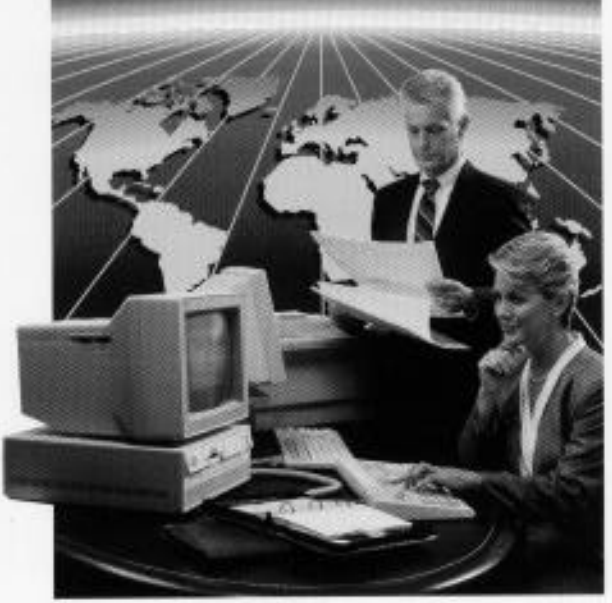
BOCA MODEM

V.34 DATA FAX



V.34 MODEM
28,800bps

Macintosh

New International Standard

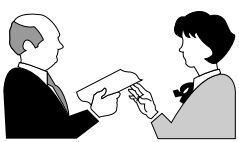
Product Code: MV.34MA

Before You Begin your Installation

The product you have purchased is designed to be easily installed into most Macintosh 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 Macintosh tasks. If you are not familiar with these tasks, you should check your Macintosh documentation, 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

Automated *Fax Retrieval System*
407-995-9456

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

Technical Support Fax
407-997-0918

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

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.

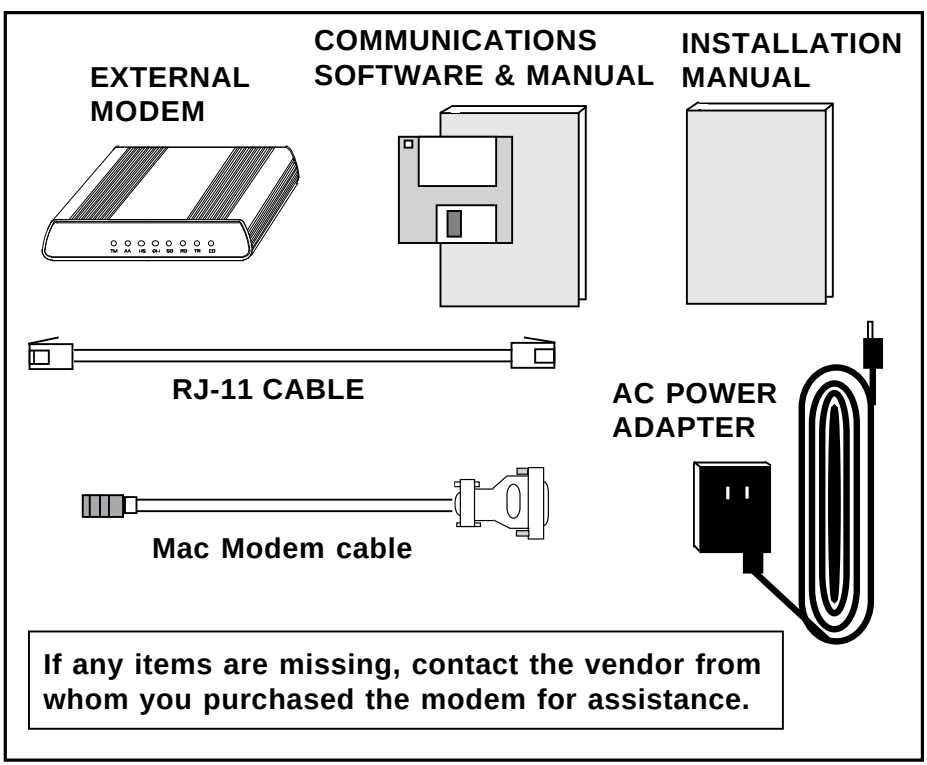
Damaged or Missing Items

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.

