem. Make sure that the driver disk is still in the disk drive and click "Next." Windows will find the second driver. Click "Finish" to complete the installation.

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.**

2.4.3 Windows 98

When Windows 98 starts for the first time after card installation, it detects the adapter and displays the **Add New Hardware Wizard**.

Insert the disk that contains your modem drivers into the appropriate drive and click "Next." Windows 98 will ask you "What do you want Windows to do" Select "Search for the best driver for your device". Click "Next". Windows 98 will find the driver on the driver disk. Click "Next". Windows will now find a second device on the modem. Make sure that the driver disk is still in the disk drive and click "Next." Windows will find the second driver. Click "Finish" to complete the installation.

When all necessary files are copied, the modem is configured. Windows 98 will assign the modem a COM port and IRQ line. **Proceed to Section 2.5.**

2.5 Software Installation and 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.

115,200 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 1**” modem type should be selected in your fax software, and a “**Rockwell**” modem type should be selected in your Voice 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 Using the Fax, Voice and Speakerphone Capabilities of the Modem

Your modem has built-in advanced FAX, voice and speakerphone functions. Please consult your FAX, voice and speakerphone software manual about procedures on using these features.

Voice and speakerphone functions include recording and playback of voice prompts (files) and utilizing your computer as a speakerphone. You may record or playback voice with your modem by attaching a microphone to the MIC jack and an amplified speaker to the SPK jack of your modem. Follow instructions in the FAX, Voice and Speakerphone software on recording /playback of voice prompts.

2.7 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 any case, the modem should respond with an **OK** or **0**. If it does not, either the modem may not have 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.

2.8 Using Your Modem

The communication software included with your modem product provides a user friendly interface to access the fax, voice, data and 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).

2.9 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
A	Manually answer incoming call.
D_	0 - 9, A-D, * and #
L	last number redial
P	pulse dialing
T	touch-tone dialing
W	wait for second dial tone
\$	wait for credit card tone
,	pause
@	wait for five seconds of silence
!	flash
;	return to Command Mode after dialing
E_	E0 Commands are not echoed
	E1 Commands are echoed
+++	Escape Characters - Switch from Data Mode to Command Mode

+MR=n	0	Disables reporting of modulation connection
	1	Enables reporting of modulation connection (+MCR and +MRR are transmitted)
	2	Enables reporting of modulation connection
+MS?		Displays the current Select Modulation settings
+MS=?		Displays a list of supported Select Modulation options
H_	H0	Force modem on-hook (hang up)
	H1	Force modem off-hook (make busy)
I_	I0	Default speed and controller version
	I1	Display factory ROM checksum
	I2	Internal memory test
	I3	Default speed and controller version
	I4	Datapump firmware version
	I9	Country code
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
N_	N0	Disable Autoscan mode
	N1	Enable Autoscan mode
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
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
V_	V0	Numeric responses

	V1	Word responses
W_	W0	Report DTE speed only
	W1	Report line speed, error correction protocol, and DTE speed.
	W2	Report DCE speed only
X_	X0	Hayes Smartmodem 300 compatible responses/blind dialing
	X1	Display connect message according to AT\V, 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
	X5	Same as X4
	X6	Same as X4
	X7	Same as X0 plus dial tone and busy signal detection
Z_	Z0	Reset and retrieve active profile 0
	Z1	Reset and retrieve active profile 1

3.4 Extended AT Commands

&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
	&D3	Resets modem after DTR toggle
&F_	&F	Recall factory default configuration
&G_	&G0	Guard tone disabled
	&G1	550 Hz guard tone
	&G2	1800 Hz guard tone
&K_	&K0	Disable flow control
	&K3	Enable RTS/CTS hardware flow control
	&K4	Enable XON/XOFF software flow control
&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
&V	&V0	Displays Active Profile
&W_	&W0	Stores the current configuration
%E_	%E0	Disable auto-retrain
	%E1	Enable auto-retrain

