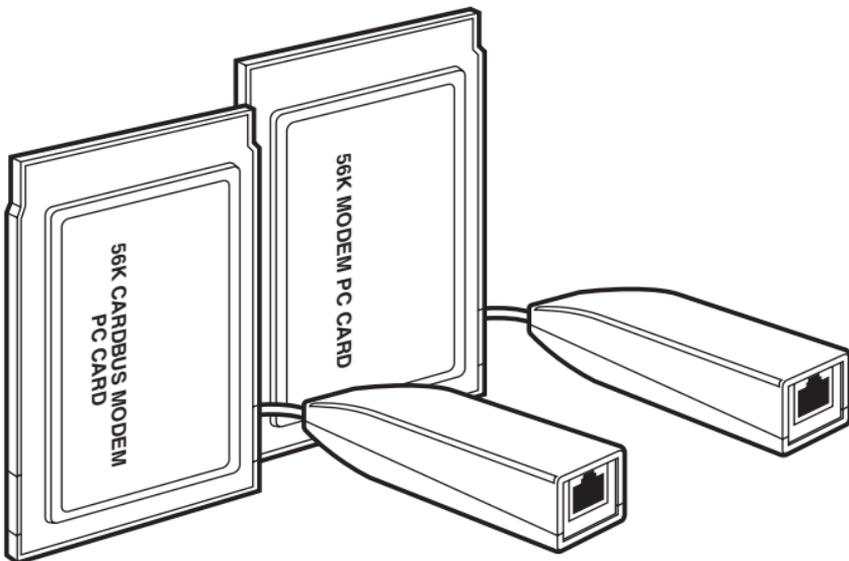




# 56K CardBus Modem PC Card

## 56K Modem PC Card



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### CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX** (outside U.S. call **724-746-5500**)

FREE technical support 24 hours a day, 7 days a week: Call **724-746-5500** or fax **724-746-0746**

Mailing address: **Black Box Corporation**, 1000 Park Drive, Lawrence, PA 15055-1018

Web site: [www.blackbox.com](http://www.blackbox.com) • E-mail: [info@blackbox.com](mailto:info@blackbox.com)

**FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA  
RADIO-FREQUENCY INTERFERENCE STATEMENTS**

*Class B Digital Device.* This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular 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. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one 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 circuit different from that to which the receiver is connected.
- Consult an experienced radio/TV technician for help.

**Caution:**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

*This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.*

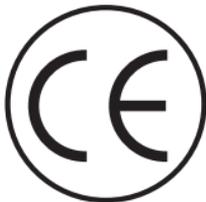
*Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.*

### EUROPEAN UNION DECLARATION OF CONFORMITY

The manufacturer declares that this equipment conforms to the following standards:

- EN 55022 (1987): “Limits and methods of measurements of radio interference characteristics of information technology equipment.”
- EN 50082-1 (1992): “Electromagnetic compatibility - Generic immunity standard for residential, commercial, and light industrial equipment.”

These products herewith comply with the requirements of the EMC Directive 89/336/EEC. The products were tested in a typical configuration.



### REPEAT-CALLING STATEMENT

The host computer must not initiate repeated call attempts within intervals shorter than 30 seconds. It is the user's responsibility to make sure that their software is set to handle repeat calling correctly.

## **NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT**

### **INSTRUCCIONES DE SEGURIDAD**

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
  - A: El cable de poder o el contacto ha sido dañado; u
  - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
  - C: El aparato ha sido expuesto a la lluvia; o
  - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
  - E: El aparato ha sido tirado o su cubierta ha sido dañada.

**FEDERAL COMMUNICATIONS COMMISSION MODEM STATEMENT**

1. The Federal Communications Commission (FCC) has established rules which permit this device to be directly connected to the telephone network with standardized jacks. This equipment should not be used on party lines or coin lines.
2. If this device is malfunctioning, it may also be causing harm to the telephone network; this device should be disconnected until the source of the problem can be determined and until the repair has been made. If this is not done, the telephone company may temporarily disconnect service.
3. If you have problems with your telephone equipment after installing this device, disconnect this device from the line to see if it is causing the problem. If it is, contact your supplier or an authorized agent.
4. The telephone company may make changes in its technical operations and procedures. If any such changes affect the compatibility or use of this device, the telephone company is required to give adequate notice of the changes.
5. If the telephone company requests information on what equipment is connected to their lines, inform them of:
  - a. The telephone number that this unit is connected to.
  - b. The ringer equivalence number.
  - c. The USOC jack required: RJ-11C.
  - d. The FCC registration number.