Contents

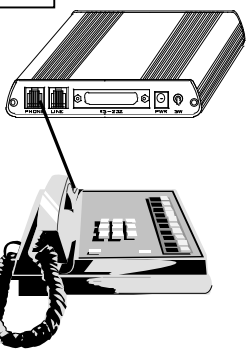
EXPRESS Install

Congratulations on the purchase of your MV.34MA modem for the Macintosh 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:

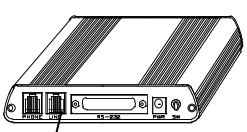


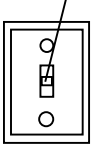
Installation Overview

START HERE

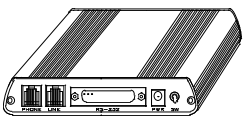


CONNECT EXISTING PHONE CABLE BETWEEN PHONE JACK AND PHONE (OPTIONAL)

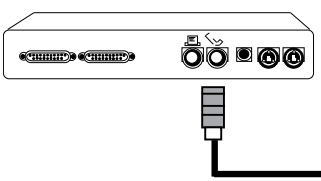


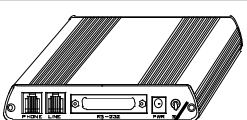


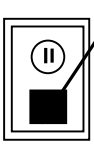
CONNECT SUPPLIED RJ-11 CABLE BETWEEN LINE JACK AND WALL PHONE JACK



CONNECT MAC CABLE TO MODEM PORT







CONNECT SUPPLIED AC POWER ADAPTER TO WALL OUTLET

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

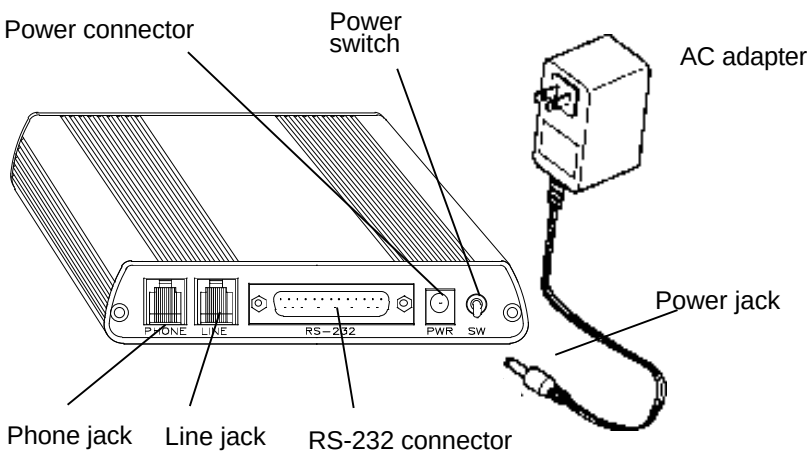
Installing the MV.34MA modem

Follow these simple steps to connect the modem to your computer:

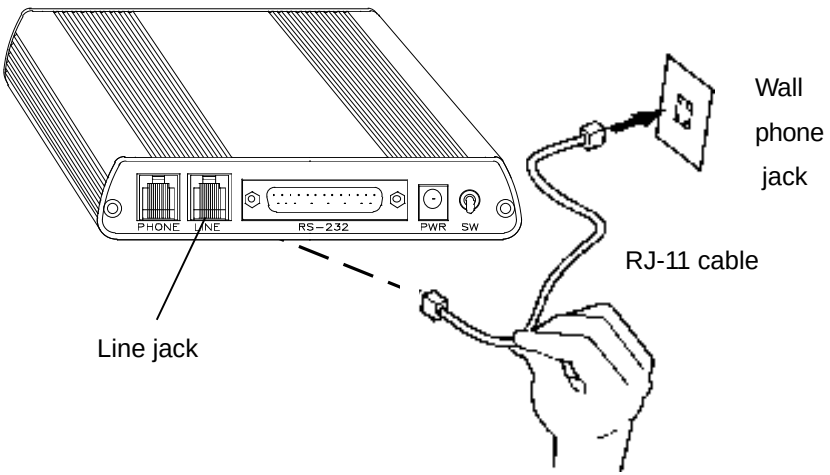
1. Turn off your computer and all peripheral devices.

2. Examine the back of the modem and review the attached interfaces as shown above.

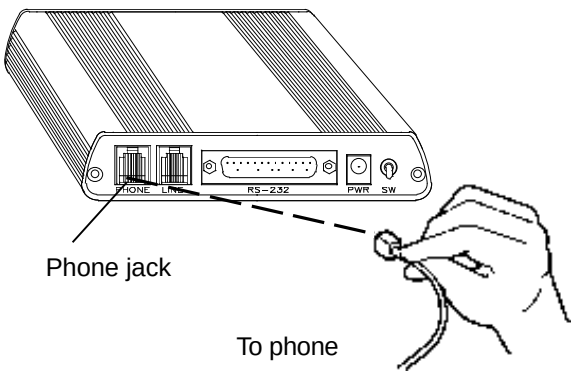
3. Check to make sure that the power switch is OFF (DOWN). Then plug the small end of the power adapter into the power jack on the back of the modem and plug the power adapter into a standard 110V AC wall socket.



