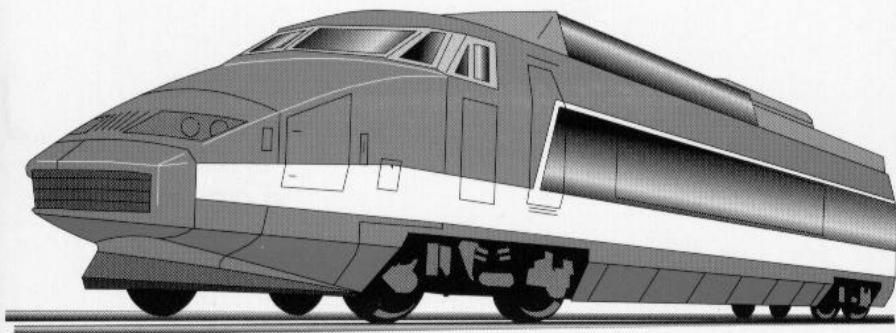


# On-Line *EXPRESS* 144™



External Data & Fax Modem for Windows™

Product Code: M144AE



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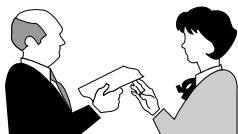
## Before You Begin your Installation

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 page.

---



**Boca BBS**  
407-241-1601



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



**Technical  
Support Fax**  
407-997-0918



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



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

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.

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



## ***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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All Boca Research products are trademarks of Boca Research, Inc. All other references to computer systems, software, and peripherals use trademarks owned by their respective manufacturers.

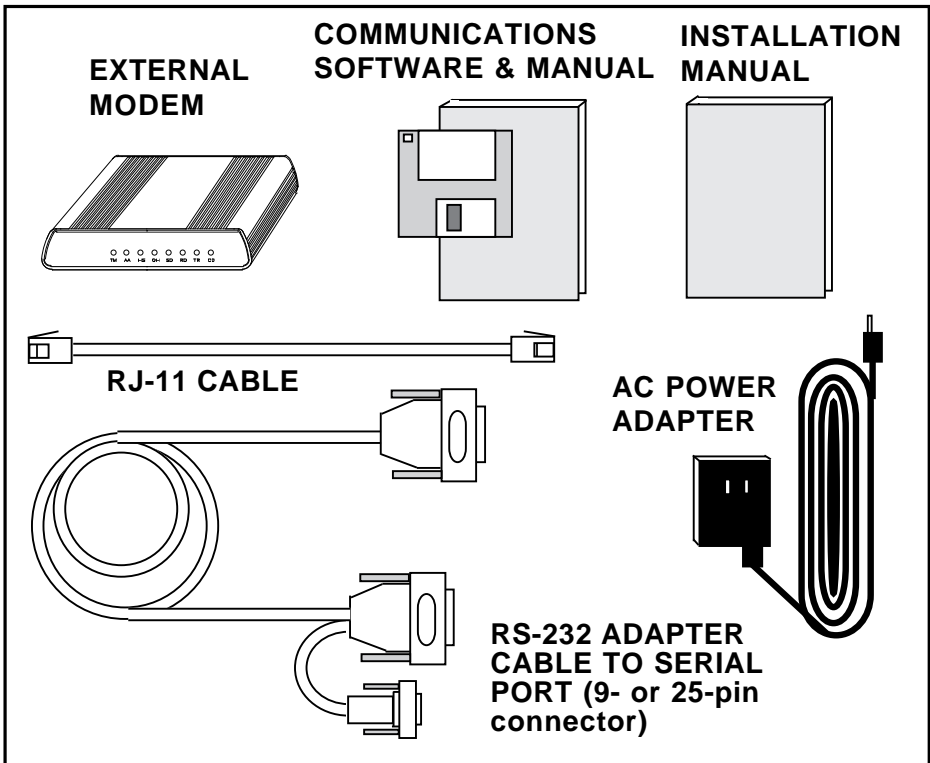
**Publication Date:** March, 1995  
Printed in the U.S.A.