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

6. In the event of an equipment malfunction, all repairs should be performed by your supplier or an authorized agent. It is the responsibility of users requiring service to report the need for service to the supplier or to an authorized agent.

### INDUSTRY CANADA MODEM STATEMENT

The Industry Canada (IC) label identifies certified equipment. This certification means that the equipment meets certain telecommunications-network protective, operation, and safety requirements. Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should 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. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly (extension cord). 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—in this case, Black Box. 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.

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 total of the load numbers of all the devices does not exceed 100.

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# 1. Specifications

## **Compliance —**

EMI/RFI: CE (EN 55022 and EN 50082-1), FCC Part 15

Subpart J Class B, IC Class/classe B;

Phone-system compatibility: FCC Part 68;

Also certified by various European PTTs

**FCC Part 68 Registration Number —** Both models share the registration number 4W91SR-32427-M5-E

**Ringer-Equivalence Number —** Both models are 0.88 B

## **Standards and Data Rates —**

PC Card:

MD401A: 32-bit CardBus PC Card, Type II, 3.3V;

MD402A: 16-bit PC Card, Type II;

Modem commands: Full AT command set;

Error correction: ITU V.42 LAPM and MNP 2 through 4;

Data compression: ITU V.42 bis and MNP 5;

Video-ready modem (VRM): ITU V.80;

**Standards and Data Rates (continued) —**

## Modem communication:

Downstream only: ITU V.90 and K56flex™ at up to 56,000 bps (FCC rules limit speeds to ~53,000 bps in the U.S.);

“V.34+” at up to 33,600 bps;

ITU V.34 at up to 28,800 bps;

“V.32 terbo” at up to 19,200 bps;

ITU V.32 bis at up to 14,400 bps;

ITU V.32 at up to 9600 bps;

ITU V.22 bis at up to 2400 bps;

ITU V.22 A/B and V.23 at 1200/600 bps;

ITU V.21 at up to 300 bps;

Bell 212A at 1200 bps;

Bell 103J at up to 300 bps;

Fax commands: ITU Group 3, command sets for ITU Classes 1 and 2 (TIA-578 and -592);

## Fax communication:

ITU V.17 at up to 14,400 bps;

ITU V.29 at up to 9600 bps;

ITU V.27 ter at up to 4800 bps;

ITU V.21 channel 2 at up to 300 bps

## 56K CARDBUS MODEM PC CARD AND 56K MODEM PC CARD

**Compatibility** — Compatible with all popular communication software

**Processing and Memory** —

16550 UART with buffer memory;  
NVRAM for user profiles plus three (MD402A) or four (MD401A) stored phone numbers

**User Controls** — Full set of AT commands, fax commands, and S-registers; also comes with driver software for Windows and (MD402A only) MS-DOS

**Indicators** — None

**Diagnostics** — Power-up self-test

**Connectors** —

Both models: RJ-11C female (on detachable dongle) to phone line;  
MD401A: Type II CardBus PC Card female to computer;  
MD402A: PC Card Type II female to computer

**Temperature Tolerance** — 32 to 122°F (0 to 50°C)

**Humidity Tolerance** — Up to 90% noncondensing

**Power** —

MD401A: 3.3V from CardBus:

86 mA active (284 mW);

98 mA transmit (324 mW);

16 mA sleep (53 mW);

MD402A: 5V from PC Card bus:

220 mA active (1100 mW);

20 mA sleep (100 mW)

**Size** — 0.2"H x 2.1"W x 3.4"D (0.5 x 5.4 x 8.5 cm)

**Weight** — Including phone-line pigtail:

MD401A: 3.6 oz. (102 g);

MD402A: 2.4 oz. (66 g)

## 2. Introduction

The 56K Modem PC Card (MD402A) is the ideal high-performance data/fax modem solution for portable-PC users running DOS or Windows®. It plugs into any Type II PC Card slot.

