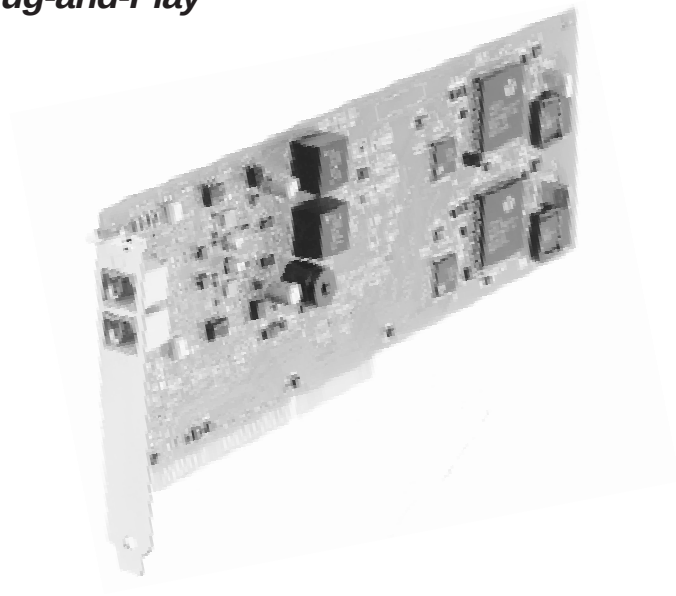
Boca 112K DynamicDuo Modem

Up to 112Kbps DATA

14.4Kbps FAX

Plug-and-Play



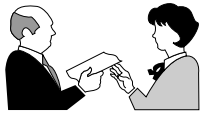
Hardware Reference Guide

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 Windows tasks. If you are not familiar with basic Windows commands, you should check your Windows 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
561-241-1601

Automated *Fax Retrieval System*
561-995-9456

Standard Free Technical Support
561-241-8088

Priority Service
900-555-4900

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

The Standard Free Technical Support number is for quick answers to specific inquiries on product features and technical questions (call **561-241-8088**; 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.

Using this manual...

This manual provides installation and operating instructions for your modem. The manual assumes the user has basic computer skills and is familiar with personal computers. Its primary purpose is to provide physical installation instructions and basic troubleshooting. All sections should be read carefully before beginning any installation procedures. Customer support experience has shown that many costly and time-consuming calls to technical support staff can be avoided with closer attention to the information provided here. **In addition to following the instructions provided in this manual, you will also need to consult the documentation supplied with your communications software.**

IMPORTANT NOTICE

FCC Requirements

The Federal Communications Commission (FCC) restricts the way you can use modems. Read the FCC compliance statement found in Appendix B of this manual.

Connecting the Modem

You can connect the modem to various types of telephone jacks. The acceptable phone jack types are RJ-11, RJ-12, RJ-13, RJ-41S, and RJ-45S. Most homes and businesses use one of these jacks. If your phone system does not have a modular jack, you can purchase an adapter to convert your jack into an RJ-11C jack. Adapters may be purchased from any local phone or electronics store.

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Printed in the U.S.A. 9346.P65

Contents

HOW THIS MANUAL IS ORGANIZED

Section One: Introduction. An overview of the features of your modem.

Section Two: Installation. This section provides physical installation instructions (including how to connect the phone line), and procedures for testing the connection. A section for Windows 95 and Windows NT users is also included.

Section Three: Troubleshooting. This section 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 as well as other regulatory statements, and an AT command reference. Instructions for servicing your product and warranty information are also included.

Section One: Introduction

The Boca 112K DynamicDuo Modem product provides an integrated two line modem solution on a single plug-in ISA card. Both modems can be operated independently on two analog phone lines or "teamed" to provide a single data communications link. The Boca 112K DynamicDuo Modem provides full fax/data modem operation and is Plug-and-Play compatible.

Modem data rate speed is up to 56Kbps* on each telephone line for a combined speed of up to 112Kbps on two lines. The modem code is stored in flash memory, allowing upgrades as the 56K standard evolves.