M144AE.PM5

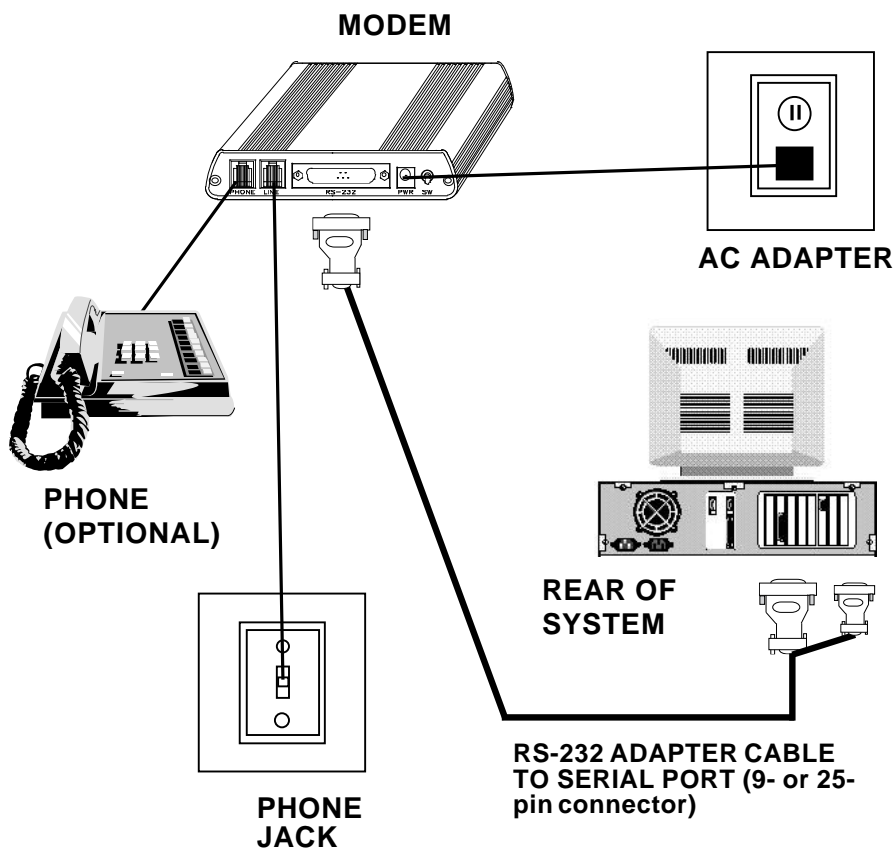
---

# *EXPRESS* Install

Congratulations on the purchase of your On-Line *EXPRESS* 14.4 (M144AI) from Boca Research, Inc., a leader in high-tech computer enhancement products. Get started with the streamlined *EXPRESS* Install provided here. The balance of the manual contains a product overview, troubleshooting, technical specifications, and a comprehensive AT command reference. Make sure you have received the following items:



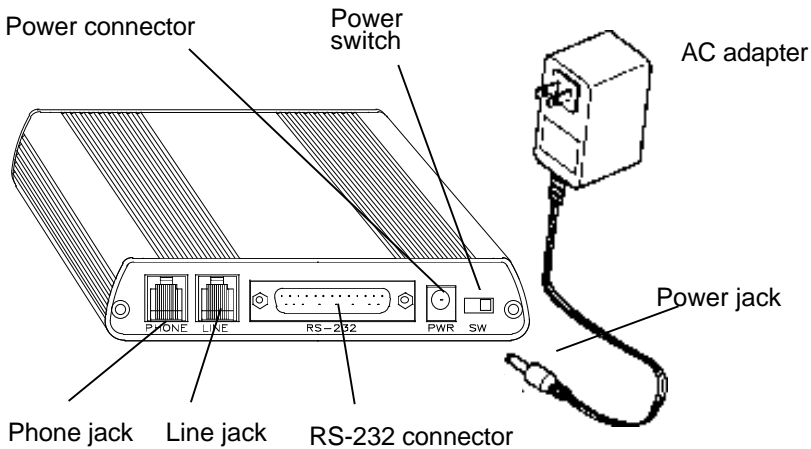
# Installation Overview



*For details on the procedure outlined above, continue with the **EXPRESS Install** on pages 8-12.*