The 56K CardBus Modem PC Card (MD401A) is designed for Microsoft® Windows environments only. It uses high-bandwidth 32-bit CardBus busmastering architecture to make the best use of modem speeds up to 56 kbps. It complies with the PC98 and ACPI specifications, and plugs into any Type II CardBus PC Card slot. Because it uses 3.3-volt technology and advanced power management, it consumes very little energy and is easier on your PC's battery than other cards.

You won't have to change your communication software to use these cards. They are both ITU V.90-compliant modems installed as Plug-and-Play COM ports, plus they respond to an extended AT command set, so they fully support all recent fax/modem software. They even have V.80 video-ready interfaces to make videoconferencing over regular phone lines easier. And they are flash-upgradable, so they'll be able to support any *future* ITU 56K modem standards too.

These cards support downstream speeds up to 56 kbps to access email, download data, or fax documents using the fastest available modem technology. Their support for error correction and data compression means better reliability *and* throughput. To cut down even more on their demands on your computer's battery, if they are idle for a set period of time, they automatically go into "sleep" mode, which uses a minuscule amount of power. They're certified and approved for use in many countries, so you can use them to get easy, dependable connections around the world.

Besides this manual and a diskette with drivers and documentation, both cards come with a detachable dongle which has a RJ-11C phone jack on it, as well as a 6-ft. (1.8-m) flat-satin patch cable that can run from the dongle to a telephone wall jack.

#### **NOTE**

Keep in mind that 56 kbps is the theoretical maximum speed of downstream (incoming from the network) transmissions only, and requires compatible modems at both ends of the connection. Lower-quality telephone lines might not be able to carry data at that speed. Also, in some countries (including the U.S.), phone-network regulations require lower maximum line speeds. Upstream transmissions (from the modem to the network) are always limited to a maximum data rate of 33.6 kbps.

## 3. Installation and Operation

To install the 56K CardBus Modem PC Card or 56K Modem PC Card in a PC running a version of Windows, first install the Card's Online User Guide:

1. With the computer ON and Windows running, put the Card's software diskette in your PC's floppy disk drive.
2. Click the Windows **Start** button, then click on **Run**.
3. Type "A:\SETUP" and click on **OK**.

The Online User Guide will be automatically installed and run. Follow the Help utility's on-screen instructions to install and set up the Card.

Once the Card is installed, it will normally be controlled transparently by your communication software. If you need to control it directly with AT commands or by setting S-registers, see the **Appendix**.

*MD402A only:* To install the 56K Modem PC Card in a PC running MS-DOS, consult the README.TXT file on the Card's software diskette.

## 4. Troubleshooting

### 4.1 Calling Black Box

If your 56K CardBus Modem PC Card or 56K Modem PC Card seems to be malfunctioning, *do not attempt to alter or repair it*. It contains no user-serviceable parts. Call Black Box Technical Support at 724-746-5500; the problem might be solvable over the phone.

Before you call, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem;
- when the problem occurs;
- the components involved in the problem;
- any particular application that, when used, appears to create the problem or make it worse; and
- the results of any testing you might have already done.

### 4.2 Shipping and Packaging

If you need to transport or ship your Card:

- Package it carefully. We recommend that you use the original container.
- If the shipping is return- or repair-related, include everything you received with the Card when you pack it. Contact Black Box to get a Return Authorization (RA) number.

## Appendix: Direct Modem Control

**Section A.1** lists the AT commands that can be sent directly to your modem. **Section A.2** lists the user-settable S-registers that contain the modem's configuration data. **Section A.3** lists the result codes that the modem will report under various conditions. Finally, **Section A.4** lists the factory-default settings of important commands and registers.

### A.1 AT Commands

The 56K Modem PC Card and 56K CardBus Modem PC Card use a standard command set for modem operation in command mode. These alphanumeric commands, called AT commands because most of them begin with the two characters "AT," are executed by typing the command followed by any necessary argument and pressing [Enter].

