

V.34

On-Line *EXPRESS*

PRODUCT CODE:
MV.34AI
FDSP34AI

Before You Begin your Installation

The product you have purchased is designed to be easily installed into most IBM PC or compatible systems. Many products have large, easy-to-read legends to allow for the easy configuring of the product. This installation manual contains detailed instructions. Most included software has automatic installation programs to place the software correctly onto your computer. However, as all computers are configured differently, you may be required to perform some basic DOS or Windows tasks. If you are not familiar with basic DOS commands such as DIR, CD, or EDIT, you should check your DOS manual, or seek assistance from you local computer dealer to install the product.



How to get Technical Assistance

The dealer that you purchased this product or your computer from is



the first place you should go for technical assistance. The dealer is usually the most qualified source of help, and is most familiar with your system and how this product

should be installed. Many dealers have customer service and technical support programs, with varying levels of support offered, depending on your needs and computer knowledge. ***Please contact the dealer first whenever a problem occurs.***

If your Dealer Can't Assist you

If you can't get assistance from your dealer, the manufacturer provides varying levels of technical assistance as summarized on the following pages.

The Standard Free Technical Support number is for quick answers to specific inquiries on product features and technical questions (call **407-241-8088**; M-F, 8 am to 6:30 pm EST). Direct access to technical support representatives is provided on a limited basis. If you require immediate attention or in-depth help with the installation of the product, please call our 900-priority support number for service. This number gives you immediate access to senior-level technicians. The number is **900-555-4900**. You will be charged \$2.00 per minute. The charges will appear on your next phone bill.

Damaged or Missing Items

We use many world-class quality assurance programs to ensure the product you purchased is of the highest caliber. Sometimes, however, a component may be missing from the box, or is damaged or corrupt in some way. If this happens, immediately return the entire package to your place of purchase so you may exchange it for a new one. Your dealer should be able to provide you with an exchange far more quickly than by contacting us directly. If for some reason you are unable to return the product directly to its place of purchase, refer to the “Servicing Your Product” and “Warranty” sections in this manual for instructions.

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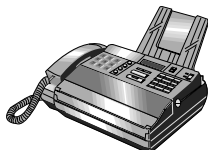
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Publication Date: March, 1996
Printed in the U.S.A.

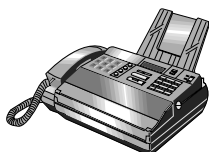
V34OLE.PM5



Boca BBS
407-241-1601



Technical Support Fax
407-997-2163



***Automated Fax
Retrieval System***
407-995-9456



***Standard Free
Technical Support***
407-241-8088



Priority Service
900-555-4900
(\$2 per minute)



On-Line Support!
CompuServe: GO BOCA
Internet:
email: support@boca.org
on the World Wide Web:
http://www.boca.org

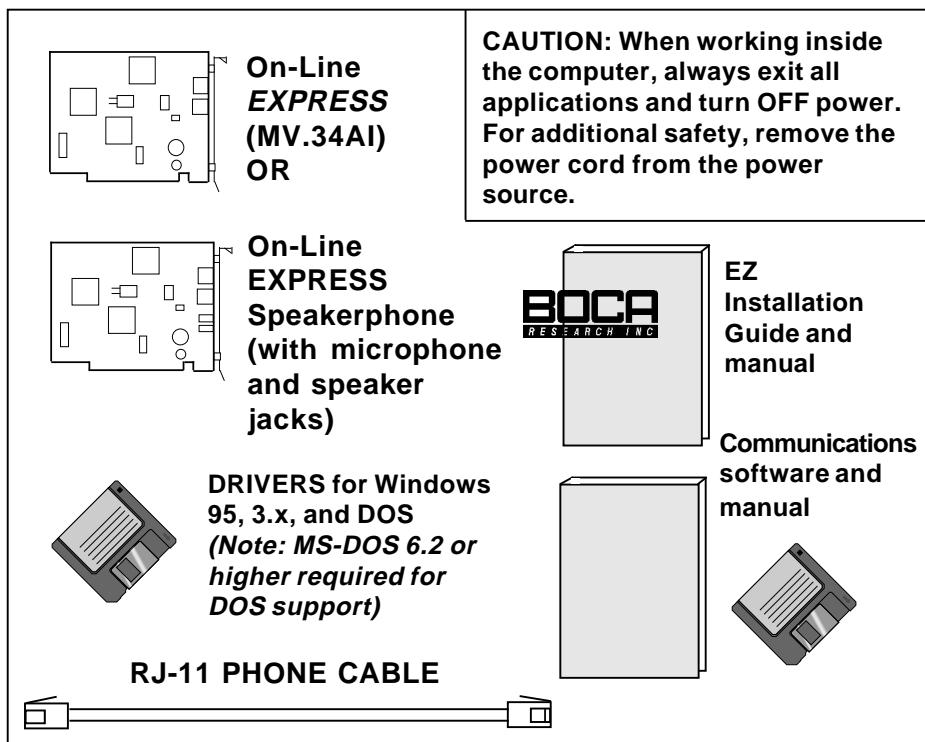
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Section One: Installation

Congratulations on the purchase of your On-Line *EXPRESS* V.34 (MV.34AI or FDSP34AI) from Boca Research, Inc. Get started with the Installation Overview which starts on the next page. The balance of the manual contains a product overview, troubleshooting, technical specifications, and a comprehensive AT command reference. Make sure you have received the items as shown below. If any items are missing or appear damaged, contact your dealer for assistance.

NOTE: YOU MUST INSTALL THE DRIVER DISKETTE SOFTWARE BEFORE INSTALLING THE MODEM.



Installation Overview for Windows 95 Users

1 YOU MUST INSTALL THE DRIVER DISKETTE SOFTWARE BEFORE INSTALLING THE MODEM!

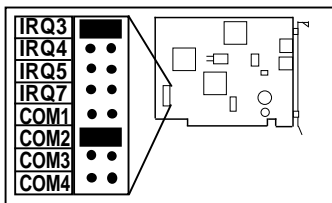


- Physically remove or disable existing modem.
- Start Windows 95 and insert driver diskette.
- Double-click **My Computer, Control Panel, and Add New Hardware**. Click **Next, No, Next, Ports, Next, Have Disk, OK, Next**.
- Note Input/Output range (COM setting) and Interrupt Request (IRQ):

03F8-03FF=COM1 02F8-02FF=COM2
03E8-03EF=COM3 02E8-02EF=COM4

DO NOT SELECT 'NEXT' YET

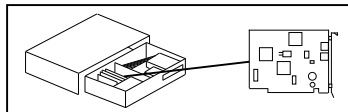
- ### 2
- Change the jumpers on the modem (if necessary) to match **EXACTLY** the settings recommended by Windows 95.



- Select **Next, Finish**. Select **YES** to restart, or go to **Start, Shutdown**. *
- Then power off.

* If you view the Device Manager information before shutting down and installing the modem, Windows 95 reports a problem with the modem port.

3

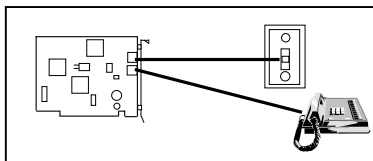


- With power **OFF**, remove system cover, choose an open ISA slot, and gently insert the modem card.

4

- Remove diskette, power back on, and start Windows 95
- Double-click **My Computer, Control Panel**. Click **Add New Hardware**. Click **Next, No, Next**.
- Select **Modem, Next**, then **Don't Detect my modem...**, then **Next**.
- Select **Boca Research** from manufacturer list.
- Select the **MV.34AI** from the list (or **FDSP34AI** only if you have the speakerphone model) .
- Then click **Next**, then select the COM port that was installed in Step 1.
- Select **Next, Finish**. Hardware installation is complete.
- Shut down computer before connecting phone cables.

5



- Connect supplied phone cable between **LINE** jack and wall jack.
- Connect existing phone cable between **PHONE** jack and phone (optional).
- If you have the FDSP34AI, refer to p. 10 or 27-28 for mic./spkr. connections.

6

Communications Software



- Power back on
- Install your communications software. Refer to the EZ Installation Guide foldout as well as the software documentation.

Installation Overview for Windows 3.x and DOS Users

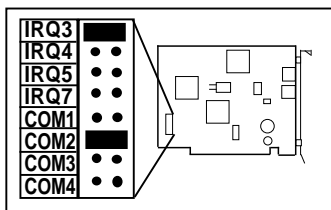
****NOTE: MS-DOS 6.2 or higher required for DOS support.****

1 YOU MUST INSTALL THE DRIVER DISKETTE SOFTWARE BEFORE INSTALLING THE MODEM!

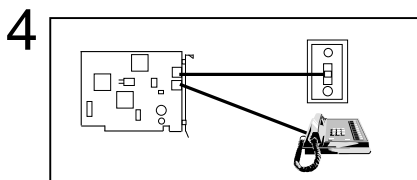
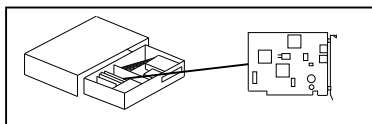


- Physically remove or disable existing modem.
- Turn on the computer and exit Windows
- Insert the driver diskette; from DOS type **A:INSTALL** (or **B:INSTALL**).
- Choose **EXPRESS Install**.

- ### 2
- Change the jumpers on the modem (if necessary) to match **EXACTLY** the settings recommended by EXPRESS Install.



- ### 3
- Make sure the jumpers are set as recommended by EXPRESS Install.
 - With power **OFF**, remove system cover, choose an open ISA slot, and gently insert the modem card.



- Connect supplied phone cable between LINE jack and wall jack.
- Connect existing phone cable between PHONE jack and phone (optional).