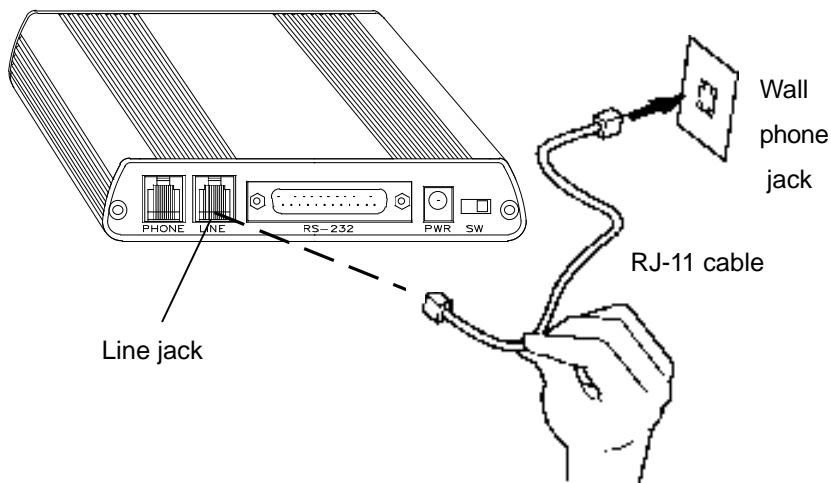
## Installing the On-Line *EXPRESS* Modem

1. Turn off your computer and all peripheral devices.
2. Examine the back of the modem and review the interfaces as shown below.
3. Check to make sure that the power switch is OFF (RIGHT). Then plug the small end of the power adapter into the power jack on the back of the modem and plug the power adapter into a standard 120V AC wall socket.

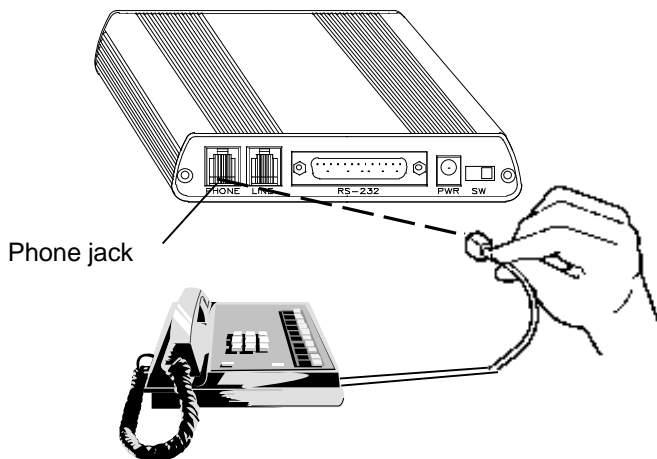


4. Disconnect your present phone cord from the wall jack. Plug the end of the phone cord that came with the modem into the wall jack, and the other end into the RJ-11 jack at the rear of the modem marked **LINE**.

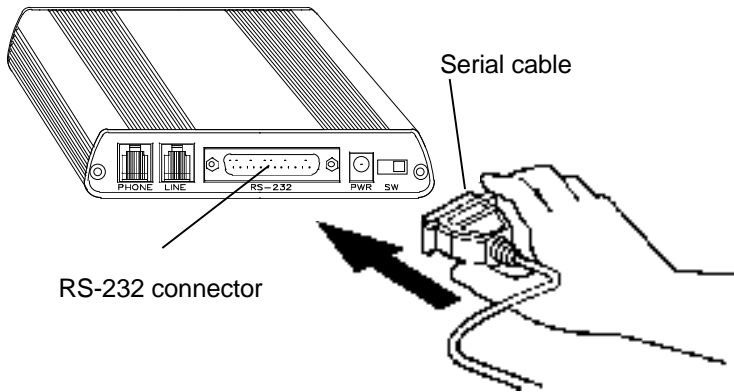




If you want to keep your telephone connected for conventional calls, plug its cord into the other jack at the rear of the modem labeled **PHONE**.



5. Lastly, connect the modem to the computer's serial port with the serial cable. The modem is now ready to be tested and operated. Turn your computer on now, then switch ON the modem (switch in the LEFT position).



6. Install your communications software now. Depending on the software you choose, refer to the appropriate manual for start-up and configuration. Following that, you are ready to test the connection.

## Testing the Connection

1. Note the status indicators as explained on the following page, then continue.

Indicator	Definition	Status
TM	Test Mode	<b>FLASHES</b> when modem is in test mode and if any errors are detected.
AA	Auto Answer	<b>ON</b> when in Auto Answer mode and when online with the host modem.
HS	High speed	<b>ON</b> when the modem is powered on or communicating with another modem at 4800bps or faster.
OH	Off Hook	<b>ON</b> when the modem takes control of the telephone line to establish a data link.
SD	Send Data	<b>FLASHES</b> when a data bit is sent to the modem by the computer.
RD	Received Data	<b>FLASHES</b> when a data bit is received from the phone line, or when the modem sends result codes to the computer.
TR	Terminal Ready	<b>ON</b> when the modem receives a data terminal ready signal from the computer via the RS-232 cable.
CD	Carrier Detect	<b>ON</b> when the modem receives a valid data signal (carrier) from a remote modem. Ready for data transmission.