Command	Function
A/	Repeat previous command
ATA	Answer the phone
ATB	Communication standard setting
ATC	Carrier control

<b>Command</b>	<b>Function</b>
ATD	Dial phone number
ATE	Echo
ATF	On-line data character echo
ATH	Go on- or off-hook
ATI	Request ID information
ATL	Monitor speaker volume
ATM	Monitor speaker mode
ATN	Modulation handshake
ATO	Return on-line to data mode
ATP	Select pulse dialing
ATQ	Result-code control
ATT	Select tone dialing
ATV	DCE response format
ATW	Result code option
ATX	Result-code selection and call progress
ATY	Long-space disconnect
ATZ	Recall stored profile
AT&B	V.32 auto retrain
AT&C	Data Carrier Detect (DCD) control
AT&D	Data Terminal Ready (DTR) control
AT&F	Local factory settings

<b>Command</b>	<b>Function</b>
AT&G	V.22bis guard tone control
AT&J	Auxiliary relay options
AT&K	Local flow control
AT&M	Asynchronous communications mode
AT&P	Pulse-dial make-to-break ratio
AT&Q	Asynchronous communications mode
AT&S	Data Set Ready (DSR) control
AT&T	Self-testing
AT&V	View active configuration or stored profile
AT&W	Store current configuration
AT&Y	Select stored profile for hard reset
AT&Z <i>n=x</i>	Store telephone number in slot <i>n</i> (MD401A: <i>n</i> = 0, 1, 2, or 3; MD402A: <i>n</i> = 0, 1, or 2)
AT% <i>B</i>	View numbers in blacklist
AT% <i>C</i>	Data-compression control
AT% <i>E</i>	Enable/disable auto-retrain and fallback/fall-forward
AT% <i>X</i>	Enable/disable redialing
AT\A	Select maximum MNP block size

<b>Command</b>	<b>Function</b>
AT\B	Transmit break
AT\G	Remote modem port flow control
AT\J	Adjust bits-per-second rate
AT\K	Break control
AT\N	Select error-control mode
AT\Q	Local flow control
AT\R	Ring Indicator (RI) control
AT\T	Inactivity timer
AT\V	Protocol result code
AT\X	X-ON/X-OFF pass-through
AT-C	<i>MD401A only</i> : Data calling tone
AT-SSE	<i>MD401A only</i> : DSVD

## A.2 S-Registers

The 56K CardBus Modem PC Card and 56K Modem PC Card use a series of programmable memory locations called “S-registers.” The S-registers contain parameters which control modem operation and AT-command performance.

<b>S-Register</b>	<b>Function</b>
S0	Number of rings after which the modem should auto-answer
S1	Ring counter
S2	AT escape character
S3	Command-line termination character
S4	Response-formatting character
S5	Command-line editing character
S6	Wait before dialing
S7	Connection completion timeout
S8	Comma dial-modifier time
S10	Automatic disconnect delay
S11	DTMF dialing speed
S12	Escape guard time
S14	General bitmapped options status
S21	V.24/general bitmapped options status

<b>S-Register</b>	<b>Function</b>
S22	Results bitmapped options status
S24	Timer to control sleep mode
S28	V.34 modulation enable/disable
S30	Inactivity timer
S32	Synthetic ring volume
S33	Synthetic ring frequency
S35	Data calling tone
S36	Negotiation fallback
S37	Dial line rate
S38	56K dial line rate
S42	<i>Auto rate (for test and debugging purposes only)</i>
S43	Auto mode
S48	LAPM error control and feature negotiation
S89	Timer to control sleep mode
S90	Local phone status
S91	Line transmit level

### A.3 Result Codes

The 56K CardBus Modem PC Card and 56K Modem PC Card will report the results of various commands and procedures by sending a “result code” to the PC. You can use the ATQ command to control whether the code the modem sends is a two-digit number or a text string.