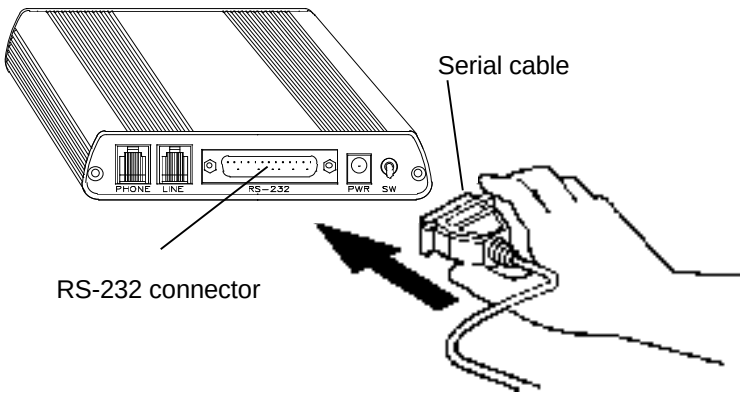
4. Disconnect your present phone cord from the wall jack. Plug the end of the phone cord that came with the modem into the wall jack, and the other end into the RJ-11 jack at the rear of the modem marked **LINE**.



5. 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**.



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



7. 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 below, then continue.

Indicator	Definition	Status
TM	Test Mode	**FLASHES** when modem is in test mode and if any errors are detected.
AA	Auto Answer	**ON** when in Auto Answer mode and when online with the host modem.
HS	High speed	**ON** when the MV.34MA modem is powered on or communicating with another modem at 4800bps or faster.
OH	Off Hook	**ON** when the MV.34MA modem takes control of the telephone line to establish a data link.
SD	Send Data	**FLASHES** when a data bit is sent to the MV.34MA modem by the computer.
RD	Received Data	**FLASHES** when a data bit is received from the phone line, or when the modem sends result codes to the computer.
TR	Terminal Ready	**ON** when the modem receives a data terminal ready signal from the computer via the RS-232 cable.
CD	Carrier Detect	**ON** when the modem receives a valid 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 8-11, or refer to the *Troubleshooting* section.

3. Your communications software should already be loaded as instructed on page 10. Most communications programs when started are in command mode. Refer to the program's documentation for additional information.

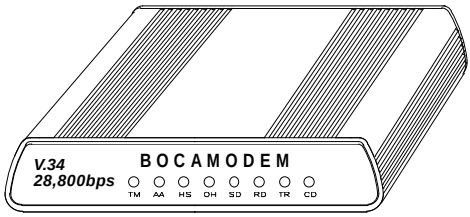
4. Start your communications software and enter command mode and type in the command **ATZ** followed by **ENTER** and the MV.34MA modem will respond with OK. If the MV.34MA modem does not respond with OK, refer to the Troubleshooting section of this manual.

5. 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 MV.34MA modem has been successfully installed into the computer.

7. Your MV.34MA modem is now ready for use. Continue now with your communications software and documentation.

Product Overview



The V.34 protocol offers the newest technology allowing faster and more reliable connections between modems. The MV.34MA modem for the Macintosh is based on the Rockwell chip set. This modem supports the highest possible speeds today.

What this Means for You

You can make connections faster and transmit data at a minimum of *100% faster than with existing technology*. For example, remote networking users can work at speeds similar to that of cabled workstations, instead of experiencing time-lag while data crosses the phone line. The MV.34MA modem lets you **SAVE TIME AND WORK SMARTER.**

Features

- Highest supported data transmission rates by the V.34 standard; 14.4Kbps send / receive fax.
- 100% compatible with the Hayes 'AT' command set.
- Auto-dial and auto-answer; tone or pulse dialing.
- Group III send and receive fax capability with support for Class 1 and Class 2 fax commands.

- DTE speed up to 115.2Kbps,serial CCITT V.24 (EIA / RS-232-D).
- Supports V.42 / MNP2-4 error control and V.42bis / MNP5 data compression for throughput up to 115.2Kbps.

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 with highest quality, data compression, and error correction. 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-K0** 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...-K0) to the modem.

Notes on Performance

To get optimum performance from your MV.34MA modem, the phone line quality over which you are transmitting and receiving must be reliable and relatively free of “noise”.