2. If you are using a telephone, check for a dial tone using the telephone handset. If a dial tone is heard, continue with the next step. If you do not hear a dial tone, check the connections you made on pages 8-10, or refer to *Troubleshooting (Section Three)*.
3. Your communications software should already be loaded as instructed on page 10. If not, start it now and enter terminal mode.

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***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.***

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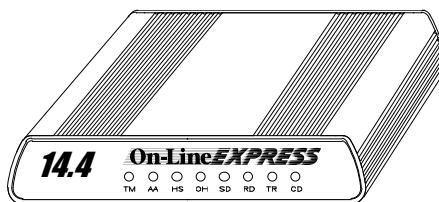
4. Type in the command **ATZ** followed by **ENTER** and the modem will respond with OK. If the modem does not respond with OK, refer to the Troubleshooting section of this manual.
5. Start your communications software and enter terminal mode; AT commands typed in at the DOS prompt will result in a “Bad command or file name” message. Type **ATH1** followed by **ENTER** and you should hear a dial tone from the speaker on the modem.
6. Type **ATH** followed by **ENTER** to put the modem on hook. This confirms that the modem has been successfully installed into the computer.
7. Your modem is now ready for use. Continue now with your communications software and documentation.



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## Section Two: Product Overview

The On-Line *EXPRESS* modem by Boca Research, Inc. combines high-speed data, modem, and fax capability on a single device. It also features V.32bis, which provides high-speed data transmission.



### Features

- Data transmission rates of 14.4K, 12K, 9600, 7200, 4800, 2400, 1200, or 300bps.
- Programmable speaker volume control
- Auto-speed sensing.
- Data throughput up to 57,600bps (with RPI support).
- Group 3 send and receive fax capability with support for Class 1 and Class 2 fax commands.
- Full error control (V.42 LAPM, MNP2-4) and data compression is available through host communications software that supports RPI. See *Appendix E* for a list of software developers who support this protocol.
- 100% data compatibility with the Hayes 'AT' command set.

The Appendix features a discussion of standard and extended ‘AT’ commands and S-Registers as well as high-level protocols.

## Installation Hints

Your modem has been pre-set at the factory for optimum performance. All defaults are set to allow the modem to negotiate the best possible connection. Because of these factory defaults, the suggested initialization (INIT) string is: **ATZ**. You should change the INIT string in all of your software packages to this INIT string.

If you want to custom configure your stored profiles, we suggest that you always start out with an **AT&F&C1&D2** before customizing other commands. This string will reset the modem to the factory defaults as well as reset some other basic settings. If modem performance suffers after modifying settings, send the INIT string above (AT&F...&D2) to the modem.

## Notes on Performance

To get optimum performance from your modem, the phone line quality over which you are transmitting and receiving must be reliable and relatively free of “noise”.



## Operational Requirements

The modem has few requirements and is easy to use. Be sure to read the information in the Appendix about connecting to the phone company. In addition, note the following:

- The communication settings are controlled by the software that manipulates the serial interface present in your system. The external modem is connected to that interface.
- Operating the modem with a computer requires communication software, either as a stand-alone product as included here, or as part of an application program.
- The modem takes a DB-25 (25-pin male connector), but computer equipment varies. Check the serial ports at the rear of your system.
- The modem uses an existing serial port on the back panel of your computer. It can be a 9-pin or 25-pin D-shell connector. Use the dual end (25-pin or 9-pin) of the cable supplied with your modem to connect to your system's serial port.

## Section Three: Troubleshooting

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

### **SYMPTOM**

### **POSSIBLE REMEDY**

**No dial tone.**

- 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.

**Modem will not connect to another modem.**

- 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**

- There may be a conflicting port address. Re-configure the modem's COM port address.





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**SYMPTOM****POSSIBLE REMEDY**

**No response when you type in AT commands (contd)**

- Verify that the communication software is set to the same communications port where your modem is attached (e.g., COM1, COM2). Check IRQ settings in your software.
- Try typing AT&F to reset the modem to its factory defaults.
- Move the modem to another serial port (**power down the host computer first**). If the modem works after being moved, it's likely the problem is not with the modem.

**AT commands not visible.**

- 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.**

- 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.