The “EC” shown in the list as being at the end of some of the CONNECT verbose codes is shorthand for any of several actual error-control/data-compression codes that actually appear: “V42BIS” for V.42 error control with V.42 bis compression, “V42” for V.42 error control without compression, “MNP” for MNP 5 data compression, or “NOEC” for no error control or compression. (These extended codes only appear when the Extended Result Codes option is enabled.)

<b>Numeric Code</b>	<b>Verbose (Text) Code</b>
00	OK
01	CONNECT
02	RING
03	NO CARRIER
04	ERROR

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<b>Numeric Code</b>	<b>Verbose (Text) Code</b>
05	CONNECT 1200 EC
06	NO DIAL TONE
07	BUSY
08	NO ANSWER
10	CONNECT 2400 EC
11	CONNECT 4800 EC
12	CONNECT 9600 EC
13	CONNECT 14400 EC
14	CONNECT 19200 EC
18	CONNECT 57600 EC
24	CONNECT 7200 EC
25	CONNECT 12000 EC
28	CONNECT 38400 EC
40	CONNECT 300 EC
55	CONNECT 21600 EC
56	CONNECT 24000 EC
57	CONNECT 26400 EC
58	CONNECT 28800 EC
59	CONNECT 31200 EC
60	CONNECT 33600 EC

<b>Numeric Code</b>	<b>Verbose (Text) Code</b>
86	CONNECT 16800 EC
87	CONNECT 115200 EC
88	DELAYED
89	BLACKLISTED
90	BLACKLIST FULL

**A.4 Factory-Default Settings of Some Important Options**

<b>Option</b>	<b>Default Setting</b>	<b>Command or Register</b>
Std. up to 1200 bps	Bell	ATB
Command char. echo	Enabled	ATE
Speaker volume	Medium	ATL
Speaker control	On until carrier	ATM
Result codes	Enabled	ATQ
Dial type	Tone	ATT, ATP
Result-code form	Text	ATV
Extended result codes	Enabled	ATX
Dialtone detect	Enabled	ATX
Busy tone detect	Enabled	ATX
LSD action	Standard RS-232	AT&C
DTR action	Standard RS-232	AT&D
V.22 bis guard tone	Disabled	AT&G
Flow control	Hardware	AT&K
Error-control mode	V42, MNP, buffer	ATN
Data compression	V42 bis/MNP5	AT% <b>C</b>
Auto-answer ring #	0	S0
AT escape character	43	S2
Carriage-return char.	13	S3
Linefeed character	10	S4
Backspace character	8	S5
Blind-dial pause	2 seconds	S6

Option	Default Setting	Command or Register
No-answer timeout	50 seconds	S7
Pause time for comma	2 seconds	S8
No-carrier discovery	2000 msec	S10
DTMF dial speed	95 msec	S11
Escape guard time	1000 msec	S12
Data calling tone	Disabled	S35
Line rate	33,600 bps	S37
<i>MD401A</i> : DSVD mode	Disabled	AT-SSE

Stored Phone Numbers:

AT&Z0= *[empty]*

AT&Z1= *[empty]*

AT&Z2= *[empty]*

*MD401A only*: AT&Z3= *[empty]*

# Legal Information

## NOTICES AND DISCLAIMERS

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*Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.*

**SOFTWARE LICENSE AGREEMENT**

The manufacturer grants you a non-exclusive license to use the copies of the software program supplied with this product on the following terms:

You **may**:

- Use the software program on any computer or network, but only in conjunction with the Modem PC Card for which it was designed.
- Permit other individuals to use the software program, either directly or on a computer network, but only if there is no more than one user of the software at a time for every Modem PC Card that the software is being used with.
- Make one backup or archival copy of the software, as long as that copy carries all proprietary notices associated with the original.

You **may not**:

- Modify, transfer, reverse-engineer, decompile, disassemble, create derivative works based on, or copy (except for archival purposes) the program or its accompanying documentation.
- Rent, transfer, sublicense, or grant any rights in the program or accompanying documentation, including any time-sharing arrangement, without the prior written consent of the manufacturer or its authorized agents.
- Remove any proprietary notices, labels, or marks on the program or its accompanying documentation.

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## NOTES