HOW THIS MANUAL IS ORGANIZED

***EXPRESS* Install.** This section provides streamlined instructions for installing the MV.34MA modem for the Macintosh, including how to make all connections as well as test the modem for operation.

Product Overview. An overview of the features of the MV.34MA modem.

Troubleshooting. This provides a description of the most common problems which may be encountered during installation and operation along with possible solutions.

Appendices. These include:

- technical specifications,
- FCC and DOC (Canada) compliance information,
- a brief survey of standard and extended AT command sets, S-registers, and high-level protocols,
- hardware diagnostics
- command reference,
- how to service your Boca product should the need arise,
- warranty information

Operational Requirements

The MV.34MA modem for the Macintosh 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 MV.34MA modem with a computer requires communication software, either as a stand-alone product as included here, or as part of an application program.

- The MV.34MA modem takes a DB-25 (25-pin male connector).

- The MV.34MA modem uses an existing modem port on your computer. The modem port requires an 8-pin DIN connector. Use the 8-pin DIN connector end of the cable supplied with the modem to connect to your system's modem port.

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 the *EXPRESS* installation section. ■ 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	■ Verify that the communication software is set properly

SYMPTOM	POSSIBLE REMEDY
No response when you type in AT commands (contd)	■ Check your serial cable connection. ■ Try typing AT&F to reset the modem to its factory defaults.
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. ■ Turn off your modem, exit, and re-run your communication software. ■ 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. ■ Exit the communications program and restart it.

SYMPTOM	POSSIBLE REMEDY
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.
I am having trouble getting my init string to work.	■ Init strings are primarily personal preferences. Use the most basic one that can get the job done. See Installation Hints, page 14. An &Q6 (which disables error control) is optional.

SYMPTOM	POSSIBLE REMEDY
Connection Errors	■ Try connecting at a lower speed (e.g., 9600 or 2400bps). ■ Turn off error correction / compression with an AT&Q6%C0 command. ■ Noisy / poor line conditions may prohibit connection. Have your phone company test your lines. ■ Verify that the modem at the other end is compliant with current CCITT and Bell standards.
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&Q6N0S37=**6** for 2400 baud, and AT&Q6N0S37=**9** for 9600 baud services.
Download terminates abnormally.	■ Make sure the AT&R1 is set in your active profile.

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 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 35-60 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.FC A Rockwell International-sponsored protocol. It can operate up to 28,800bps for data.

V.34 ITU-TSS protocol. It can operate up to 28,800bps for data.

Appendix B: Hardware Diagnostics

The MV.34MA modem includes several tests which evaluate the operation of the modem, its connection to the local DTE, and the communications link between the local and remote modems. Use of these tests requires setup of internal registers and may also require the use of two modems and a central office line simulator. **A thorough knowledge of modem operation and registers is needed for their use and should not be undertaken lightly.**

Local Analog Loopback Test

This test verifies the path between the local modem and the PC.

1. Set the DTE speed from 1200 to 28,800 bits per second. If the speed is less than 1200 or greater than 28,800 the test **WILL NOT** operate and a result code of ERROR will be generated if any tests are attempted.

2. Make sure the modem is in command mode (no connection made).

3. Issue an AT&Q0 command to the modem. This sets the modem to the direct mode.

4. Set the timer register (S18) for desired test time (in seconds). Example: “ATS18=10” provides for a 10 second test.

5. To begin the test, type AT&T1 [ENTER]. The modem should respond with a CONNECT message.

6. After the number of seconds specified in S18, the modem will terminate the test and respond with "OK".

Local Analog Loopback Test with Self-Test

This test verifies the integrity of the local modem's transmit and receive circuits.

1. Set the DTE speed from 1200 to 28,800 bits per second. If the speed is less than 1200 or greater than 28,800 the test **WILL NOT** operate and a result code of ERROR will be generated if any of the tests are attempted.

2. Make sure the modem is in command mode (no connection made).

3. Issue an AT&Q0 command to the modem. This sets the modem to the direct mode.

4. Set timer register (S18) for desired test time (in seconds). Example: "ATS18=10" provides for a 10 second test.

5. To begin, type AT&T8 [ENTER]. The modem responds with OK.

6. After the number of seconds specified in S18, the modem should respond with 000 (meaning 0 errors were found during the self test).

Remote Digital Loopback Test

1. Set the DTE speed from 1200 to 28,800 Bits per second. If the speed is less than 1200 or greater than 28,800 the test **WILL NOT** operate and a result code of ERROR will be generated if the test is attempted.