**SYMPTOM****POSSIBLE REMEDY**

**After data connection is established, data is displayed as garbled characters. (contd)**

- 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.**

- You may not have enabled auto-answer. Use your software to enable this function.
- 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.

**Modem disconnects while on-line.**

- Check for any loose connections.
- 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.

**My software does not support a speed of 14.4Kbps.**

- 14.4Kbps refers to modem to modem speed. Select 19.2Kbps (or faster if your hardware supports it) for computer to modem speed.



---

SYMPTOM	POSSIBLE REMEDY
<b>I am having trouble getting my init string to work.</b>	<ul style="list-style-type: none"><li>• Init strings are primarily personal preferences. Use the most basic one that can get the job done. See Installation Hints, page 8.</li></ul>
<b>My 2400bps (or other modem) worked with my system but the this modem does not.</b>	<ul style="list-style-type: none"><li>• Review earlier suggestions.</li><li>• Make sure you use software included with modem.</li></ul>
<b>I need the modem to connect at a certain speed.</b>	<ul style="list-style-type: none"><li>• Send an AT&amp;Q6N0S37=n where n= 9 for 9600, 6 for 2400, 5 for 1200, 1 for 300bps.</li></ul>
<b>Connection Errors.</b>	<ul style="list-style-type: none"><li>• Try connecting at a lower speed (e.g., 9600 or 2400bps).</li><li>• Turn off error correction/compression with an AT&amp;Q6%C0 command.</li><li>• Noisy/poor line conditions may prohibit connection. Have your phone company test your lines.</li><li>• Verify that the modem at the other end is up to date and compliant with current CCITT and Bell standards.</li></ul>

---

**SYMPTOM****POSSIBLE REMEDY**

**Problem  
Connecting to  
On-line  
subscription  
services.**

- Some on-line services require that your modem be configured to run with error correction and data compression turned **OFF**. The easiest way to accomplish this is by using the command **AT&Q6** and setting the communication software to the correct baud rate for the service you are calling (e.g., 2400, 9600bps). If you still have problems connecting, try forcing the modem to connect up at the slower speed with the commands **AT&Q6F5** for 2400 baud, and **AT&Q6F8** for 9600 baud services.



## Appendix A: 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 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.

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 the DOS prompt.

AT Command[parameter]AT Command[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:

**Extended AT Commands:**

the *ampersand* (&) character

the *backslash* (\) character

the *percent* (%) character

**Examples:** AT&V tells the modem to display (view) its configuration and user profile, providing the modem has non-volatile RAM, meaning it can store limited amounts of information when power is off. AT%E1 tells the modem to monitor line quality.

## 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.

The “V-Dot” standards are more numerous, but have a single origin: 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 below:

**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.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.\*

\* See *Appendix D* for list of software developers who support these protocols through RPI (Rockwell Protocol Interface)





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## Appendix B: Technical Specifications

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

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

**Compatibility:** **Modem Modulation Protocols**

**ITU-T:** V.32bis, V.32, V.22 (2400bps), V.21 (1200bps)

**Bell:** Bell 212A (1200bps), Bell 103 (300bps)

**Fax Modulation Protocols**

V.17 (14,400/12,000bps transmit and receive)  
V.29 (9600/7200bps) transmit and receive  
V.27 ter (4800/2400bps) transmit and receive  
V.21 channel 2 (300bps) transmit and receive

**Diagnostics:** Local/remote digital and analog loopback  
Automatic power-on self-test

**LED Status**

**Indicators:** TM, AA, HS, OH, SD, RD, TR, CD

### Physical and Electrical Characteristics

- Dimensions: 7 1/4" x 5 3/8" x 1 1/4"
- Power: 500 mA@ 5V
- 2 RJ-11 modular phone connectors
- RS-232 serial port

### Operating Temperature Requirements:

Dry Bulb Temperature: 10-40° C (50-104° F)

Relative Humidity: 8-80%

Storage: 1-60° C (33.8-140° F)

## 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 modem board.

### ***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 underside of the modem.

## Appendix D: RPI Application Software Developers

The following lists software vendors who support RPI (Rockwell Protocol Interface). This standard allows the communication software to engage V.42, V.42bis, and MNP5 protocols and data compression.

