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**High Performance  
V.90/K56flex/V.34+/V.42bis  
56000BPS  
Plug & Play Internal  
Data/Fax/Modem**

# ***User's Manual***

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## Section One - Introduction

This 56 kbps\* Plug and Play FAX/Data Modem connects your computer to all popular high speed modems available today. Its incorporates "V.90/K56Flex" (56Kbps) technology to provide increased download speeds using regular telephone lines. The modem incorporates Plug and Play for ease of installation.

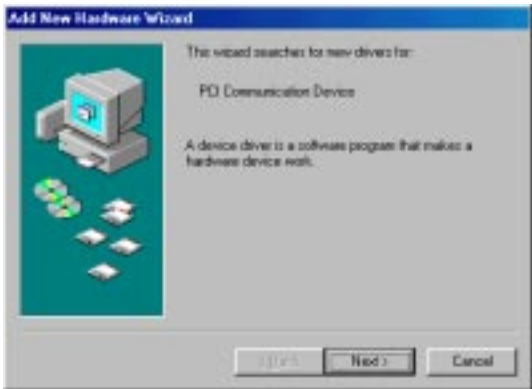
This manual describes the AT commands and S-registers so that your system can be customized for a particular operating environment.

*\*Note: K56flex is capable of downloading at 56kbps. However, current FCC regulations limit its speeds to 53Kbps.*

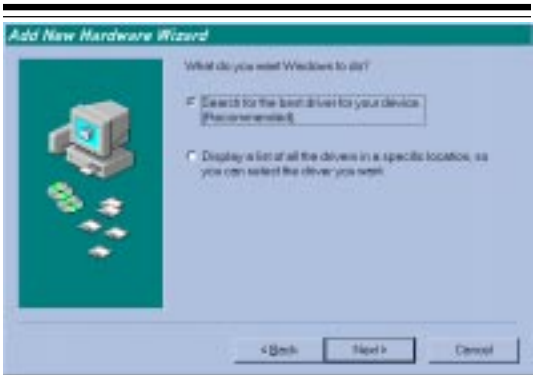
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## Section Two - Installation Guide

1. Turn off power to Windows 98 PC, remove PC cover, insert card to an available PCI slot, close cover, turn on power.
2. When Windows 98 loads, it will detect the new hardware and ask for a driver. the following window should appear.



3. Click Next and you should see:



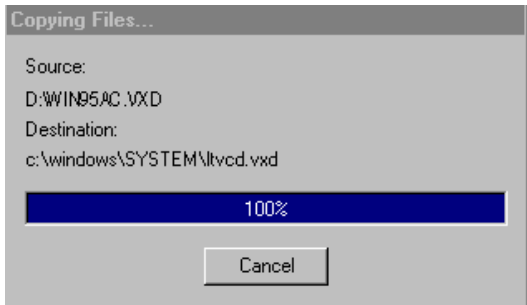
4. Select "Search for the best driver for your device" Option. Click Next and you should see:



5. Insert the CD-ROM that comes with your Modem into the CD-ROM drive. Make sure the CD-ROM drive check box is checked. Leave all other check boxes blank. Click Next and you should see:



6. Click Next and you should see the following.



7. Wait until Windows 98 finishes copying all the required files.



8. When you see the above window, Windows 98 has already finished copying all the files. Click Finish and you should see the following window.



9. Your Modem is now installed in Windows 98.

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## Section Three - AT Command Set

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### 3.1 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 in your communications software is set to one of the above speeds.

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### 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.

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### 3.3 Basic AT Commands

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

<b>Command</b>	<b>Function</b>
<b>A</b>	Manually answer incoming call.
<b>A/</b>	Repeat last command executed. <b>Do not</b> precede <b>A/</b> with <b>AT</b> or follow with <b>ENTER</b> .
<b>D_</b>	0 - 9, A-D, # and *
<b>L</b>	last number redial
<b>P</b>	pulse dialing
<b>T</b>	<b>touch-tone dialing</b>
<b>W</b>	wait for second dial tone
<b>,</b>	pause
<b>@</b>	wait for five seconds of silence