   The baud rate is also limited to the highest baud rate supported by the telephone line (28,800bps modulation is possible if the telephone line is without distortion and noise free). If the telephone line has problems, bring the baud rate down to 9600 or 2400. If the line quality is too poor, use a line simulator to run this test.

2. Issue an AT&Q0 command to the local modem. This sets the modem to the direct mode.

3. Issue an AT&Q0 command to the remote modem, also setting it to the direct mode.

4. Issue an AT&T4 to the remote modem. This instructs the remote modem to grant a request for a remote digital loop back test.

5. Issue an ATS0=1 to the remote modem which allows it to auto-answer the incoming call.

6. Set the timer register (S18) of the local modem for desired test time (in seconds). Example: "ATS18=10" provides for a 10 second test.

7. Issue a dial command to the local modem to instruct it to call the remote modem. Wait until the two modems have established a connection.

8. Type the escape sequence +++ to revert to command mode. The modem will respond with OK.

9. To start the test, type AT&T6 [ENTER]. The modem will return a CONNECT response if the loopback data link has been successfully completed, and an ERROR response if the link has failed. If a CONNECT response was received, key in a text message and it will echo on the screen.

Remote Digital Loopback Test with Self-test

1. Set the DTE speed from 1200 to 28,800 bits per second. If the speed is less than 1200 or greater than 28,800 the test **WILL NOT** operate and a result code of ERROR will be generated if the test is attempted.

   The baud rate is also limited to the highest baud rate supported by the telephone line (28,800 is possible if the telephone line is without distortion and noise free). If the telephone line has problems, bring the baud rate down to 9600 or 2400. If the line quality is too poor, use a line simulator to run this test.

2. Issue an AT&Q0 command to the local modem. This sets the modem to the direct mode.

3. Issue an AT&Q0 command to the remote modem, also setting it to the direct mode.

4. Issue an AT&T4 to the remote modem. This instructs the remote modem to grant a request for a remote digital loop-back test with self test.

5. Issue an ATS0=1 to allow the remote modem to auto-answer the incoming call.

6. Set timer register (S18) of the local modem for desired test time (in seconds). Example: "ATS18=10" provides for a 10 second test.

7. Issue a dial command to the local modem to instruct it to call the remote modem. Wait until the two modems have established a connection.

8. Type the escape sequence (+++) to revert to the command mode. The modem will respond with OK.

9. Type AT&T7 [ENTER] to initiate the remote digital loopback test. The local modem will send a test pattern to the remote modem. This pattern will not be visible on the screen.

10. The modem will then send a three-digit value, indicating the number of errors detected during testing. If the result is 000, no errors were found.

Appendix C: Technical Specifications

Modem Data Rate: 28.8K, 26.4K, 24K 21.6K, 19.2K, 16.8K, 14.4K, 12K, 9600, 7200, 4800, 2400, 1200, or 300bps

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

Protocol Compatibility:

CCITT: (ITU-TSS) CCITT: V.34 (28.8Kbps), V.32bis (14.4Kbps), V.32 (9600bps), V.42, V.22 (2400bps), V.21 (1200bps)

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

Rockwell: V.FC

Fax Modulation Protocols

V.17 (14.4Kbps) 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

V.42/MNP2-4 and V.42bis/MNP5 support

LED Status Indicators: (EXTERNAL) **TM, AA, HS, OH, SD, RD, TR, CD**

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

Dimensions: 7 1/4" x 5 3/8" x 1 1/4"

Appendix D: 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 underside of the MV.34MA modem.

Command Reference

BASIC AT COMMANDS (default values are highlighted)

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

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. (See AT&Z)

Command	Description

Command Character Echo

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

Switch Hook Control

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

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.
ATI4	Reports OEM-defined identifier string.
ATI5	Reports country code.
ATI6	Reports modem data pump model.

Speaker volume

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

Speaker control

ATM0	Disables the modem speaker.
ATM1	**Turns speaker on until carrier has been detected. (default)**
ATM2	Speaker is always on.
ATM3	Speaker is off when receiving carrier and during dialing, but off during answering.

Command	Description
Automode enable	
ATN0	Requires speed of the connection be that specified by the value of S37.
ATN1	**Permits handshaking at any speed supported by both modems. (default)**
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.
Mode responses	
ATQ0	**Enables result codes to be issued to the screen. (default)**
ATQ1	Disables result codes to be issued to the screen.
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 (e.g., CONNECT 28800).

Command	Description

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.
ATX3	Enables monitoring of busy tones; sends only OK, CONNECT, RING, NO CARRIER, ERROR, NO DIALTONE, NO ANSWER and CONNECT XXXX.
ATX4	**Enables monitoring of busy tones and sends all messages. (default)**

Control long space disconnect

ATY0	**Disables long space disconnect. (default)**
ATY1	Enables long space connect.