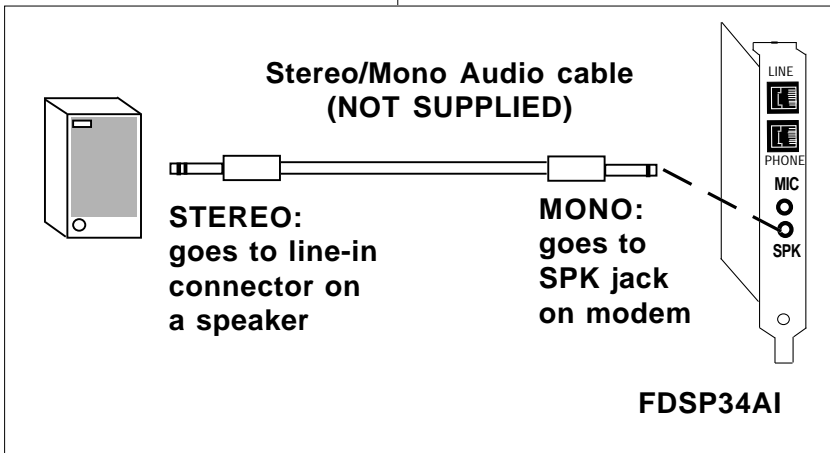
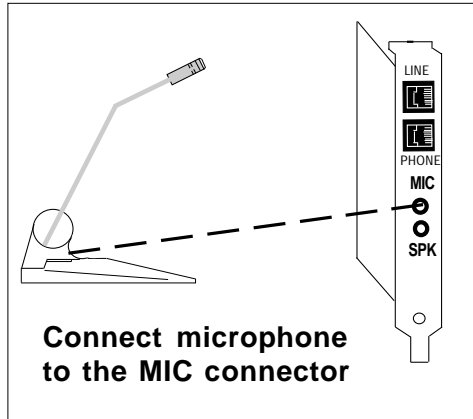
5 Communications Software



- Remove diskette from floppy drive.
- Power back on.
- Install your communications software. Refer to the EZ Installation Guide foldout as well as the software documentation.

NOTE: MV.34AI shown in these installation diagrams. If you have the FDSP34AI, see p. 10, or 27-28 for microphone and speaker connections.

Connecting Input/Output Devices to the FDSP34AI



Step-by-Step Installation for Windows 3.x/DOS

NOTE: You MUST install the driver diskette software BEFORE installing the modem. (MS-DOS 6.2 or higher required for DOS support).

Installing the Driver

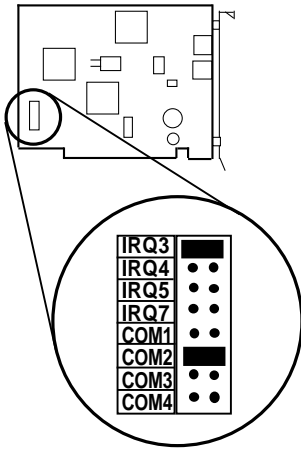
1. Remove or disable any existing modem in your computer. If you are removing a modem or changing jumpers on your computer's motherboard, make sure power is off. Then turn your computer on. If your system automatically starts in Windows, exit to DOS.
2. Insert the driver diskette and type **A: (or B:) INSTALL** and press ENTER. An introductory screen similar to the one shown below is displayed. Press any key to continue or ESC to quit.



3. Install can operate in either EXPRESS or CUSTOM mode. EXPRESS Install scans your system, determines the best settings for your modem, and installs the modem configuration files. CUSTOM Install is for advanced users who wish to specify directories and settings for the

modem. Select the type of installation you desire. If you select EXPRESS Install, you will be shown how to set the jumpers on the modem before placing it in your computer. When Install instructs you to set the jumpers, go to step 9. If you select CUSTOM install, continue with step 4.

4. With a series of screens, EXPRESS Install asks for a drive and directory where you would like the files copied (the default is C:\MODEM). You are also asked for the location of your DOS files (normally C:\DOS).
5. Next, you need to specify whether or not Windows is installed on your machine and its location (drive and directory). Following that, files are copied to C:\MODEM (or another directory selected by you).
6. The program then starts the “OLESET Utility”. OLESET automatically chooses the best settings for the modem based on your computer’s current configuration.
7. Setup tells you how to configure the jumper settings on the modem. Press ENTER to continue
8. You are then asked if you want to enable support for Windows and DOS. You can change these and other settings later if needed. Install is now complete. Make a note of the COM/IRQ settings shown. You will need it for step 9.

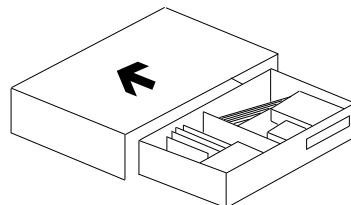


9. Remove the On-Line EXPRESS modem from its anti-static bag and examine the jumper block in the lower left-hand corner of the board (with the bracket on your right). Change the jumpers on the modem (if necessary) to match **EXACTLY** the settings assigned by Windows 3.x in step 2.

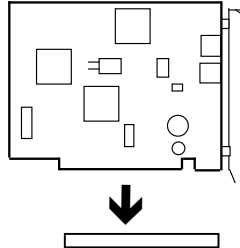
Should you need to change any settings later, simply run the program **OLESET** as described on page 17. Now you are ready to physically install the modem in your computer. Power down your system.

10. Handle the modem by its edges and its retaining bracket. Be careful not to touch the edge connector or any components on the card. For safety, you may want to disconnect any attached devices and power cords.

11. Remove the computer's cover and locate an available 8- or 16-bit ISA expansion slot. Remove that expansion slot cover and save the screw.



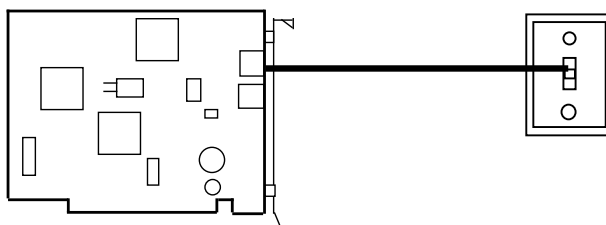
- Carefully insert the modem into the expansion slot you selected, applying pressure to the upper metal edge until it snaps into place.



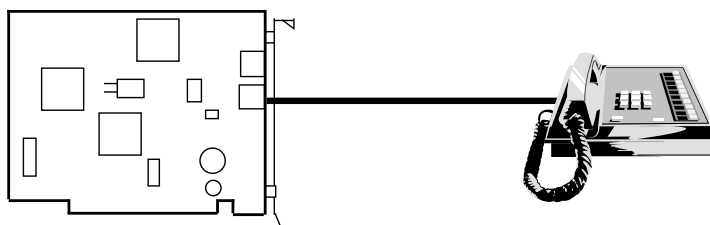
- Secure the modem into place by aligning its metal retaining bracket with the hole in the top edge of the system's rear panel. Fasten the metal bracket with the screw removed in step 11.
- Replace the system cover and reconnect any detached devices and power cords. Continue with the next page.

Connecting the Phone Line

1. Plug either end of the supplied RJ-11 telephone cable into the LINE jack on the modem. The LINE jack is the topmost jack on the modem.



2. If a phone is plugged into a wall jack, unplug the phone cable. Then plug the other end of the supplied modem cable into the telephone wall jack.
3. To continue using the phone, connect the phone cable into the phone jack on the modem board. Power your computer back on. If you need to change configuration, see pages 16-18, otherwise continue with page 25, **Testing the Connection**.



Changing Configuration

If you need to change configuration after installation, run the configuration utility as described below. There are separate versions of this utility for Windows 3.x and DOS. With either configuration utility you can change COM port and IRQ settings (**if you change these, check the jumpers on the modem**). Also, you can enable or disable the driver for Windows and DOS independently.

For example, if you don't use your modem in DOS, you can disable DOS support. This will prevent the driver from loading which will free more memory for other programs you are running.

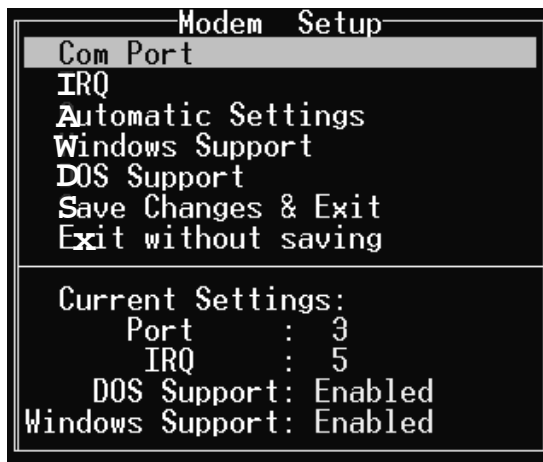
Windows support is established by a series of drivers in your SYSTEM.INI file. The Configuration utility edits the SYSTEM.INI file based on the settings you selected.

DOS support is established by a driver loaded in your AUTOEXEC.BAT called OLEDOS.EXE. The Configuration utility edits the AUTOEXEC.BAT file based on the settings you selected. **NOTE: EMM386 is required with the RAM option enabled. The Configuration Utility ensures that this is set up properly in your CONFIG.SYS file. If you have any questions regarding use of EMM386.EXE, please consult your DOS manual. (Do not use 'NOEMS' either).**

Turn to the next page for instructions on how to run the Configuration utility for both Windows and DOS.