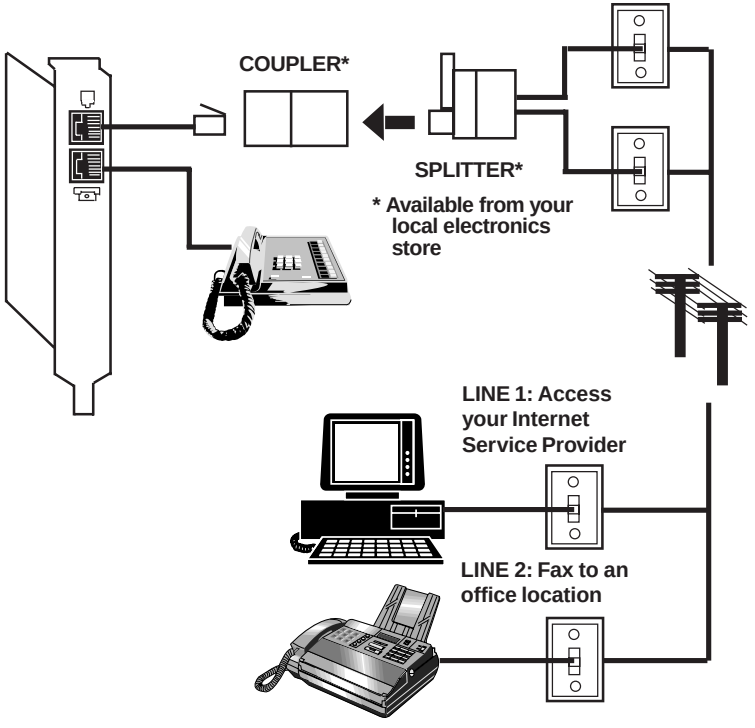
A comprehensive and versatile software package is supplied with the product. The interface allows access to all the configuration options for both modems, handles communication operations, and can provide communication monitoring functions. The software is compatible with Windows 95 and Windows NT.

Minimum System Requirements

- IBM-compatible DX2/66 or higher system
- One available 16-bit ISA expansion slot
- Windows 95 or Windows NT
- 8MB system RAM
- 20MB free hard disk space for included software
- 2x or greater CD-ROM drive (software on CD)

***Actual speeds vary depending on line conditions. Due to FCC limitations, speeds in the U.S. are less than 56Kbps.**

Boca 112K DynamicDuo Modem Sample Configuration



Section Two: Installation

This section explains how to install the Boca 112K DynamicDuo Modem in your computer. Review the contents of your package to make all items are present. **If any items are missing or damaged, contact the dealer from whom you purchased the modem for assistance. Also note that phone cable configuration will vary for international settings.**

2.1 Installing the Modem

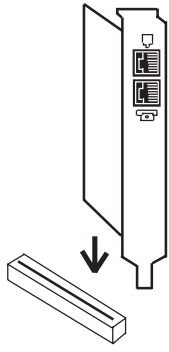
NOTE: If your computer came with an internal modem, you must physically remove it or disable it through your computer's BIOS setup. Consult your computer's manual or manufacturer for specific instructions.

1. Turn off your computer and disconnect any attached devices and power cords. Remove any diskettes.

2. Remove the computer's cover and locate an available 16-bit expansion slot. Remove that expansion slot cover and save the screw.

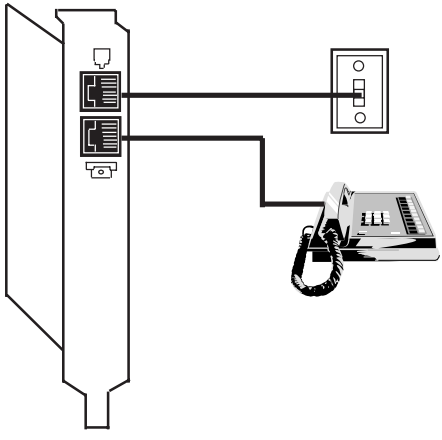
3. Remove the modem from its anti-static bag, handling it by its edges and retaining bracket. Be careful not to touch the edge connector or any components on the card.

4. Carefully insert the modem into the expansion slot you selected, applying pressure to the upper board edge until it is seated in the slot.



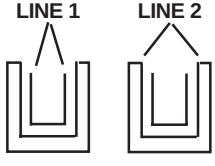
5. Secure the modem into place by aligning its metal retaining bracket with the hole in the top edge of the system's rear panel. Fasten the modem's metal bracket with the screw removed from step 2.

6. Disconnect your present phone cord(s) from the wall jack(s). Plug the end of the phone cord that came with the modem into the wall jack, and the other end into the jack with the symbol ( ) on the back of the modem. Plug the phone into the jack with the symbol ( ) on the back of the modem.