Soft reset and restore profile

ATZ0	**Restores stored profile 0. (default)**
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

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.

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

DTE/Modem flow control

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

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)

Command Description

Select pulse dial make/break ratio

AT&P0 **Selects a make/break ratio of 39/61 at 10pps. US and Canada. (default)**

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 **Modem negotiates an error-corrected link. (default)**

AT&Q6 Selects asynchronous operation in normal mode (i.e. speed buffering).

RTS/CTS (Request to Send/Clear to Send)

AT&R0 Not supported.

AT&R1 **CTS will drop if required by flow control (default).**

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.

Command	Description
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. Saves the current configuration into non-volatile RAM as one of two user profiles.

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.
Stored phone number	
AT&Z0=	Stores a 45 digit dial string.
AT&Z1=	Stores a 45 digit dial string.
AT&Z2=	Stores a 45 digit dial string.
AT&Z3=	Stores a 45 digit dial string.

MNP Operation

The MV.34MA modem supports all of the preceding classes. The following AT Commands apply to the MNP protocol. Default values are highlighted.

Maximum MNP Block Size. Use this command to transmit smaller blocks of data in a reliable data link connection.

AT\A0	set maximum block size to 64 characters.
AT\A1	**set maximum block size to 128 characters. (DEFAULT)**
AT\A2	set maximum block size to 192 characters.
AT\A3	set maximum block size to 256 characters.

Transmit Break. When this command is entered during a non-MNP connection, a break signal is sent to the remote modem. The length of the break is 100 times the n parameter (1-9) in milliseconds. The default is 3.

AT\B3 (DEFAULT)

Modem to Modem Flow Control. Enables or disables modem to modem flow control during a normal mode connection. This command is ignored when error correction is selected.

AT\G0	**Disables flow control (XON/XOFF) (DEFAULT)**
AT\G1	Enables flow control (XON/XOFF)

Break Control. Determines the modem response when a BREAK is received from the DTE or the remote modem. The values of the parameters vary based on the three following conditions:

(1) When a break is received from the DTE during NORMAL or MNP mode:

AT\K0, 2, 4	modem enters command mode without sending a break to the remote modem.
AT\K1	modem clears the terminal and modem buffers and sends a break to the remote modem.
AT\K3	modem does not clear the buffers, but sends a break to the remote modem.
AT\K5	**modem sends a break to the remote modem in sequence with any transmitted data. (DEFAULT)**

(2) When a break is received from the remote modem during NORMAL mode:

AT\K0, 1	modem clears the terminal and modem buffers and sends a break to the local DTE.
AT\K2, 3	modem does not clear the buffers but sends a break to the local DTE.
AT\K4, 5	**modem sends a break in sequence with any data being buffered. (DEFAULT)**

(3) When a break is received from the DTE during DIRECT MODE mode:

AT\K0,1,3	modem sends a break to the remote modem and enters command mode.
AT\K2, 4, 5	**modem sends a break to the remote modem. (DEFAULT)**

Error Correction Operating Mode. Selects the operating mode the modem uses while connected.

AT\N0	NORMAL (speed buffering) mode.
AT\N1	DIRECT (pass-through) mode.
AT\N2	RELIABLE LINK mode. Specifies error correction for the modem-to-modem connection
AT\N3	AUTO-RELIABLE LINK mode. Attempts error-correction connection but will fall back to normal mode if unable to establish an MNP link.
AT\N4	LAPM error correction mode.
AT\N5	MNP error correction mode

AT Commands for V.42/V.42bis

The following AT commands apply to the V.42/V.42bis protocol:

Compression Control. Determines whether or not modem will use data compression.

AT%C0	disables data compression
AT%C1	enables MNP5 data compression negotiation
AT%C2	enables V42bis data compression
AT%C3	**enables both V.42bis and MNP5 data compression (DEFAULT)**

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

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.

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

AT+MS Command (Modulation Select)

This extended format command selects the modulation, optionally enables or disables automode, and optionally specifies the lowest and highest connection rates using from one to four subparameters. The command format is:

+MS=<mod>[,[<automode>][,[<min_rate>][,[<max_rate>]]]]

The default value as reported by the +MS? command is:

+MS=11,1,300,28800

Note 1: For 14400bps and lower speeds, the Nn command and S37 register can alternatively be used, in which case the +MS subparameters will be modified to reflect the Nn command and S37=x settings. Use of the Nn and S37=x commands is not recommended, but is provided for compatibility with existing communication software. (S37 is not updated by the +MS command).