Configuration Utility for DOS

Go to the directory where you installed the modem software, type **OLESET** and press ENTER. The following is displayed.



```
Modem Setup
Com Port
IRQ
Automatic Settings
Windows Support
DOS Support
Save Changes & Exit
Exit without saving

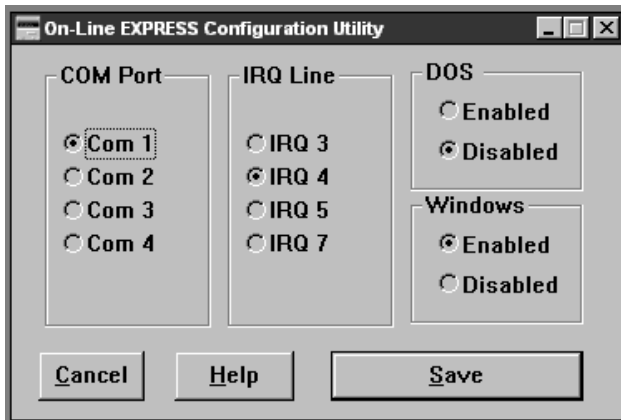
Current Settings:
Port      : 3
IRQ       : 5
DOS Support: Enabled
Windows Support: Enabled
```

Listed here are the menu options and a brief description of each.

- | | |
|---------------------------------|-------------------------------------------------------------------------------------------|
| Com Port: | Allows you to change the COM port settings (must match jumper settings on board) . |
| IRQ: | Allows you to change the IRQ settings (must match jumper settings on board). |
| Automatic Settings: | Determines available settings for your modem. |
| Windows Support: | Turns on/off support for Windows applications. |
| DOS Support: | Turns on/off support for DOS applications. |
| Save Changes & Exit: | Saves the changes and exits. |
| Exit without saving: | Cancel and changes and exits. |

Configuration Utility for Windows 3.x

In the BocaModem Program Group, created during initial driver installation, click on the “**On-Line Express Setup Utility**”. The following is displayed:

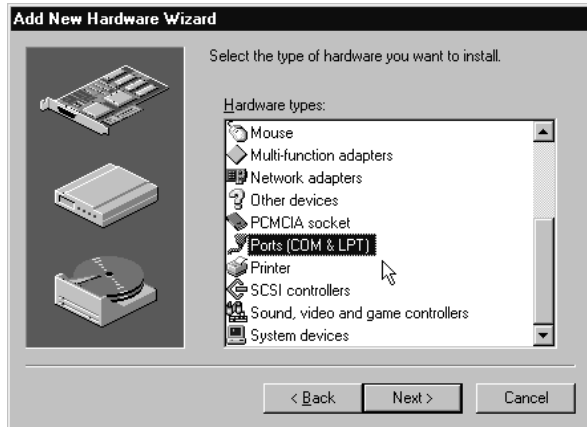


The options presented are the same as for the DOS version as explained on the previous page with the exception of “Automatic Settings”. For automatic setting, you must run the DOS version of the Configuration Utility.

Step-by-Step Installation for Windows 95

NOTE: You **MUST** install the driver diskette software **BEFORE** installing the modem.

1. Start Windows 95 and insert the driver and utilities diskette. Double click **My Computer**, **Control Panel**, **Add New Hardware**, then click **Next**. Then, click **No** when



asked if you want Windows to search for your new hardware. Click **Next** and scroll to **Ports**. Then click **Next** and **Have Disk...** and specify A:\ (or B:\), then **OK**.

2. Click **OK**, then **Next** again. Windows 95 assigns an I/O range and IRQ for the modem. Note the selected settings and decide if you want them, or another setting. Use the chart to select a COM port based on a particular address:

I/O PORT (Windows 95 Selected Jumper Settings)

3F8-3FF (com1)

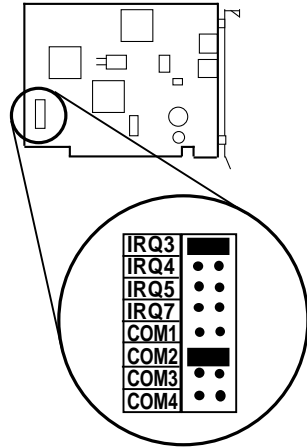
2F8-2FF (com2)

3E8-3EF (com3)

2E8-2EF (com4)

**DO NOT SELECT
'NEXT' YET**

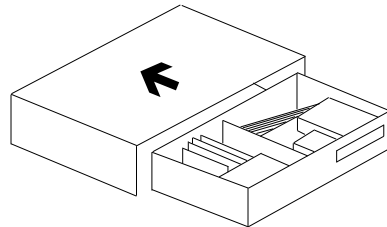
- 3. Remove the On-Line EXPRESS modem from its anti-static bag and examine the jumper block in the lower left-hand corner of the board (with the bracket on your right). Change the jumpers on the modem (if necessary) to match **EXACTLY** the settings assigned by Windows 95 in step 2.



- 4. Click **Next** again. Files are now copied into the `WINDOWS\SYSTEM` subdirectory. Click **Finish**.

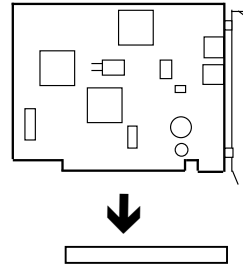
NOTE: If you view the Device Manager information before shutting down and installing the modem, Windows 95 reports a problem with the modem port.

- 5. Shut down Windows 95.
Power off the computer.
Carefully remove the cover from your computer and locate any unused 8- or 16-bit ISA slot. Remove the metal slot cover plate on the back of the computer and install the modem in the slot. Save the screw.



6. Carefully insert the modem into the expansion slot you selected, applying pressure to the upper metal edge until it snaps into place.

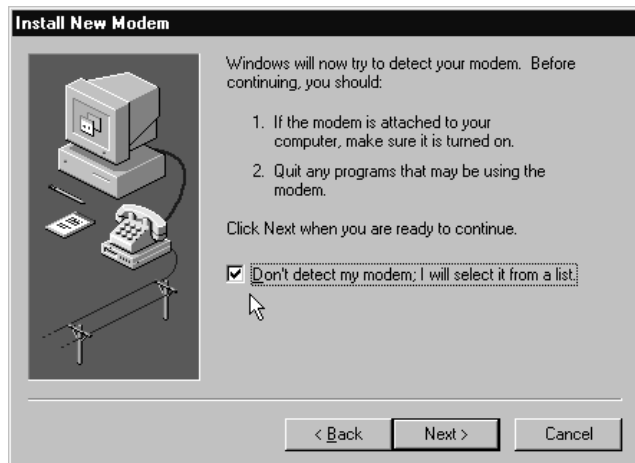
7. Secure the modem into place by aligning its metal retaining bracket with the hole in the top edge of the system's rear panel. Fasten the metal bracket with the screw removed in step 5.



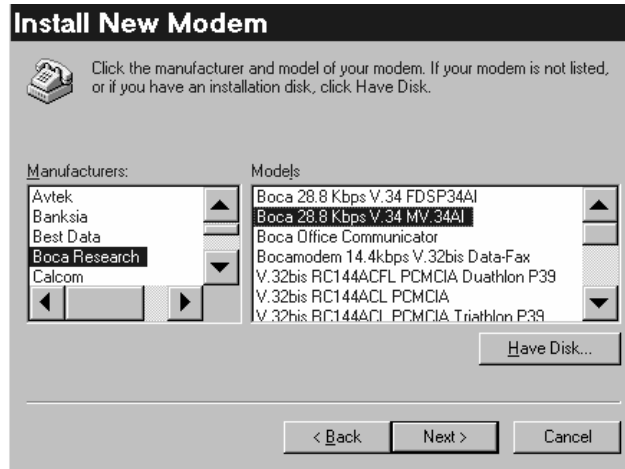
8. Replace the system cover, reconnect any detached devices and power cords, remove diskette, and power up your computer.

9. After rebooting with the new hardware installed, go to **My Computer, Control Panel, Add New Hardware, Next, No, Next, Modem, Next.**

10. Click on the box **“Don't Detect my Modem; I will select it from a list”**. The following is displayed. Then click **Next**.



11. Select Boca Research from the manufacturer list, then select your modem from the models list.
Boca Research 28.8Kbps MV.34AI or
Boca Research 28.8Kbps FDSP34AI (speakerphone model)



12. Then click **Next**, then select the COM port that was installed in Step 1.
13. Select **Next, Finish**. Hardware installation is complete.
14. Shut down computer before connecting phone cables.

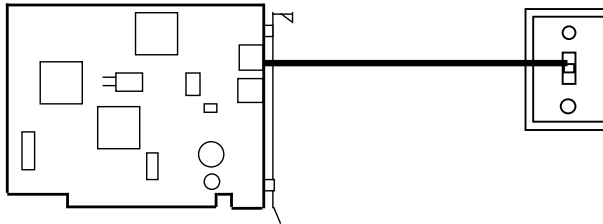
To Change I/O and IRQ Settings (Windows 95):

After completing all steps, shut down and restart Windows 95. In **Control Panel**, select **System...Device Manager**, then select **Ports**, then the COM port just installed. Then click **Properties** and select the **Resources** tab. Click either “**Input/Output Range**” or “**Interrupt Request**”, then **Change Setting...**

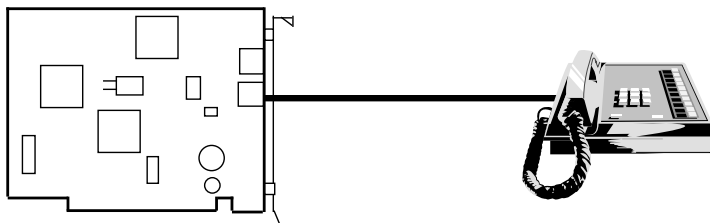
Note carefully any resource conflicts in the lower box and choose a different setting if necessary. Click **OK** twice, then select **Start...Shutdown...Yes** to shut down the computer. Remember to match settings with the jumpers on the board. After shutdown, power off the computer.

Connecting the Phone Line

1. Turn off your computer.
2. Plug either end of the supplied RJ-11 telephone cable into the LINE jack on the modem. The LINE jack is the topmost jack on the modem.