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	!	flash
	;	return to Command Mode after dialing
<b>E_</b>	<b>E0</b>	Commands are not echoed
	<b>E1</b>	<b>Commands are echoed</b>
<b>+++</b>		Escape Characters Switch from Data Mode to Command Mode
<b>H_</b>	<b>H0</b>	Force modem on-hook (hang up)
	<b>H1</b>	Force modem off-hook (make busy)
<b>I_</b>	<b>I0</b>	Reports product code
	<b>I1</b>	Reports Pre-Computed checksum
	<b>I2</b>	Internal memory test
	<b>I3</b>	Firmware ID
	<b>I4</b>	Reports data pump model and internal code revision
<b>L_</b>	<b>L0</b>	Low speaker volume
	<b>L1</b>	<b>Low speaker volume</b>
	<b>L2</b>	Medium speaker volume
	<b>L3</b>	High speaker volume
<b>M_</b>	<b>M0</b>	Internal speaker off
	<b>M1</b>	<b>Internal speaker on until carrier detected</b>
	<b>M2</b>	Internal speaker always on
	<b>M3</b>	Internal speaker on until carrier detected and off while dialing
<b>O_</b>	<b>O0</b>	Return to Data Mode
	<b>O1</b>	Return to Data Mode and initiate an equalizer retrain
<b>P</b>		Set Pulse dial as default
<b>Q_</b>	<b>Q0</b>	<b>Modem sends responses</b>
	<b>Q1</b>	Modem does not send responses
<b>Sr?</b>		Read and display value in register r.
<b>Sr=n</b>		Set register r to value n (n = 0-255).
<b>T</b>		<b>Set Tone Dial as default</b>
<b>V_</b>	<b>V0</b>	Numeric responses
	<b>V1</b>	<b>Word responses</b>
<b>X_</b>	<b>X0</b>	Hayes Smartmodem 300 compatible responses/blind dialing.
	<b>X1</b>	Same as X0 plus all CONNECT responses/blind dialing
	<b>X2</b>	Same as X1 plus dial tone detection
	<b>X3</b>	Same as X1 plus busy detection/blind dialing

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	<b>X4</b>	<b>All responses and dial tone and busy signal detection</b>
<b>Z_</b>	Z0	Reset and retrieve active profile 0

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### 3.4 Extended AT Commands

<b>&amp;C_</b>	&C0	Force Carrier Detect Signal High (ON)
	<b>&amp;C1</b>	<b>Turn on CD when remote carrier is present</b>
<b>&amp;D_</b>	&D0	Modem ignores the DTR signal
	&D1	Modem returns to Command Mode after DTR toggle
	<b>&amp;D2</b>	<b>Modem hangs up, returns to the Command Mode after DTR toggle</b>
<b>&amp;F_</b>	&F	Recall factory default configuration
<b>&amp;G_</b>	<b>&amp;G0</b>	<b>Guard tone disabled</b>
	&G1	Guard tone disabled
	&G2	1800 Hz guard tone
<b>&amp;P_</b>	&P1	Select 33 ratio M/B at 10pps
	&P3	Same as &P1 setting but at 20 pulses per second
<b>&amp;V</b>	&V0	Displays Active and Stored Profiles
<b>&amp;W_</b>	&W0	Stores the active profile as Profile 0
<b>%E_</b>	<b>%E0</b>	<b>Disable auto-retrain</b>
	%E1	Enable auto-retrain
<b>+MS?</b>		Displays the current Select Modulation settings
<b>+MS=?</b>		Displays a list of supported Select Modulation options
<b>+MS=a,b,c,d,e,f</b>		Select modulation. <b>a,b,c,d,e,f default = V.90, 1, 75, 33600, 75,56000.</b> Parameter $i\{a_i\}$ specifies the modulation protocol desired where: B103=Bell103, B212=Bell212, V21=V.21, V22=V.22, V22B=V.22bis, V23C=V.23, V32=V.32, V32B=V.32bis, V34=V.34, K56FLEX=K56FLEX, V.90=V.90. Parameter $i\{b_i\}$ specifies automode operations where=automode disabled, 1=automomod enabled. Parameter $i\{c_i\}$ specifies the minimum connected speed of the transmit direction. Parameter $i\{d_i\}$ specifies the maximum connected speed of the transmit

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direction. Parameter  $i\{e_i\}$  specifies the minimum connected direction. Parameter  $i\{f_i\}$  specifies the maximum connected direction.