### *Software Developer:*

**Smith-Micro**  
51 Columbia  
Aliso Viejo, California 92656

**Tradewind**  
1301 E. Alostia Ave.  
Suite 3900  
Glendora, California 94538

**Bit Software**  
47987 Fremont Blvd.  
Fremont, California 94538

**MagicSoft/WordPerfect**  
1555 N. Technology Way  
Orem, Utah 84057

**SoftKlone**  
Suite 100  
327 Office Plaza Drive  
Tallahassee, Florida 32301

**Phoenix Corporation**  
846 University Ave.  
Norwood, Massachusetts 02062



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## Command Reference

BASIC AT COMMANDS (default values are highlighted)

Command	Description
AT	Attention characters
ATA	Answer command
A/	Re-Execute last command

### Transmit Carrier Signal

ATC0	<b>Transmit carrier signal off. (default)</b>
ATC1	Transmit carrier signal on.

### Dial Modifiers

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. Default is 50 seconds.
ATD,	0-255sec	Pause. Default is 2 seconds.
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.

---

## Command      Description

### Comand character echo

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

### Select Line Modulation Speed

- ATF0      **Select auto-detect mode (connect as fast as possible) (default)**  
ATF1      Connect at 1200bps (V.21 or Bell 103)  
ATF2      Reserved  
ATF3      Connect at 75/1200 bps (V.23)  
ATF4      Connect at 1200 bps (V.22 or Bell 212A)  
ATF5      Connect at 2400 bps (V.22bis)  
ATF6      Connect at 4800 bps (V.32 or V.32bis)  
ATF7      Connect at 7200bps (V.32bis)  
ATF8      Connect at 9600 bps (V.32 or V.32bis)  
ATF9      Connect at 12,000 bps (V.32bis)  
ATF10     Connect at 14,400 bps (V.32bis)

### Switch Hook Control

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

### Modem Identification

- ATI0      Displays the product identification code.  
ATI1      Displays the checksum.  
ATI2      Displays ROM checksum as OK or ERROR.  
ATI3      Displays the firmware revision level.





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Command	Description
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### Speaker volume

ATL0	Off or low volume.
ATL1	<b>Low volume. (default)</b>
ATL2	Medium volume.
ATL3	High volume.

### Speaker control

ATM0	Disables the modem speaker.
ATM1	<b>Turns speaker on until carrier has been detected. (default)</b>
ATM2	Instructs the modem speaker to stay on all of the time.
ATM3	Enables speaker after dialing until connection is established.

### Automode enable

ATN0	Requires speed of the connection be that specified by the value of S37.
ATN1	<b>Permits handshaking at any speed supported by both modems. (default)</b>

### Return to on line state mode

ATO0	Switches the modem from command mode to on-line mode without dialing.
ATO1	Switches from command mode to on-line mode and initiates an equalizer retrain sequence during 2400 baud bps operation.

### Mode responses

ATQ0	<b>Enables result codes to be issued to the screen. (default)</b>
ATQ1	Disables result codes to be issued to the screen.

---

Command      Description

Result code format

ATV0            Numeric format.  
ATV1            **Verbal format. (default)**

Error correction message control

ATW0            **Error correction call progress not reported.  
(default)**  
ATW1            Call progress reported.  
ATW2            Call progress not reported. Connect xxxx  
message reports DCE speed.

Extended result codes

ATX0            Disables monitoring of busy tones unless  
forced otherwise by country requirements;  
sends only OK, CONNECT, RING, NO  
CARRIER, ERROR and NO ANSWER result  
codes.  
  
ATX1            Disables monitoring of busy tones unless  
forced otherwise by country requirements;  
sends only OK, CONNECT, RING, NO  
CARRIER, ERROR, NO ANSWER and  
CONNECT XXXX result codes.  
  
ATX2            Disables monitoring of busy tones unless  
forced otherwise by country requirements;  
sends only OK, CONNECT, RING, NO  
CARRIER, ERROR, DIAL TONE, NO  
ANSWER and CONNECT XXXX result codes.



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Command	Description
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ATX3	Enables monitoring of busy tones; sends only OK, CONNECT, RING, NO CARRIER, ERROR, NO DIALTONE, NO ANSWER and CONNECT XXXX.
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ATX4	<b>Enables monitoring of busy tones and sends all messages. (default)</b>
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#### Control long space disconnect

ATY0	<b>Disables long space disconnect. (default)</b>
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ATY1	Enables long space connect.
------	-----------------------------

#### Soft reset and restore profile

ATZ	<b>Restores stored profile 0 (default).</b>
-----	---

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.
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## Extended AT Commands

Command      Description

### Data carrier detect (DCD) signal

AT&C0      **Forces DCD signal to be on at all times. (default)**

AT&C1      DCD on indicates presence of data carrier.