3. If a phone is plugged into a wall jack, unplug the phone cable. Then plug the other end of the supplied modem cable into the telephone wall jack.
4. To continue using the phone, connect the phone cable into the phone jack on the modem board. Power your computer back on. Continue with the next page.



Testing the Connection

1. Check that you have made all connections and with your computer powered on, check for a dial tone on a phone set if one is connected.
2. If you do not have communications software already installed, you may install the software supplied with the On-Line EXPRESS. Refer to the diskettes and manual for installation instructions. After installing and starting your communications software, enter terminal mode.

IMPORTANT: If you are not in terminal mode and you type AT commands at the DOS prompt, a “Bad Command or File Name” message will result.

3. Type in **ATZ** followed by ENTER and the modem will respond with OK after a few seconds.
4. Type **ATH1** followed by ENTER and you should hear a dial tone. To increase speaker volume, refer to your communications software or type the **ATL3** command.

```
ATZ
OK
ATH1
OK
ATH
OK
```

5. Type **ATH** followed by ENTER to put the modem “on-hook”. This confirms that the modem has been successfully installed into your computer. Your modem is now ready for use. Continue now with your communications software and documentation. **If you are connecting other devices to your FDSP34AI**, continue with the next page.

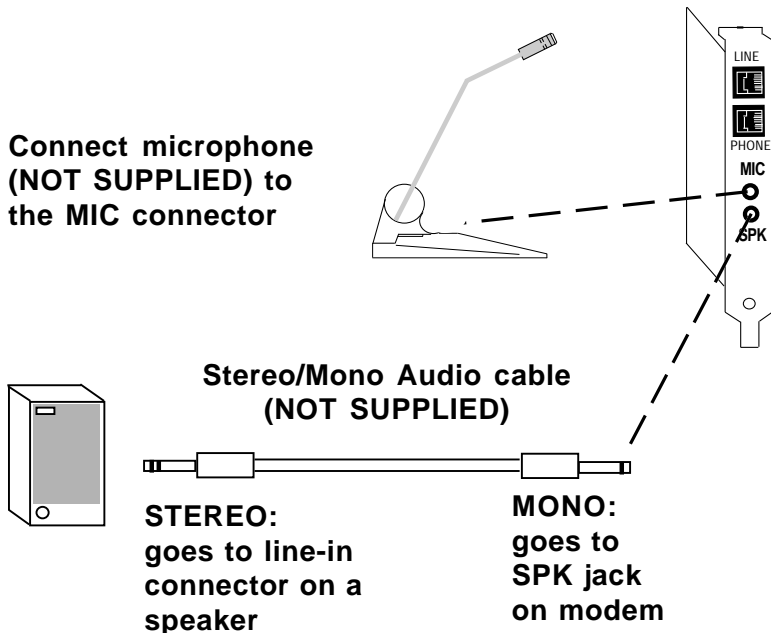
Connecting Devices to Microphone/Speaker Jacks (FDSP34AI only)

1. If you have an existing sound card, continue below, or skip to step 2.

- Attach a microphone (not supplied) to the **MIC** jack on the modem (to record outgoing messages; in addition, the microphone serves as a transmitter for your speakerphone) on the modem.
- Attach the mono-end of a stereo-mono cable (not supplied) to the **SPK** jack on the modem to listen to phone messages through your sound board, and for playback and call monitoring.
- Attach the stereo-end of the stereo-mono cable to the line-in connector on your sound card. If your sound card does not have a line-in connector, you will need to attach a speaker(s) to the **SPK** jack on the modem.

2. If you do NOT have an existing sound card:

- Connect the microphone (not supplied) to the **MIC** jack (to record outgoing messages; in addition, the microphone serves as a transmitter for your speakerphone).
- Connect a speaker(s) (not supplied) to the **SPK** jack (to listen to incoming messages; in addition, the speaker serves as a receiver for your speakerphone) on the board.



NOTE: For information on microphone and speaker requirements, see Appendix A.

Section Two: Product Overview

The *On-Line EXPRESS* modem by Boca Research combines high-speed data and fax capability for the Microsoft Windows 95 and 3.1 environments. DOS capability is also provided. The *On-Line EXPRESS*, along with the supplied driver software, is designed to take advantage of your system's processor, thus eliminating the need for a standard on-board UART.

Your COM ports are assigned via the driver software. This innovative solution offers a low-cost communications alternative without compromising performance. The modem supports the V.34 protocol, as well as V.32bis which provides high-speed data transmission with V.42bis/MNP5 (data compression) and V.42/MNP2-4 (error control).

In addition to fax and data functions of the MV.34AI, the FDSP34AI offers an all-in-one communications product that serves as an answering machine and voice mailbox. It also comes with VoiceView[®] Support. This standard allows the transmission of computer data to be introduced during a normal phone call. It alternates between voice and data—once the data goes through, you automatically switch back to your voice conversation.

For additional information on features, supported protocols, and technical specifications, see Appendix B.

Section Three: Troubleshooting

This section lists common problems that may be encountered and their possible solutions.

SYMPTOM	POSSIBLE REMEDY
No dial tone.	<ul style="list-style-type: none">• Verify that you have cables plugged in correctly as instructed in Section Two.• Connect a telephone set directly to the wall jack and check for a dial tone. If no dial tone is heard, the telephone line is not working. Contact the telephone company.• Review software installation.
Modem will not connect to another modem.	<ul style="list-style-type: none">• Check the connections between the modem and the computer, and the modem and the telephone line.• Make sure the telephone jack is operational as described above.• The telephone line may be in use at a different extension.• Perhaps the number you have called does not reach a modem, or the remote modem may not be set up to respond.
No response when you type in AT commands	<ul style="list-style-type: none">• There may be a conflicting port address. Re-configure the modem's I/O port address.

SYMPTOM	POSSIBLE REMEDY
No response when you type in AT commands (contd)	<ul style="list-style-type: none"> • Verify that the communication software is set to the same communications port where your modem was assigned. Check IRQ settings on the modem. • Try typing AT&F to reset the modem to its factory defaults.
AT commands not visible.	<ul style="list-style-type: none"> • Make sure the echo command is set to ON. Change to echo with the ATE command.
After data connection is established, data is displayed as garbled characters.	<ul style="list-style-type: none"> • Make sure the local (yours) and remote modem configurations are compatible. • Verify that both modems are operating with the same settings, speed, data, parity, and stop bits. • The software may not be set for correct terminal emulation. Configure software to correct type. ANSI terminal emulation is most commonly used. • Power down your system and re-run your communications software. Check software settings. • Exit the communications program and restart it.
The modem does not answer an incoming call.	<ul style="list-style-type: none"> • You may not have enabled auto-answer. Use your software to enable this function.

SYMPTOM	POSSIBLE REMEDY
The modem does not answer an incoming call (contd)	<ul style="list-style-type: none"> • If you have an answering machine, it may be answering before the modem can. Turn the answering machine off, or, use the software to set auto-answer to respond in fewer rings than the answering machine. • Check for any loose connections.
Modem disconnects while on-line.	<ul style="list-style-type: none"> • Re-try the connection by dialing the number several times. You may be experiencing line interference. • An incoming call may have broken the connection if a call-waiting feature was enabled. Disable call-waiting and try again.
I am having trouble getting my init string to work.	<ul style="list-style-type: none"> • Init strings are primarily personal preferences. Use the most basic one that can get the job done. Try: AT&F&C1&D2.
Connection Errors.	<ul style="list-style-type: none"> • Try connecting at a lower speed (e.g., 14.4Kbps, 9600bps). • Noisy/poor line conditions may prohibit connection. Have your phone company test your lines. • Verify that the modem at the other end is up to date and compliant with current CCITT and Bell standards.
I receive a "Hardware Not Found Aliased Addressing" when I try to load the DOS driver.	<ul style="list-style-type: none"> • Ensure that jumpers are set correctly on the modem.

SYMPTOM	POSSIBLE REMEDY
You receive the message: “Cannot Open Port”	<ul style="list-style-type: none">• Check your SYSTEM.INI file and make sure that that the line COMM.DRV=COMM.DRV is in the file. If not, edit the statement and restart Windows.

Appendix A: Optional Accessories

The V.34 On-Line Express (**FDSP34AI**) is equipped with microphone and speaker jacks for use with headset, speakers and microphone. The microphone can be used to record outbound messages. These messages can also be recorded with a telephone attached to the modem. However, a microphone is recommended for better quality recordings. You may use a combination headphone and microphone or a separate microphone and speaker(s).

Microphone Requirements:

The microphone element must be of the electret type also known (incorrectly) as a condenser type. The microphone in most telephone handsets is of this type. The FDSP34AI was designed for a microphone sensitivity of -64 dBspl. Other microphone sensitivities work equally well, with only a subjective difference in loudness. Carbon microphone elements will also work, but don't offer the quality of the electret. Another common microphone element is the dynamic type which will NOT work with the V.34 On-Line Express.

Speaker Requirements:

You can attach the FDSP34AI to a high-quality external speaker or the earpiece of a handset. The external speaker must have an impedance rating of 8 ohms or more.

Appendix B: Technical Specifications

Modem Data Rate: 28.8K, 14.4K, 12K, 9600, 7200, 4800, 2400, 1200, or 300bps.

Fax Data Rate: 14.4K, 12K, 9600, 7200, 4800, 2400bps.

Protocol Compatibility:

- Data protocols:

CCITT/ITU-TSS: V.34: 28800

AT&T: V.32terbo

CCITT/ITU-TSS: V.32bis: 14400, 12000, 7200

CCITT/ITU-TSS: V.32: 9600, 4800

CCITT/ITU-TSS: V.22bis: 2400

CCITT/ITU-TSS: V.21: 300

CCITT/ITU-TSS: V.23: 600/75, 1200/75

Bell 212A: 1200

Bell 103: 300

- Fax protocols:

CCITT/ITU-TSS: V.17: 14400, 12000, 9600, 7200

CCITT/ITU-TSS: V.29 9600, 7200

CCITT/ITU-TSS: V.27ter 4800, 2400

CCITT/ITU-TSS: V.21 Channel 2: 300

- V.42 error control (LAPM and MNP)

- V.42bis and MNP Class 5 data compression

Diagnostics:

- Local/remote digital and analog loopback.