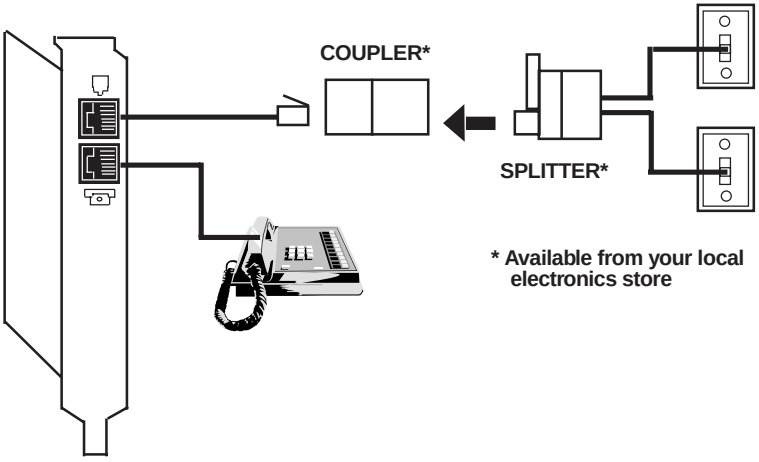
NOTE: for both on-board modems to work, you must have one of the following:

- An RJ-14 wall jack which is wired for two telephone lines (independent numbers), as shown here:



Or

- Two physical RJ11 jacks (independent phone numbers). If the latter is the case, you will need an RJ-11 splitter and coupler, which should be connected as follows:



7. Replace the system cover and reconnect any detached devices and power cords. Power up your computer. **If you have a Plug-and-Play computer**, the modem should be recognized at power-up. **If you do NOT have a Plug and Play computer**, go on to **Modem Setup** (Windows 95, page 13; Windows NT, page 15).

2.2 Modem Setup for Windows 95 Users

Plug and Play Installation

Please check the version of Windows 95 that you are using. Right click on the "My Computer" icon on the desktop and select "Properties". Under "System", if your version reads 4.00.950 B, then you have OEM Service Release 2 of Windows 95. In this case, follow the instructions immediately below. Otherwise, continue with the next page.

1. When Windows 95 detects new hardware, it starts the **"Update Device Driver Wizard"**.

2. Insert the CD and click **Next.**

3. Complete the installation by clicking on the **Finish** button.

Congratulations! Setup is complete for Windows 95 users. Continue with *2.4 Testing the Connection.*

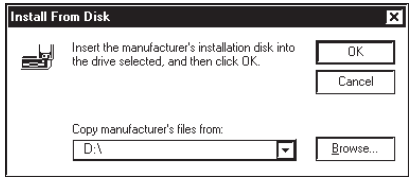
If you need to re-configure the board, click on **Control Panel**, then **System**, then **Device Manager**. The device description is under the section, **Modem**. See your Windows 95 documentation on changing properties of devices using the **Device Manager**. Congratulations! Setup is complete for Windows 95 users. Continue with *2.4 Testing the Connection.*

Earlier Versions of Windows 95

1. When the board is physically installed, start Windows 95 as you normally would.

2. When Windows 95 detects new hardware, it displays the **New Hardware Found** dialog box. Here, you are asked what driver files are associated with the new hardware.

3. From the choices given, select **Driver from disk provided by hardware manufacturer**.



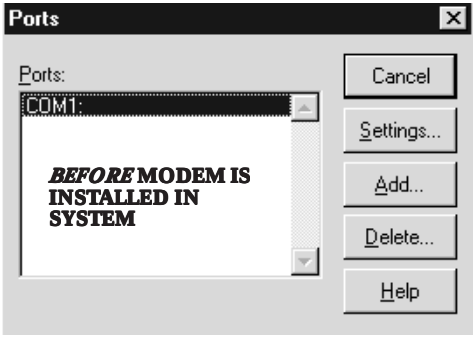
4. Windows 95 then displays the **"Install from Disk"** dialog box. Here, you are asked for the location of the driver files.

5. Select **Have Disk**. Then:
   a. Insert the CD
   b. Type the path for the location of the drivers (D:\).

If you need to re-configure the board, click on **Control Panel**, then **System**, then **Device Manager**. The device description is under the section, **Modem**. See your Windows 95 documentation on changing properties of devices using the **Device Manager**. Congratulations! Setup is complete for Windows 95 users. Continue with *2.4 Testing the Connection.*

2.3 Modem Setup for Windows NT Users

NOTE: you must have a Plug and Play system for the modem to work with Windows NT. Windows NT installs your modem as a COM port.