Data terminal ready (DTR) signal. Interprets the ON to OFF transition of the DTR signal from the DTE according to the &Q settings.

AT&D0      &Q0,5,6. DTR ignored.  
&Q1,4. Modem hangs up; auto answer not affected.  
**&Q2,3. Modem hangs up; auto answer inhibited. (default)**

AT&D1      &Q0,1,4-6. Asynchronous escape sequence.  
&Q2,3. Modem hangs up; auto answer inhibited.

AT&D2      &Q0-6. Modem hangs up; auto answer inhibited.

AT&D3      &Q0,1,4-6. Modem does a soft reset as if the ATZ command were received;  
&Q2,3. Modem hangs up; auto answer inhibited.

### Recall Factory Defaults

AT&F      Recalls factory defaults. Instructs the modem to use the factory set parameters.

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Command	Description
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### DTE/Modem flow control

AT&K0	Disable flow control.
AT&K3	<b>Enable RTS/CTS (default for data modem)</b>
AT&K4	Enable XON/XOFF.
AT&K5	Enable transport XON/XOFF.
AT&K6	<b>Enable both RTS/CTS and XON/XOFF (default for FAX modem)</b>

***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 follows:*

#### RECEIVER

#### TRANSMITTER

CTS ON	—————>	START SENDING
CTS ON	←————	RTS ON (ready to send)
CTS OFF	—————>	RTS OFF (stop sending)

### Select pulse dial make/break ratio

AT&P0	<b>Selects a make/break ratio of 39/61 at 10pps. US and Canada. (default)</b>
AT&P1	Selects a make/break ratio of 33/67 at 10pps. UK and Hong Kong.
AT&P2	Same as 0 except at 20pps.
AT&P3	Same as 1 except at 20pps.

### Asynchronous mode

AT&Q0	Direct Asynchronous mode.
AT&Q5	<b>Modem negotiates an error-corrected link. (default)</b>
AT&Q6	Selects asynchronous operation in normal mode (i.e. speed buffering).

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Command      Description

### Data Set Ready (DSR) signal

**AT&S0**      Causes DSR signal to be active at all times. (default)

**AT&S1**      Causes DSR signal to be active according to the CCITT specification.

### 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 mode 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.

### View Configuration

**AT&V**      View current configuration and user profile.

### Store user profile

**AT&W0**      Saves as user profile 0.

**AT&W1**      Saves as user profile 1.

### Designate default user profile

**AT&Y0**      Selects user profile 0.

**AT&Y1**      Selects user profile 1.



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## Store user profile

### Stored phone number

AT&Z=0        Stores a 36 digit dial string.  
AT&Z=1        Stores a 36 digit dial string.  
AT&Z=2        Stores a 36 digit dial string.  
AT&Z=3        Stores a 36 digit dial string.

**Auto-retrain.** Determines whether or not the modem automatically monitors the line quality and requests a retrain when necessary.

**AT%E0**        **disables line quality monitor auto-retrain (default)**  
AT%E1        enables line quality monitor auto-retrain  
AT%E2        enables line quality monitor auto retrain and auto fall back/forward.

### Report Received Signal Level.

AT%L        009 = -9 dBm, 010 = -10dBm, etc. all the way to 043 (-43 dBm)

Line signal and noise are determined by the unit of measurement dBm (decibel referenced to one milliwatt). To arrive at a signal/noise ratio, the noise level is subtracted from signal level in dBm.

**Report Line Signal Quality.** Returns a “high-order” byte of the calculated EQM (“eye quality monitor”). This can range from 0 to 255. When the value is 8 or greater, the modem will automatically retrain if enabled by the AT%E1 command. The value for a normal connection ranges from 0 to 2 and approaches 8 for a progressively poorer connection. Returns an OK result code.

000 to 007    no retrain  
008 to 255    retrain performed if enabled by %E1.

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## 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.



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Register	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	0-32	ASCII	8	Backspace character.
S6	2-255	seconds	2	Wait time for Blind Dialing.
S7	1-255	seconds	50	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				Reserved.
S12	0-255	seconds	50(1)	Escape code guard time (in one-fiftieth second increments)
S13				Reserved.
S14	Bit Mapped	AA,hex		Bit mapped registers.
S15				Reserved
S16	Bit Mapped	80,hex		Modem test options.
S17				Reserved.
S18	0-255	seconds	0	Test timer.
S19				Reserved.
S20				Reserved.