- Automatic power-on self-test.

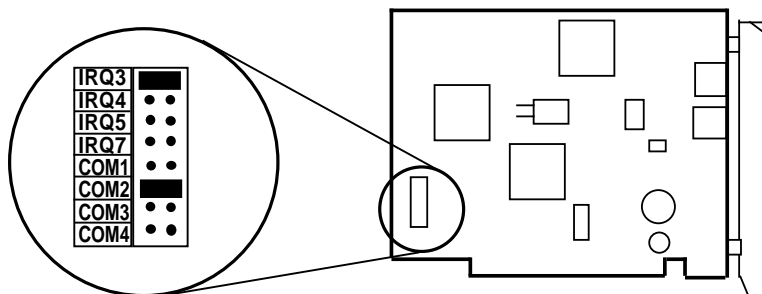
Dimensions:

5 1/4" x 4 1/8"

Communication Settings

The On-Line *EXPRESS* Modem can be configured as I/O port address COM1, COM2, COM3, or COM4 and IRQ 3, 4, 5, or 7. **The default setting for the modem is I/O port address COM2, using IRQ3.**

NOTE: The modem cannot share the same interrupt or COM port with any other device.



Appendix C: Compliance Information

FCC Statement:

“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.
- (2) This device must accept any interference received including interference that may cause undesired operation.

THIS UNIT COMPLIES WITH FCC PART 68 AS OF DATE OF MANUFACTURE.

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to Part 15 of 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 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:

- Re-orient or relocate the receiving antennae.
- 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.

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.

Note: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user’s authority to operate the equipment.”

Notification to the Telephone Company

Notification to the telephone company is no longer required prior to connecting the registered equipment but upon request from the telephone company the user shall tell the telephone company which line the equipment is connected to as well as the registration number and the ringer equivalence of the registered protective circuitry. In most, but not all areas, the sum

of all RENs should be 5.0 or less. The FCC Registration number and Ringer Equivalence number are printed on the main chip in the center of the internal modem board, or on the underside of the external modem.

Malfunction of the Equipment

In the event that the MODEM should fail to operate properly, the customer shall disconnect the equipment from the telephone line to determine if it is the customer's equipment which is not working properly, or if the problem is with the MODEM, the user shall discontinue use until it is repaired. In the event service is needed the user should contact the vendor from whom you purchased the MODEM.

Telephone Connection Requirements

Except for telephone company-provided ringers, all connections to the telephone network shall be made through standard plugs and standard telephone company-provided jacks, or equivalent, in such a manner as to allow for easy and immediate disconnection of the terminal equipment. Standard jacks shall also be arranged that, if the plug connected thereto is withdrawn, no interference to the operation of the equipment at the customer's premises which remains connected to the telephone network, shall occur by reason of such withdrawal.

Incidence of Harm

Should terminal equipment or protective circuitry cause harm to the telephone network, the telephone company shall, where practical, notify the customer that temporary discontinuance of service may be required; however, where prior notices are not practical, the telephone company may temporarily discontinue service if such action is deemed reasonable in the circumstances. In the case of such temporary discontinuance, the telephone company shall promptly notify customers and will be given the right to bring a complaint to the FCC if they feel the disconnection is not warranted.

Changes in Telephone Company Equipment or Facilities

The telephone company may make changes in its communications facilities, equipment, operations, or procedures, where such action is reasonably required and proper in its business. Should any such changes render the customer's terminal equipment incompatible with the telephone company facilities, the customer shall be given adequate notice to make modifications to maintain uninterrupted service.

General

The FCC prohibits customer-provided terminal equipment be connected to party lines or to be used in conjunction with coin telephone service.

Installation

The MODEM is equipped with a USOC RJ-11 standard miniature modular jack and is designed to plug directly into a modular jack.

DOC Compliance Statement (Canada)

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 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 (telephone 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 designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunction, 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. The Load number appears on the bracket of the On-Line *EXPRESS* Modem.

CAUTION: Telecommunications voltages and currents can exceed the limits of safety extra low voltage (SELV), resulting in personal injury. Do not touch any components on the modem's printed circuit board when power is applied, or the telephone cable is plugged in. Avoid installing, handling the telephone cable, or changing the jumper settings on the modem during any weather activity where lightning strikes may occur.

To be installed in UL-listed and CSA-certified computers with instructions on how to add/remove expansion cards.

Appendix D: AT Command Reference

Command/Protocol Overview

In most cases, your communications software will set and control the operation of your modem. Following is a brief survey of the most commonly used Hayes-compatible AT commands for use with your modem. In addition, we've also provided information on extended AT command sets, S-Registers, and commands and registers for high-level protocols such as MNP, V.42/V.42bis, and V.32/V.32bis. It will rarely be necessary to use 'AT' commands and S-Registers in command mode. We include them here for more advanced users who may prefer command mode operation, or require special settings. See pages 44-60 for additional details.

Hayes-compatible commands consist of a basic command set and an extended command set. The basic set involves functions such as dialing a number, or putting the modem on-hook (i.e., replacing the telephone handset).

Extended commands allow more sophisticated control of the modem such as transmission speed, or initiating high-level functions like data compression or error correction. These functions are defined and controlled by the available protocols mentioned above. A protocol is a set of standards by which data communications operate.

Every AT command includes an "AT" prefix, followed immediately by the command and, in many cases, additional parameters. Multiple commands can be entered at the same time from your communications software.

AT Command[parameter] [parameter] ...
PRESS ENTER

Example: ATH or ATH0 tells the modem to disconnect

Extended commands were developed to provide greater functionality and control over modem operations. Their format is the same as the basic command except that an additional parameter is required following the AT prefix and before the numerical parameter. This additional parameter comes in three different forms:

the ampersand (&) character: **extended AT command**

the backslash (\) character: **extended AT command for MNP**

the percent (%) character: **extended AT command for V.42/V.42bis**

Examples: AT&V tells the modem to display (view) its current configuration and user profile.

AT\G1 enables flow control. Flow control compensates for the difference between the rate at which data reaches a device and the rate at which the device processes and transmits.

AT%E1 tells the modem to monitor line quality and request a “retrain” (adjustment) to the connection.

S-Registers

Modem command “language” also employs a set of indicators or registers, which are various numerical values all with a standard “S” prefix, hence S-Registers. To a large extent, the values defined in the S-Registers regulate the operation of the modem and the function of some commands in the AT command set.

Example: S-Register 6, or S6=n, defines the length of time the modem will wait for a dial tone. In this case the acceptable range is 3-6 (in seconds) with a default value of 5. With S6=3, the modem will wait three seconds for a dial tone when going off-hook before dialing the first digit of its telephone number.

Data Communication Protocols

This can be more than a little confusing. These protocols represent various domestic and international standards which enhance modem performance and reliability. The protocols are activated and controlled by a variety of extended AT commands and S-Registers.

MNP stands for Microcom Networking Protocol and is a protocol developed by Microcom for full-duplex, error-free communications. This protocol detects and corrects errors which can result from telephone line noise and other signal distortions. There are several classes of MNP operation also referred to as service classes. Class 5 maximizes data transfer rate and provides compression which can significantly increase data throughput.

The “V-Dot” standards are more numerous, but have a single origin: the International Telecommunications Union Telecommunications Standards Sector (formerly the Consulting Committee for International and Telephone and Telegraph or CCITT). Some of the lower-level standards such as V.21 and V.22 have “domestic” equivalents as developed by the former Bell System, also referred to as Bell standards. The “V-Dot” standards may be summarized as shown on the following page.

-
- V.21** The CCITT standard for 300bps communications. Domestic modems follow the Bell 103 standard, but V.21 can accept international calls at 300bps.
- V.22** The CCITT standard for 1200bps communications. The domestic equivalent is the Bell 212A standard.
- V.22bis** The CCITT standard for 2400bps.
- V.23** CCITT for 1200bps with a 75bps back channel. This is mostly used in Europe and South America.
- V.24** CCITT serial interface standard (EIA/RS232-D).
- V.32** CCITT standard for 9600bps and 4800bps communications.
- V.32bis** CCITT standard for an extensive range of high-speed modems operating at 14,400bps, 12Kbps, 9600bps, 7200bps, and 4800bps.
- V.42** CCITT standard for detection and negotiation for LAPM (Link Access Procedure for Modems) error control. V.42 will also support MNP levels 2-4.
- V.42bis** An extension of V.42 specifying the data compression protocol for use with V.42.
- V.34** ITU-TSS protocol. It can operate up to 28,800bps for data and 14,400bps for send/receive fax.

BASIC AT COMMANDS (default values are highlighted)

Command Description

AT	Attention characters
A	Answer command
A/	Re-Execute last command

ATB Line Modulation Options. Configures the modem to the to the desired communications standard setting at a particular speed.

ATB0	Selects the V.22 protocol when the modem is at 1200 bps and V.21 when the modem is at 300 bps.
ATB1	Selects the Bell 212A protocol when the modem is at 1200 bps and the Bell 103 protocol when the modem is at 300 bps. (default)
ATB2	Selects V.23 originate mode receive @ 1200bps (transmit 75bps); answer mode receive 75bps (transmit 1200bps)
ATB3	Selects V.23 originate mode receive @ 75bps (transmit 1200bps); answer mode receive 1200bps (transmit 75bps)
ATB15	Selects V.21 when the modem is at 300bps.
ATB16	Selects Bell 103 when the modem is at 300bps.

ATD. The ATD command begins the dialing sequence. The following modifiers are used in conjunction with the ATD command.