Note 2: Subparameters not entered (enter a comma only or <CR> to skip the last subparameter) remain at their current values.

Reporting Selected Options

The modem can send a string of information to the DTE consisting of selected options: +MS?

The response is:

+MS:<mod>,<automode>,<min_rate>,<max_rate>

Example: +MS: 11, 1, 300, 28800 (shows default values)

Reporting Supported Options

The modem can send a string of information to the DTE consisting of supported options using the following commands.

+MS=?

The response is:

+MS: (list of supported <mod> values), (list of supported <automode> values), (list of supported <min_rate> values), list of supported <max> rate values)

Example:

+MS: (0, 1, 2, 3, 9, 10, 11, 64, 69, 74), (0,1) (300-28800), (300-28800)

Subparameter Definitions

1. **<mod>** = a decimal number which specifies the preferred modulation (automode enabled) or the modulation (automode disabled) to use in originating or answering a connection. The options are as shown on the following page:

<mod>	Modulation Selected	Possible rates (bps)
0	V.21	300
1	V.22	1200
2	V.22bis	2400 or 1200
3	V.23	1200*
9	V.32	9600 or 4800
10	V.32bis	14400, 12000, 9600, 7200, or 4800
11	**V.34**	**28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400 (DEFAULT)**
64	Bell 103	300
69	Bell 212	1200
74	V.FC	28800, 26400, 24000, 21600, 19200, 16800, 14400

* For V.23, originating modes transmit at 75bps and receive at 1200bps; answering modes transmit at 1200bps and receive at 75bps. The rate is always specified at 1200bps.

The modem may also automatically switch to another modulation (automode), subject to the following constraints:

- The modem may not be able to automatically switch from the current modulation (specified by <mod>) to some other modulation. For example, there is no standard way to automode from Bell 103 to V.23.

- The DTE may disable automode operation (see <automode>).

- The DTE may constrain the range of modulations available by specifying the lowest and highest rates (see <min_rate> and <max_rate> below).

2. **<automode>**=an optional numeric value which enables or disables automatic modulation negotiation. Options are:

<automode>	Option Selected
0	Automode disabled
1	Automode enabled

The default value is 1, which enables automode. Note, however, there are modulations for which there is no automatic negotiation (e.g., Bell 212 (<mod>=69).

For <automode> = 0 (automode disabled, i.e., fixed modulation):

a. If <max_rate> is within the rates supported by the selected modulation, the selected rate is that specified by <max_rate>.

Example: +MS=9,0,1200,4800 selects V.32 4800bps fixed rate.

b. If <max_rate> is greater than the highest speed supported by the modulation specified by <mod>, the starting rate is the highest rate supported by the selected modulation.

Example: +MS=9,0,2400,14400 selects V.32 9600 or 4800bps.

c. To emulate N0S37=x command sequence to select fixed mode operation, specify the <max_rate> and <min_rate> both to be the same requested speed, and <mod> to be the modulation for that speed.

Example: +MS=11,0,16800,16800 selects V.34 16800bps fixed mode (no comparable S37 command).

+MS=9,0,12000,12000 selects V.32 12000bps fixed mode (same as N0S37=10).

For <automode> = 1 (automode enabled; i.e., automatically selected speed and modulation).

a. If <max_rate> is greater than the highest rate supported by the modulation specified by <mod>, the modem automodes down from the highest rate of selected modulation.

Example: +MS=10,1,1200,24000 selects automoding down from V.32bis 14400bps.

b. To emulate N1S37=x sequence command, specify the modulation and the rate to start automoding down from using <mod> and <max_rate>, respectively. Set <min_rate> to 300 to allow automoding all the way down to V.21 300bps.

Example: +MS=11,1,300,16800 selects automode starting at V.34 16800bps (no comparable S37 command)

+MS=9,1,300,12000 selects automode starting at V.32bis 12000bps (same as N1S37=10).

3. **<min_rate>**= is an optional number which specifies the lowest rate at which the modem may establish a connection. The value is decimal-coded in units of bps, e.g., 2400 specifies the lowest rate to be 2400bps. The default is 300 for 300 bps.

4. **<max_rate>**= is an optional number which specifies the highest rate at which the modem may establish a connection. The value is decimal-coded in units of bps, e.g., 14400 specifies the highest rate to be 14400bps. The default is 28800 for 28800bps.