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

- +ES? Displays the current Error Control and Synchronous Mode Selection settings.
- +ES=? Displays a list of supported Error control and Synchronous Mode Selection options.
- +ES=a,b,c Error Control and Synchronous Mode Selection where: a=1-4, b=0,2-4, c=1,2,4,5,6. **a,b,c default=3,0,2.** Parameter "a" specifies the initial requested mode of operation where 1=Normal Mode, 2=V.42 without Detection Phase, 3=V.42 with Detection Phase, 4=MNP. Parameter "b" specifies the acceptable fallback mode of operation where: 0=LAPM, MNP, or Normal Mode error control optional, 2=LAPM or MNP error control required, 3=LAPM error control required, 4=MNP error control required. Parameter "c" specifies the acceptable fallback mode of operation where: 1=Normal Mode, 2=LAPM, MNP, or Normal Mode error control optional, 4=LAPM or MNP error control required, 5=LAPM error control required, 6=MNP error control required.
- +ER? Displays the current Error control reporting settings.
- +ER=? Displays a list of supported Error control reporting options.
- +ER=n      n=0 Error control reporting disabled.  
            n=1 Error control reporting enabled. (Default.)
- +DS? Displays the current Data Compression settings.
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+DS=?		Displays a list of supported Data compression options.
+DS=a,b,c,d		Data Compression. <b>a,b,c,d default =3,0,2048,32.</b> Parameter <i>a</i> specifies the desired direction(s) of operation of operation of the data compression function where:0=no compression, 3=both. Parameter <i>b</i> specifies whether or not the modem should continue to operate if the desired result is not obtained where:0= Do not disconnect if V.42bis not negotiated by the remote modem as specifies in a. Parameter <i>c</i> the maximum number of dictionary entries (2048 entries) which should be negotiated. Parameter <i>d</i> specifies the maximum string length (32bytes) to be negotiated. (V.42bis P2)
+DR?		Displays the current Data Compression Reporting setting.
+DR=?		Displays a list of supported Data Compression reporting options.
+DR=n	n=0	Data Compression reporting disabled.
	n=1	Data Compression reporting enabled.
%E_	%E0	Disable Line Quality Monitor, Auto-Retrain,and Auto-Rate Renegotiation.
	%E1	Enable Line Quality Monitor,Auto-retrain,and Auto-Rate Renegotiation.
%L		Line signal Level
%Q		Line Signal Quality

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### 3.6 Fax Class 1 Commands

+FAE=n	Data/Fax Auto Answer
+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

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**+FTS=n** Stop transmission and wait

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## Section Four - S Registers

Your modem has 13 registers, designated S0 through S29. Table 3-1 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**

<b>Register</b>	<b>Function</b>	<b>Range/units</b>	<b>Default</b>
<b>S0</b>	Auto-answer Ring	0-255 /rings	0
<b>S1</b>	Ring Counter	0-255 /rings	0
<b>S2</b>	Escape Character	0-255 /ASCII	43
<b>S3</b>	Line Termination Character	0-127 /ASCII	13
<b>S4</b>	Response Formatting Character	0-127 /ASCII	10
<b>S5</b>	Command Line Editing Character	0-32 /ASCII	8
<b>S6</b>	Wait Time for Dial Tone	2-255 /seconds	2
<b>S7</b>	Wait Time for Carrier	1-255 /seconds	50
<b>S8</b>	Pause Time for Dial Delay Modifier	0-255 /seconds	2
<b>S10</b>	Carrier Loss Disconnect Time	1-255 /0.1 second	14
<b>S11</b>	DTMF Tone Duration	50-255 /0.001seconds	95
<b>S12</b>	Escape Prompt Delay	0-255 /0.02 second	50
<b>S29</b>	Flash Dial Modifier Time	0-255 /10milliseconds	70

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## Appendix A - Specifications

Communication Std: V.90,K56flex (56k model) for highest Internet connection rates, 33.6kbps,31.2kbps,V.34, V.32bis,V.22bis,V.22A/B,V.23,and V.21;Bell 212A and 103

Data Compression: V.42bis/MNP5

FAX Group: Group 3 send and receive and T.30 protocol.

FaX Correction: EIA/TIA 578 Class 1, Class 1.0 (T.31) fax

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Error Correction:	V.42/MNP2,3,4
Other Function:	Plug and Play ,ACPI Power management compliantly .
Host Interface:	Plug and Play PCI bus interface.
Transmit Level:	-11dBm
Receiver Sensitivity:	-32dBm(V.34);-36dBm(all other protocols)
DTE Speeds:	300-115200bps
Operating Temperature:	-0 - + 55 degrees C
Storage Temperature:	-50 - + 70 degrees C

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## Appendix B - Specifications

Installation	<p>Restart the computer after plugging in the modem. When Windows detects the modem, the message "This wizard will complete the installation of:PCI Serial Controller" is displayed.</p> <p>Click "next" other location", then enter then path to the drivers, then click "OK".</p> <p>Windows displays "Windows found the following updated driver for this device:Rockwell PCI Modem Enumerator".</p> <p>Click "Finish" and Windows displays "Please insert the disk labeled WIN95 Installation Disk, and then click OK."</p> <p>Click "OK" and enter the path of the drivers again. Installation should then complete automatically.</p>
Uninstalling	<p>Click on the "Add/Remove Programs" icon under START&gt;SETTINGS&gt;CONTROL PANEL.</p> <p>Select "Rockwell HCF 56k Modem" under the INSTALL/UNINSTALL tab and click the "ADD/REMOVE" button. When completed successfully, the INF files, VXD's, and registry entries caused by the modem installation are deleted from the hard disk. The system should be rebooted at this point if a modem is to be reinstalled.</p>

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**Federal Communications Commission (FCC) 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 receiver.
- Connect the equipment into an outlet on a different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.