Dial	Options	Description
ATD	none	Dial. (ATD followed by phone number)
ATDL	none	Re-dial.
ATDP	none	Pulse (rotary) dial. 10 pulses per second.
ATDT	none	Touch tone dial (DTMF).
ATDW	1-255sec	Wait for dial-tone.
ATD,	0-255sec	Pause.
ATD@	none	Wait for quiet answer.
ATD!	none	Initiate hook flash.
ATD;	none	Return to command state after dialing.
ATD^	none	Disable calling tone.
ATDS=0-3	none	Dial stored number. (See AT&Z)

Command Description

ATEn	Command Character Echo. Determines whether or not characters are echoed to your computer screen.
-------------	---------------------------------------------------------------------------------------------------------

ATE0	Disables echoing of the commands to the screen.
ATE1	Enables echoing of the commands to the screen. (default)

ATH	Switch Hook Control. Places the modem on- or off-hook.
------------	---------------------------------------------------------------

ATH0	Instructs modem to go on-hook.
ATH1	Instructs modem to go off-hook.

ATI	Modem identification command. Instructs the modem to provide information about itself.
------------	-----------------------------------------------------------------------------------------------

ATI0	Displays the product identification code.
ATI1	Displays the checksum.
ATI2	Displays ROM checksum as OK or ERROR.
ATI3	Same as I0.
ATI4	Returns firmware version for data pump.
ATI9	Returns country code.

ATL	Speaker volume. Determines the volume level of the speaker.
------------	--------------------------------------------------------------------

ATL0	Lowest volume.
ATL1	Low volume. (default)
ATL2	Medium volume.
ATL3	High volume.

ATM	Speaker control. Controls whether or not the speaker is on.
------------	--------------------------------------------------------------------

ATM0	Disables the modem speaker.
ATM1	Turns speaker on until carrier has been detected.(default)
ATM2	Speaker is always on.

Command Description

ATN	Select Negotiate Handshake. Controls automode enable/disable.
ATN0	Requires speed of the connection be that specified by the value of S37 and Bn and no fallback.
ATN1	Starts handshake at the communication standard specified by S37 and Bn (default).
ATO	Return to on line state mode. Places the modem in on-line or data mode.
ATO0	Returns modem to a previously established state.
ATO1	Begins an equalizer retrain sequence then returns to on-line state. A retrain is an adjustment performed when one of the modems detects signal distortion or line noise.
ATO3-14	Forces the modem to a new rate as defined in S62.
ATQ	Results Code Display Option. Controls whether or not result codes are displayed to your computer screen.
ATQ0	Enables result codes to be issued to the screen. (default)
ATQ1	Disables result codes to be issued to the screen.
ATSn	Selects an S-Register (n=0-99). Selects an S-Register. (For more information on S-Registers, see...)
ATSn=m	Writes a value to a specified register
ATSn?	Displays the value of S-Register n.
ATV	Result code format. Determines if results codes (including call progress and negotiation progress messages) are displayed as numbers or words.
ATV0	Numeric format. Example: (0 for OK)
ATV1	Verbal format. (default) Example: (OK for OK)

Command Description

ATW	Select Extended Result Codes. Determines which result codes will be used to describe the type of connection that results from handshaking and negotiation.
------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------

ATW0	CONNECT result code reports your modem's speed. (default).
-------------	-------------------------------------------------------------------

ATW1	CONNECT result code reports your modem's speed and enables the CARRIER, COMPRESSION, and PROTOCOL extended result code.
-------------	-------------------------------------------------------------------------------------------------------------------------

ATW2	CONNECT result code reports the speed of the modem you're connected to.
-------------	-------------------------------------------------------------------------

ATX	Select Result Codes/Call Progress Options. Enables the tone detection options used in the dialing process.
------------	-------------------------------------------------------------------------------------------------------------------

ATX0	Displays CONNECT or "1" for all speeds.
-------------	-----------------------------------------

ATX1	Displays connect message according to ATW and AT\V; blind dial; ignores busy tone.
-------------	------------------------------------------------------------------------------------

ATX2	Displays connect message according to ATW and AT\V; waits for dial tone; ignores busy tone.
-------------	---------------------------------------------------------------------------------------------

ATX3	Displays connect message according to ATW and AT\V; blind dial; checks busy tone after dialing.
-------------	-------------------------------------------------------------------------------------------------

ATX4	Displays connect message according to ATW and AT\V; waits for dial tone; checks busy tone after dialing.
-------------	----------------------------------------------------------------------------------------------------------

ATZ	Recall stored profile. Instructs the modem to go on-hook (hang-up) and restore the selected profile.
------------	-------------------------------------------------------------------------------------------------------------

ATZ0	Restores stored profile 0.
-------------	----------------------------

ATZ1	Restores stored profile 1.
-------------	----------------------------

Escape Characters

+++	The escape characters are known as +++. They will switch from on-line mode to command mode while preserving the connection with the on line modem.
------------	----------------------------------------------------------------------------------------------------------------------------------------------------

Extended AT Commands

Command Description

AT&B	Autoretrain. Determines what action the modem takes when it receives a poor signal.
-----------------	--------------------------------------------------------------------------------------------

AT&B1	Retrains on a poor received signal. Hangs up if the condition persists longer than the threshold set in S-Register 7.
-------	-----------------------------------------------------------------------------------------------------------------------

AT&C	Data carrier detect (DCD) signal. Determines how the carrier state of the remote modem is handled.
-----------------	-----------------------------------------------------------------------------------------------------------

AT&C0	State of carrier from remote modem is ignored.
-------	------------------------------------------------

AT&C1	State of carrier from remote modem is tracked. (default).
-------	-----------------------------------------------------------

AT&D	Data Terminal Ready Option. Interprets how the modem responds to the DTR (data terminal ready) signal.
-----------------	---------------------------------------------------------------------------------------------------------------

AT&D0	DTR ignored.
-------	--------------

AT&D1	Go to command mode on on-to-off DTR transition
-------	------------------------------------------------

AT&D2	Hang up and go to command mode on on-to-off DTR transition. (default)
-------	------------------------------------------------------------------------------

AT&D3	Modem resets on on-to-off DTR transition.
-------	-------------------------------------------

AT&F	Load Factory Defaults. Instructs the modem to use the factory set parameters.
-----------------	--------------------------------------------------------------------------------------

Command Description

AT&K **Select flow control. Selects the flow control method used to prevent the modem's buffer from overflowing with data.**

AT&K0 Disable flow control.

AT&K3 **Enable bidirectional hardware flow control RTS/CTS (default)**

AT&K4 Enable bidirectional XON/XOFF flow control.

Note on Flow Control. XON/XOFF is a software-based flow control method, using standard ASCII control characters to pause or resume data transmission. RTS/CTS pacing, a hardware-based method, uses an electrical signal. Signals are exchanged as follow

RECEIVER**TRANSMITTER**

CTS ON =====>

START SENDING

CTS ON <=====

RTS ON (ready to send)

CTS OFF =====>

RTS OFF (stop sending)

AT&S **Data Set Ready (DSR) signal. Controls all DSR functions. DSR indicates when the modem is connected to a communications channel and is ready.**

AT&S0 **DSR circuit always on. (default)**

AT&S1 DSR circuit on during handshaking and on-line, off in test mode or in idle mode.

Command **Description**

AT&T	Test and diagnostics
AT&T0	Terminates any test in progress.
AT&T1	Executes the local analog loopback test.
AT&T3	Executes the local digital loopback test.
AT&T4	Enables the modem to accept a request from a remote modem for a digital loopback test. (default)
AT&T5	Instructs the modem to deny a request from a remote modem for a digital loopback test.
AT&T6	Executes the remote digital loopback test.
AT&T7	Executes the remote digital loopback test with a self test.
AT&T8	Executes the remote analog loopback test with a self test.

AT&V	View current configuration and user profile. Used to display the active and stored profiles (commands and S-Register settings) along with any stored telephone numbers.
-----------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

AT&V0	View active file, stored file #0 and stored phone numbers
AT&V1	View active file, stored file #1 and stored phone numbers

AT&W	Store Active Profile. Stores certain command options and S-Register values into one of two nonvolatile stored profile memory locations.
-----------------	------------------------------------------------------------------------------------------------------------------------------------------------

AT&W0	Saves active configuration as user profile 0.
-------	-----------------------------------------------

Command **Description**

AT&Y **Select stored profile on Power-up. Selects which user profile will be recalled into the active profile at power-up.**

AT&Y0 Selects user profile 0.

AT&Z **Stored phone number. Used to store up to four telephone numbers.**

AT&Z0= Stores a 36 digit dial string.**AT&Z1=** Stores a 36 digit dial string.**AT&Z2=** Stores a 36 digit dial string.**AT&Z3=** Stores a 36 digit dial string.

AT% (percent) Commands

AT%A **Set Autoreliable Fallback Character. Allows you to specify the character that tells the modem to return (or fall back) from autoreliable (MNP) mode to a normal connection on the answering modem. n = 1-127 (ASCII character)**

AT%C **Data Compression. Controls the MNP Class 5. The modem can only perform data compression on an error corrected link.**

AT%C0 No compression.**AT%C1** **MNP Class Compression (default).**

Command **Description**

AT\ (back slash) Commands

AT\B **Transmit Break. Sends a break to the remote modem. It is equivalent to using the <BREAK> key on your computer. This command can be used if your keyboard does not have a <BREAK> key.**

AT\B0-9 BREAK length in 100 ms.

AT\G **Set Modem Port Flow Control (only in Normal Mode). Selects the modem's DCE or port flow control. If your modem receives data from the remote modem faster than it can be processed, enabling port flow control allows the modem to handle the data efficiently.**

AT\G0 Disables port flow control.

AT\J **Constant DTE Speed Option.**

AT\J0 DCE and DTE rates are independent.