3.5 MNP/V.42/V.42bis Commands

%C_	%C0	Disable MNP Class 5 and V.42bis data compression
	%C1	Enable MNP Class 5 and V.42bis data compression
&Q_	&Q0	Direct data link only (same as \N1)
	&Q5	V.42 data link with fallback options
	&Q6	Normal data link only (same as \N0)
\N_	\N0	Normal data-link only
	\N1	Direct data-link only
	\N2	MNP data link only
	\N3	V.42/MNP/Normal data link
	\N4	V.42 data link only
	\N5	V.42/MNP/Normal data link

3.6 Fax Class 1 Commands

+FCLASS?	Service class indication
+FCLASS=?	Service class capabilities
+FCLASS=n	Service class selection
+FLO	Flow control
+FMI=?	Manufacturer identification
+FMM=?	Product Identification
+FMR=?	Version/Revision information
+FRH=n	Receive data with HDLC framing
+FRH=?	Receive HDLC data modulation
+FRM=n	Receive data
+FRM=?	Receive FAX modulation
+FRS=n	Receive silence
+FTH=n	Transmit data with HDLC framing
+FTH=?	Transmit HDLC data modulation
+FTM=n	Transmit data
+FTM=?	Transmit FAX modulation
+FTS=n	Stop transmission and wait

Section Four - S Registers

Your modem has 17 registers, designated S0 through S95. 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
S10	Carrier loss time	1-255 /0.1 second	14
S11	Touch-tone dialing speed	50-255 /milliseconds	95
S12	Escape character guard time	0-255 /0.02 second	50
S18	Test timer	0-255 /seconds	0
S29	Flash dial modifier time	0-255/0 .01 seconds	70
S30	Inactivity timer	0-255/minutes	0
S46	Data compression control		138
S95	Extended result codes	0-7/ Bits	0

Section Five - Result Codes

OK	0	CONNECT	1
RING	2	NO CARRIER	3
ERROR	4	CONNECT 1200	5
NO DIALTONE	6	BUSY	7
NO ANSWER	8	CONNECT 300 EC*	40
CONNECT 2400 EC*	10	CONNECT 4800 EC*	11
CONNECT 9600 EC*	12	CONNECT 7200 EC*	24
CONNECT 12000 EC*	25	CONNECT 14400 EC*	13
CONNECT 16800 EC*	86	CONNECT 19200 EC*	14
CONNECT 31200 EC*	83	CONNECT 21600 EC*	55
CONNECT 24000 EC*	56	CONNECT 26400 EC*	57
CONNECT 28800 EC*	58	CONNECT 31200 EC*	59
CONNECT 32000 EC*	70	CONNECT 33600 EC*	60
CONNECT 34000 EC*	71	CONNECT 36000 EC*	72
CONNECT 38400 EC*	28	CONNECT 38000 EC*	73
CONNECT 40000 EC*	74	CONNECT 42000 EC*	75
CONNECT 44000 EC*	76	CONNECT 46000 EC*	77
CONNECT 48000 EC*	78	CONNECT 50000 EC*	79

CONNECT 52000 EC*	80	CONNECT 54000 EC*	81
CONNECT 56000 EC*	82	CONNECT 57600 EC*	18
CONNECT 58000 EC*	83	CONNECT 60000 EC*	84
CONNECT 115200 EC*	87		

* EC denotes one of the following extensions depending on the error control method used when extended result codes are enabled.

V42bis - V.42 error correction and B.42bis data compression

V42 - V.42 error correction only

MNP 5 - MNP Class 4 error correction and MNP Class 5 data compression

MNP 4 - MNP Class 4 error correction only

NoEC - Error correction is off

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 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.
 2. 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.
-

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 2.3 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. Make sure the correct data format (data bits, stop bits, and parity bits) and flow control (RTS/CTS) are being used.
2. Make sure the correct terminal emulation mode is being used (see communication software manual).

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.

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.90 (56Kbps),K56Flex, V.34, 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:	PCI bus Rev. 2.1
FAX Group:	Group III Send/Receive Standard
FAX Command set:	EIA/TIA-578 Service Class 1
Data format:	300-115200 bps
Power:	0.75 W
Temperature:	0 to 55 degrees C (Operating)

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 is not 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 cover is removed from the computer.

First Edition

GZ/DGR - Version 1.0