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Register	Range	Units	Default	Definition
S21	Bit Mapped	00,hex		Bit mapped registers.
S22	Bit Mapped	75,hex		Bit mapped registers.
S23	Bit Mapped	07,hex		Bit mapped registers.
S24	0-255	seconds	0	Sleep Inactivity Timer.
S25	0-255	seconds	5	Asynchronous DTR Delay.
S26	0-255	seconds	1	Delay Interval.
S27		9,hex		Bit mapped registers.
S28				Bit mapped registers
S29				Reserved.
S30	0-255	seconds	0	Inactivity Timer.
S31	Bit Mapped Options.			
S32	0-255	ASCII	17	XON Character.
S33	0-255	ASCII	19	XOFF Character.
S34-35				Reserved.
S37	0-21		0	Modem to Modem speed

*NOTE: This is interlinked with the ATFn command. If an invalid number is entered, the number is accepted into the register, but S37 will react as though the default value has been entered.*



Register	Range	Units	Default	Definition
Bits 0-4:				
0	=	<b>Attempt auto mode connection (ATF0)(DEFAULT)</b>		
1-3	=	Attempt to connect at 300bps		
4	=	Reserved		
5	=	Attempt to connect at 1200bps (ATF1)		
6	=	Attempt to connect at 2400bps (ATF4)		
7	=	Attempt to connect at V.23 (ATF3)		
8	=	Attempt to connect at 4800bps (ATF6)		
9	=	Attempt to connect at 9600bps (ATF8)		
10	=	Attempt to connect at 12Kbps (ATF9)		
11	=	Attempt to connect at 14.4Kbps (ATF10)		
12	=	Attempt to connect at 7200bps (ATF7)		
S40	Bit Mapped			Bit Mapped Registers.
S41	Bit Mapped			Bit Mapped Registers.
S42-45				Reserved.
S49-81				Reserved.
S92	0 to -15 dBm		10	Fax Transmit Level.
S95	Bit-Mapped		NA	Extended Results Codes.

*NOTE: Bit values are defined as follows for S95:*

- 0 = CONNECT CODE indicates DCE speed instead of DTE speed.
- 1 = Append ARQ (automatic repeat request) to verbose CONNECT XXXX result code if protocol is other than none.
- 2 = Enable CARRIER XXXX result code.
- 3 = Enable PROTOCOL XXXX result code.

Bits 4, 6, and 7 are reserved.

## Result Codes

<b>Result Code</b>	<b>Numeric Value</b>	<b>Description</b>
OK	0	Modem successfully executed a command line.
CONNECT 300	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 0600	9	Modem established a connection at 600 bps.
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.
+FCERROR	+F4	Fax carrier error.
CONNECT 7200	13	Connected as data modem during an answer.
CONNECT 12000	14	Connection made at 12000 bps.
CONNECT 14400	15	Connection made at 14400 bps.
CONNECT 19200	16	Connection made at 19200 bps.
CONNECT 38400	17	Connection made at 38400 bps.



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<b>Result Code</b>	<b>Numeric Value</b>	<b>Description</b>
CONNECT 57600	18	Connection made at 57600 bps.
CONNECT 115200	19	Connection made at 115,200 bps.
CONNECT 75TX/1200RX	22	Modem returns this result code when upon establishing a V.23 originate connection when the modem has been instructed to report the DTE speed to the DTE upon connecting.
CONNECT 1200RX/75RX	23	Modem returns this result code when upon establishing a V.23 answer connection when the modem has been instructed to report the DTE speed to the DTE upon connecting.
CARRIER 300	40	Carrier rate of 300 bps.
CARRIER 1200/75	44	V.23 backward channel has been detected.
CARRIER 75/1200	45	V.23 forward channel has been detected.
CARRIER 1200	46	Carrier rate of 1200 bps.
CARRIER 2400	47	Carrier rate of 2400 bps.
CARRIER 4800	48	Carrier rate of 4800 bps.
CARRIER 7200	49	Carrier rate of 7200 bps.
CARRIER 9600	50	Carrier rate of 9600 bps.
CARRIER 12000	51	Carrier rate of 12000 bps.
CARRIER 14400	52	Carrier rate of 14400 bps.

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## 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 or external unit 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 On-Line *EXPRESS* modem (modem unit 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.



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# 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 products will be serviced and returned via UPS-ground at no charge to customers DURING the first year of service.

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- AND ONE-YEAR PERIODS, RESPECTIVELY.**

**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.

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**Manual Part No. 9435**  
**Rev. 2.0**