AT\K **Set Break Control. Selects the way in which the modem handles a break signal. The modem can handle a break signal in one of three ways: expedited destructive, expedited, or queued break.**

(In on-line data mode with V.42 protocol or normal mode, then break signal to DTE through RS-232).

0, 2, 4: Enter on-line command mode but do not send break to the remote modem.

Command Description

- 1: Empty the data buffers and send break to the remote modem immediately.
- 3: Send break to the remote modem immediately.
- 5: Send break to the remote modem in sequence with data.

(In on-line data mode with direct mode, then receive break at serial port).

- 0, 2, 4: Immediately send break and enter on-line command state. 1, 3,
- 5: Immediately send break through.

(In on-line command mode with V. 42 protocol or normal mode, and the DTE issues a transmit break command).

- 0, 1: Empty the data buffers and send break to the remote modem.
- 2, 3: Immediately send break to the remote modem.
- 4, 5: Send break to the remote modem in sequence with data.

(In on-line data mode with normal mode, receive break signal from remote at modem port, send to serial port).

- 0, 1: Empty the data buffers and send break to the local DTE.
- 2, 3: Immediately send break to local DTE.
- 4, 5: Send break to local DTE in sequence with data.

AT\<n< b=""></n<>	Modem Protocol Options. Selects the type of data connection the modem can establish.
AT\ <n0< td=""> <td>Normal mode. No protocol, but flow control is allowed.</td> </n0<>	Normal mode. No protocol, but flow control is allowed.
AT\ <n1< td=""> <td>Direct mode. No protocol and no flow control is allowed.</td> </n1<>	Direct mode. No protocol and no flow control is allowed.
AT\ <n2< td=""> <td>MNP reliable mode.</td> </n2<>	MNP reliable mode.
AT\ <n3< td=""> <td>LAPM, MNP or Normal Mode. (default)</td> </n3<>	LAPM, MNP or Normal Mode. (default)
AT\ <n4< td=""> <td>LAPM or MNP mode.</td> </n4<>	LAPM or MNP mode.

Command Description

AT\Q **DTE Flow Control Options.** Selects the flow control method the modem provides to the DTE to prevent the modem's buffer from overflowing with data. A data buffer holds the data until the modem is ready to transmit it. When the data buffer is full, flow control instructs the DTE to stop sending to the modem while the modem continues to send characters.

AT\Q0 Disables flow control.

AT\Q1 XON/XOFF software flow control.

AT\Q2 Returns ERROR.

AT\Q3 **RTS/CTS hardware flow control. (default)**

AT\T **Set Inactivity Timer.** Allows the modem to disconnect if no data activity has occurred for the selected period of time.

AT\T0 Disable inactivity timer.

AT\V **Protocol Result Code.** Responds with W0 and W2 options only.

AT\V0 Disable protocol result code (connect 9600). (default)

AT\V1 Enable protocol result code (connect 9600/LAPM).

AT\X **Set XON/XOFF Passthrough Option.** Valid only if XON/XOFF flow control is enabled, such as \G1 or \Q1; otherwise, XON/XOFF will not be detected by the modem, so always passthrough.

AT\X0 Process XON/XOFF per \G and \Q option; if XON/XOFF flow control is enabled, do not pass XON/XOFF to the remote modem or local DTE.

Command **Description**

Miscellaneous Commands

AT+H	V.42bis Compression Control. Controls V.42bis data compression over an error correction link.
AT+H0	Disables V.42bis.
AT+H1	Enables V.42bis only when transmitting data.
AT+H2	Returns ERROR.
AT+H3	Enables V.42bis for both directions. (default)

S-Registers

This section defines the purpose of the modem registers, and sequentially lists the registers and describes their functions. These registers affect various operating characteristics and allow you to obtain information about the modem, as well as test the modem. Each register has a factory-set value, which you can read or change to fit your needs.

Reading a Register Value

To read the current value of a register, type:

AT Sn? [ENTER],

where n is a register number.

AT Sn? Sn? [ENTER] from the command mode.

To read the register values of S0 and S1, type

AT S0? S1? [ENTER].

The modem will display the first register value, a carriage return, the next register value, a carriage return, and OK or 0.

Changing a Register Value

To change a register value, use the Sn command (ATSn=v), where n is a register number and v is the new value you want to assign to the register. Type:

AT S0=3 [ENTER]

to have the modem automatically answer on the third ring.

The following table lists the modem's registers and their functions.

Reg.	Range	Units	Default	Definition
S0	0-255	rings	0	Auto-answer
S1	0-255	rings	0	Count incoming rings
S2	0-255	rings	43	Escape character value.
S3	0-127	ASCII	13	Carriage return character.
S4	0-127	ASCII	10	Line feed character.
S5	0-255	ASCII	8	Backspace character.
S6	2-255	seconds	2	Wait time for Blind Dialing.
S7	1-255	seconds	60	Wait for carrier after dial.
S8	0-255	seconds	2	Pause time for dial delay.
S9	1-255	seconds	6/10	Carrier detect.
S10	1-255	seconds	14 (1.4)	Lost Carrier to Hang Up Delay.
S11	50-255	seconds	95/100	DTMF tone duration (* in one-hundredth second increments)
S12	0-255	seconds	50 (1)	Escape code guard time*. (*in one-fiftieth second increments)
S14	Bit Mapped			Bit mapped registers.
S16	Bit Mapped		0	Modem test options.
S18	0-255	seconds	0	Test timer.
S19	Bit Mapped			Bit-Mapped registers
S21	Bit Mapped			Bit mapped registers.
S22	Bit Mapped			Bit mapped registers.
S23	Bit Mapped			Bit mapped registers.
S25	0-255	seconds	5	Asynchronous DTR Delay.
S26	0-255	seconds	1	RTS to CTS Delay Interval.
S27	Bit Mapped			Bit mapped registers.

Reg.	Range	Units	Default	Definition
S30	0-90	minutes	0	Inactivity Timer Value.
S37	0	ASCII	0	Line Connection speed
	0	=		Attempt to connect at the last AT speed (default)
	3	=		Attempt to connect at 300bps
	5	=		Attempt to connect at V.22 1200bps
	6	=		Attempt to connect at V.22bis 2400bps
	7	=		Attempt to connect at V.23 4800bps
	8	=		Attempt to connect at V.32/V.32bis 4800bps
	9	=		Attempt to connect at V.32/V.32bis 9600bps
	10	=		Attempt to connect at V.32bis 12000bps
	11	=		Attempt to connect at V.32bis 14400bps
	12	=		Attempt to connect at V.34 16800bps
	13	=		Attempt to connect at V.34 19200bps
	14	=		Attempt to connect at V.34 21600bps
	15	=		Attempt to connect at V.34 24000bps
	16	=		Attempt to connect at V.34 26400bps
	17	=		Attempt to connect at V.34 28800bps
S40	Bit Mapped			Bit Mapped Registers.
S41	0-2	ASCII	0	Connect Message Display 0=CONNECT with DTE speed. 1=CONNECT with carrier, protocol, and compression 2=CONNECT with DCE speed.
S42	0-2	ASCII	0	V.32 Retrain Operation (&Bn) 0=&B0 is selected. 1=&B1 is selected. 2=&B2 is selected.
S43	0-127	ASCII	13	Auto Fallback Character for MNP Negotiation.
S44	Bit Mapped			Bit Mapped Registers.
S45				Reserved.
S46	0-255	ms	255	Automatic Sleep Timer.
S48	0-2	ASCII	0	Set Autoreliable Buffer (\Cn) 0=\C0 is selected. 1=\C1 is selected. 2=\C3 is selected.

Reg.	Range	Units	Default	Definition
S49		ASCII	255	Set Maximum Block Size 63=64bytes (\A0) 127=128bytes (\A1) 191=192bytes (\A2) 255=256bytes (\A3)
S50	0-1	ASCII	0	FAX/Data Mode Selection 0=Data mode 1=Fax mode
S51	Bit Mapped			Bit Mapped Registers
S52	0-5	ASCII	5	Break Control Option (reflects the &Kn value).
S53	0-4	ASCII	3	Operating Mode (\Nn) 0=\N0 is selected 1=\N1 is selected 2=\N2 is selected 3=\N3 is selected 4=\N4 is selected
S54	Bit Mapped			Bit Mapped Registers
S59	0-1	ASCII	1	MNP Options 0=%C0 is selected. 1=%C1 is selected.
S62	0-17	ASCII	16	DTE Rate Status 0=300bps 1=600bps 2=1200bps 3=2400bps 4=4800bps 5=7200bps 6=9600bps 7=12000bps 8=14400bps 9=16800bps 10=19200bps 11=21600bps 12=24000bps 13=26400bps 14=28800bps 15=38400bps 16=57600bps 17=115200bps

Result Codes

Result Code	Numeric Value	Description
OK	0	Modem successfully executed a command line.
CONNECT	1	Connection made at 300 bps.
RING	2	Modem detected an incoming call.
NO CARRIER	3	Modem lost or could not detect a remote carrier signal within the Register S7 time.
ERROR	4	Modem found an error in the command line.
CONNECT 1200	5	Modem established a connection 1200 at 1200bps.
NO DIALTONE	6	Modem did not detect a dial tone within 5 seconds after going off-hook.
BUSY	7	Modem detected a busy signal.
NO ANSWER	8	Five seconds of silence was not detected when using the @ command in the dial command line.
CONNECT 2400	10	Modem established a connection at 2400 bps.
CONNECT 4800	11	Modem established a connection at 4800 bps.
CONNECT 9600	12	Connection made at 9600 bps.
CONNECT 14400	13	Connection made at 14400 bps.