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	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	50-255		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)
S13				Reserved.
S14	Bit Mapped		138(8Ah)	Bit mapped registers.
S15				Reserved
S16	Bit Mapped		0	Modem test options.
S17				Reserved.
S18	0-255	seconds	0	Test timer.
S19				Reserved.
S20				Reserved.
S21	Bit Mapped		4(04h)	Bit mapped registers.
S22	Bit Mapped		117(75h)	Bit mapped registers.
S23	Bit Mapped		54(36h)	Bit mapped registers.

Reg.	Range	Units	Default	Definition
S24	0-255	seconds	0	Sleep Inactivity Timer.
S25	0-255	seconds	5	Asynchronous DTR Delay.
S26	0-255	seconds	1	RTS to CTS Delay Interval.
S27	Bit Mapped		9(09h)	Bit mapped registers.
S28	Bit Mapped		0	Bit mapped registers
S29	0-255	ms	10	Flash Dial Modifier Time.
S30	0-255	seconds	0	Disconnect Inactivity Timer.
S31	Bit Mapped		2	
S32	0-255	ASCII	17(11h)	XON Character.
S33	0-255	ASCII	19(19h)	XOFF Character.
S34-35				Reserved.
S36			7	LAPM Failure Control
S37			0	Line Connection speed

NOTE: Desired sub-V.34 line connection speed. 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. See the +MS command for more modulation selections.

Bits 0-4:

0 = **Attempt auto mode connection (DEFAULT)**
1-3 = Attempt to connect at 300bps
4 = Reserved
5 = Attempt to connect at V.22 1200bps
6 = Attempt to connect at V.22bis 2400bps
7 = Attempt to connect at V.23
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 12Kbps
11 = Attempt to connect at V.32bis 14.4Kbps
12 = Attempt to connect at V.32bis 7200bps (ATF7)

Reg.	Range	Units	Default	Definition
S38	0-255	seconds	20	Delay Before Forced Hangup.
S39	Bit Mapped		3	Bit Mapped Registers.
S40	Bit Mapped		104(68h)	Bit Mapped Registers.
S41	Bit Mapped		3	Bit Mapped Registers.
S42-45				Reserved.
S46	136 or 138		138	Data Compression Control.

NOTE: 136 enables error correction with no compression; 138 enables error correction WITH compression.

S48	0, 7, 128		7	V.42 Negotiation.

NOTE: 0 disables negotiation and proceeds with LAPM; 7 enables negotiation; and 128 disables negotiation and proceeds with fallback action specified in S36. The default for S36 is to attempt an MNP connection.

S49-81				Reserved.
S82	3, 7, 128		128(40h)	Break Handling Option.
S86	0-255		NA	Connection Failure Cause Code.
S91	0 to -15 dBm		10	PSTN Transmit Level.
S92	0 to -15 dBm		10	Fax Transmit Level.

Reg.	Range	Units	Default	Definition
S95	Bit-Mapped		0	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.
5 = Enable COMPRESSION result code.

Bits 4, 6, and 7 are reserved.

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 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.

Result Code	Numeric Value	Description
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.
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.

Result Code	Numeric Value	Description
DELAYED	24	For X4; when a call fails to connect and the number dialed is 'delayed' due to country blacklisting requirements.
BLACKLISTED	32	For X4; when a call fails to connect and the number dialed is considered 'blacklisted'.
FAX	33	A fax modem connection is established.
DATA	35	A data modem connection is established.
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.

Result Code	Numeric Value	Description
CARRIER 12000	51	Carrier rate of 12000 bps.
CARRIER 14000	52	Carrier rate of 14400 bps.
CARRIER 16800	53	Carrier rate of 16800 bps.
CARRIER 19200	54	Carrier rate of 19200 bps.
CARRIER 21600	55	Carrier rate of 21600 bps
CARRIER 24000	56	Carrier rate of 24000 bps
CARRIER 26400	57	Carrier rate of 26400 bps.
CARRIER 28800	58	Carrier rate of 28800 bps.
COMPRESSION: CLASS 5	66	The modem has connected in MNP class 5 and COMPRESSION message reporting has been enabled.
COMPRESSION V.42bis	67	The modem has connected in V.42bis and COMPRESSION message reporting has been enabled.

Result Code	Numeric Value	Description
COMPRESSION: NONE	69	The modem has connected without data compression and COMPRESSION message reporting has been enabled.
PROTOCOL: NONE*	76	Modem has connected without any form of error connection.
PROTOCOL: LAPM*	77	Modem has connected in the V.42 LAPM mode of error correction.
PROTOCOL: ALT*	80	Modem has connected in the MNP mode of error correction.

* PROTOCOL message reporting has been enabled.

+FCERROR	+F4	Fax carrier error.

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 (pages 17-20) 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 MV.34MA modem (external 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.

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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