Result Code	Numeric Value	Description
CONNECT 19200	14	Connection made at 19200 bps.
CONNECT 7200	24	Connection made at 7200 bps.
CONNECT 12000	25	Connection made at 12000 bps.
CONNECT 21600	55	Connection made at 21600 bps.
CONNECT 24000	56	Connection made at 24000 bps.
CONNECT 26400	57	Connection made at 26400 bps.
CONNECT 28800	58	Connection made at 28800 bps.
CONNECT	86	Connection made at 16800 bps.

Appendix E: Popular Software Initialization Strings

FAX	Setting	Initialization String
<i>WINDOWS 3.1</i>		
FaxWorks	Automatic	ATJ0\Q3
Winfax Pro	Boca Modem	AT&F&C1&D2&K3S7=55
Procom Plus Fax	Boca Modem	
	V.34 Fax/Data	AT&F&C1&D2
Bit Fax Pro	Generic Class 1	AT&FV1&C1&D2
FAX	Setting	Initialization String
<i>WINDOWS 95</i>		
FaxWorks	Automatic	ATJ0\Q3
Microsoft Fax	Automatic	No string needed
Procom Plus Fax	Boca Modem	
	V.34 Fax/Data	AT&F&C1&D2
DATA	Setting	Initialization String
<i>WINDOWS 3.1</i>		
Procom Plus	Boca Modem	
	V.34 Fax/Data	AT&F&C1&D2
Qmodem Pro	Boca V.32bis 14.4 Fax	AT&F&C1&D2&K3&Q9W2
Pc Anywhere	Comm. Port	AT&F&C1&D2
DATA	Setting	Initialization String
<i>WINDOWS 95</i>		
Hyperterminal	Automatic settings	No string needed
Qmodem Pro	Direct to COM port	AT&F&C1&D2^M
Procom Plus	Boca Modem	
	V.34 Fax/Data	AT&F&C1&D2

On-Line Services	Setting	Initialization String
America On-Line	MV.34KI(2.5)	AT&F&C1&D2\N3S95=1^M
Compuserve	Hayes	ATS0=0Q0V1&C1&D2^M
Prodigy	Auto detect	No string to change
Dial-Up Internet	Setting	Initialization String
GNN	Hayes Comp. Error correcting	AT&F&C1&D2&K3&Q5E1V1Q0X4^M
NetCruiser	Boca 14.4 Speed 28,800	AT&F&C1&D2&K3% C1E1\N3S95=47^M

Appendix F: Servicing Your Boca Product

If your modem requires service, first contact the authorized dealer from whom you purchased the modem. If the dealer is unable to assist you, and you must contact Boca Research, Inc., please follow the instructions below.

Our electronic BBS is available 24 hours a day at (407) 241-1601 and will support data transmission speeds up to 28.8Kbps with settings of N, 8, 1. Once your modem is functional, the BBS may be helpful (especially during off hours) if you have a question about product settings, or if you wish to download special software or utilities.

If the Troubleshooting section (Section Three) did not resolve your problem, you may call our technical support staff for assistance. If you haven't referred to the Troubleshooting section, do so now.

NOTE: CALLING TECHNICAL SUPPORT WITHOUT COMPLETE AND ACCURATE INFORMATION CONCERNING YOUR PROBLEM MAY BE BOTH TIME-CONSUMING AND FRUSTRATING FOR YOU.

1. When calling Boca Research Technical Support, have the following information available:

- Board name and part number
- Computer manufacturer
- Computer Model
- Peripherals in system
- Operating system and version

If you suspect a problem with a specific program or software package, make note of the name, version or release number, and manufacturer of the software.

2. Call our Technical Support Department between the hours of 8:00 a.m. and 6:30 p.m. EST Monday through Friday at (407) 241-8088. A technician will be available to discuss the problem(s) you are experiencing.

If factory service is required, you will be given a Return Merchandise Authorization (RMA) number. **Please place this number on the outside of the package** when you return the item(s) for service and reference it on any correspondence included in the package. Boca Research, Inc. will return any product which is not accompanied by an RMA number.

3. Refer to the Warranty Statement if the product is covered under the five-year Boca Research, Inc. Limited Warranty.
4. Certain parts will not be covered under the Boca Research, Inc. Limited Warranty. Dealer installed parts are warranted by the dealer. Parts which you have installed yourself are covered only by the supplier's warranties. In these cases, Boca Research, Inc. can identify which parts are defective, but will not replace such parts until specific written authorization is received from you. The cost of parts and labor involved in making such repairs will be billed to you C.O.D.
5. When sending the modem to Boca Research, Inc. for repairs, please be sure to include:
 - the MV34AI or FDSP34AI modem (board only)
 - a copy of the original invoice
 - your return street address (for UPS purposes)
 - phone number
 - the RMA number mentioned above

Package the product securely in a container equivalent to the original packaging, and insure the package to protect against loss or damage during transit. Shipping charges must be prepaid; C.O.D. shipments will not be accepted. Please use the address below for all correspondence:

Boca Research, Inc.
RMA Department - RMA # _____
1601 Clint Moore Road
Boca Raton, FL 33487-2841

6. If the repairs performed on your modem were covered by the warranty, Boca Research, Inc. will return it prepaid via UPS.

Appendix G: Warranty Information

Limited Warranty

Boca Research, Inc. (BRI) warrants to the original buyer of this BRI product that the hardware is free of defects in materials and workmanship for a period of five (5) years from the date of purchase from BRI or its authorized dealer. Should the product fail to be in good working order at any time during the five-year period, BRI, will at its option, repair or replace this product as described below. This warranty does not cover defects resulting from misuse, abuse, negligence, accident, repairs, or alterations made by either the customer or another party. Boca Research reserves full rights to determine whether a defective product falls into this category.

The entire risk as to the quality and performance of the product rests with the customer. Any written or oral information or advice given by Boca Research dealers, distributors, agents, or employees will in no way increase the scope of this warranty. This warranty applies only to the product described in this manual and not to any other value-added software which may be included.

All customers are required to demonstrate proof of purchase when requesting a Return Merchandise Authorization (RMA). The period of service commences on the date of purchase. A copy of the sales slip must be included with the returned merchandise.

Products which require Limited Warranty service during the warranty period should be delivered to BRI at the address in the Appendix (Servicing Your Boca Product) with proof of purchase and the Return Merchandise Authorization (RMA) number provided by BRI Technical Support. Refer to the Appendix in your manual. Replacement parts or complete products will be furnished on an exchange basis only. Replaced parts and/or products become the property of BRI.

If the returned product is sent by mail, the purchaser agrees to prepay shipping charges, insure the product or assume the risk of loss or damage which may occur in transit, and to use a shipping container equivalent to the original packaging. ALL EXPRESS AND IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OF PURPOSE FOR THE PRODUCT ARE LIMITED IN DURATION TO THE ABOVE FIVE-YEAR PERIODS.

UNDER NO CIRCUMSTANCES (WHETHER BASED IN CONTRACT OR TORT) SHALL BOCA RESEARCH BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL, OR PUNITIVE DAMAGES OF ANY KIND, OR FOR LOSS OF REVENUE, LOSS OF BUSINESS, OR OTHER FINANCIAL LOSS AS A RESULT OF THE SALE, INSTALLATION, MAINTENANCE, USE, PERFORMANCE, FAILURE, OR DISRUPTION OF ITS PRODUCTS.

Boca Research reserves the right to make periodic changes or enhancements to any Boca Research product without prior notification, but has no obligation to modify or update products once sold.

This warranty gives you specific legal rights, and you have other rights which may vary from state to state. This warranty is valid only in the United States.

WARNING/ATTENTION

#1“**CAUTION:** THIS MODEM CARD IS INTENDED TO BE INSTALLED IN CSA CERTIFIED EQUIPMENT IN THE FIELD BY THE USER IN THE MANUFACTURER'S DEFINED OPERATOR ACCESS AREA. CHECK THE EQUIPMENT OPERATING/ INSTALLATION INSTRUCTIONS AND/OR EQUIPMENT MANUFACTURER TO VERIFY/CONFIRM IF YOUR EQUIPMENT IS SUITABLE FOR USER-INSTALLED APPLICATION CARDS.”

“**ATTENTION:** CETTE CARTE MODEM EST DESTINEE A ETRE INSTALLEE PAR L'UTILISATEUR, SUR PLACE ET A L'INTERIEUR DE LA ZONE DEFINIE PAR LA FABRICANT, DANS UN APPAREIL CERIFIE CSA. CONSULTER LE MODE D'EMPLOI OU LE FABRICANT DE L'APPAREIL POUR VERIFIER OU CONFIRMER SI L'UTILISATEUR PEUT Y INSTALLER LUI-MEME DES CARTES PERIPHERIQUES.”

#2“**CAUTION:** ALWAYS DISCONNECT MODEM BOARD (THE ONE WITH THE TELEPHONE/PLUG JACK) FROM THE TELEPHONE SYSTEM WHEN INSTALLING OR WHEN COVERS ARE REMOVED FROM THE HOST PRODUCT.”

“**ATTENTION:** TOUJOURS DEBRANCHER LA LIGNE TELEPHONIQUE DE LA CARTE MODEM (MUNIE D'UNE PRISE OR D'UNE FICHE) AVANT DE PROCEDER A L'INSTALLATION DANS L'APPAREIL OU LORSQUE LE COUVERCLE DE CELUI-CI EST RETIRE.”

#3“**CAUTION:** APPLY THE ENCLOSED ADHESIVE WARNING LABEL TO THE OUTSIDE OR INSIDE OF THE EQUIPMENT ENCLOSURE ADJACENT TO THE MODEM CARD.”

“**ATTENTION:** APOSER L'ETIQUETTE AUTOCOLLANTE DE MISE EN GARDE CI-INCLUSE SURE LE PAROI EXTERIEURE OU INTERIEURE DU BOITIER DE L'APPAREIL PRES DE LA CARTE MODEM.”



Manual Part No. 9484
Rev. 2.0