To determine your available COM ports, follow these steps:

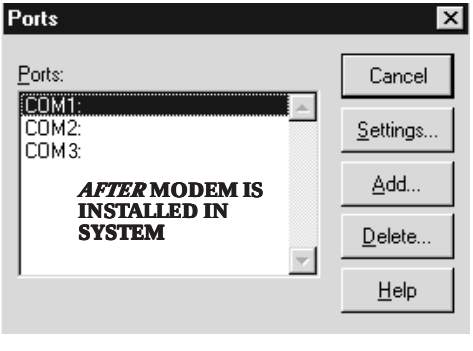
1. Click on **Control Panel** and then **Ports**. Note the assigned COM ports.

2. Select **Cancel**, then shut down the computer.

3. Install the modem.

4. Restart Windows NT

5. Select **Start**, **Settings**, **Control Panel,** then **Ports.**



Note the additional COM ports assigned to the modem. Continue with the next page.

Example: Prior to installing the modem, you have COM1; after installing the modem you should see the new port to which the modem was assigned (COM2 in the example on the previous page).

If no additional COM ports are displayed, make sure your system has a Plug and Play BIOS. If yes, please contact your dealer for assistance. Select **Cancel** to exit the Ports dialog box.

6. Double-click on the **Modems** icon.

7. At the **Install New Modem** screen, check the box in front of **"Don't Detect my Modem; I Will Select it from a List"**.

8. Select **Next**, then **Have Disk**. Insert the Modem Drivers Installation CD or Disk into your diskette drive.

9. Type D:\ (if your CD-ROM drive is other than D:, substitute the appropriate letter) or A:\, then click **OK**.

10. Highlight and select the modem (for the first line) which corresponds to the one you purchased, then **Next**.

11. Select the COM ports to which the modem was assigned. Then select **Next**, then **Finish**. Repeat steps 6-10 for Line 2 Congratulations! Setup is complete for Windows NT.

The modem is now ready to be tested and operated. Continue with *2.4 Testing the Connection*.

2.4 Testing the Connection

1. Install and start your communications software. Place it in terminal mode and select the modem you wish to test. Refer to the program's documentation if you require assistance. **If you are not in terminal mode, AT commands typed in at the DOS prompt will result in a "Bad Command or File Name" message**.

2. Type in **ATZ** followed by ENTER and the modem will respond with OK after a few seconds. If the modem does not respond OK, refer to *Troubleshooting (Section Three)*.

3. Type **ATH1** followed by ENTER and you should hear a dial tone from the modem speaker. To adjust speaker volume up, refer to your communications software, or type the **ATL3** command the press ENTER.

4. Type **ATH** followed by ENTER to put the modem "on-hook". This confirms that the modem has been successfully installed into the computer. Repeat steps 1-4 to test the Line 2 modem.

5. Your modem is now ready for use. Continue now with your communications software and documentation.

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.
Modem does not respond	■ There may be a conflicting port address. Re-configure the modem's COM port address

SYMPTOM	POSSIBLE REMEDY
Modem does not respond (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 the Control Panel. ■ 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
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.

SYMPTOM	POSSIBLE REMEDY
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. An &Q6 (which disables error control) is optional.
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 up to date and 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).

SYMPTOM	POSSIBLE REMEDY
Problem Connecting to On-line subscription services (contd).	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.
Problem connecting to ISPs using the 56KFlex protocol	■ Be sure your ISP (Internet Service Provider) supports the K56Flex interim standard. If you cannot achieve a 56Kbps connection, the modem will fallback to V.34 (33.6Kbps)).
Download terminates abnormally.	■ Make sure the AT&R1 is set in your active profile.

Appendix A: Technical Specifications

• Integrated 56Kbps Modem Data/Faxchipset

Data

• K56Flex, 33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, 300
• V.34, V.32bis, V.32, V.23, V.22bis, V.22, V.22A/B, and V.21; Bell 212A and 103 DTE data rate up to 230.4bps
• Parallel 16C550A UART support
• Industry standard AT command set
• 2K increment speed steps between 33600 and 56Kbps*
• Supports Error Correction V.42 LAPM, MNP 2-4, MNP10-EC
• Supports Data Compression V.42bis, MNP5

Fax

• Fax speeds of 14400, 12000, 9600, 7200, 4800, 2400
• ITU-T V.33, V.17, V.29, V.27ter, V.21 ch2
• Class 1, Group 3 fax support

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

Power

+5V, 1.2 watts (maximum)
+/-12V, 0.5 watts (maximum) (from host computer power supply)

Dimensions: 12" (30.48cm) x 4.2" (10.67cm)

Appendix B: Regulatory Statements

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.

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.

CANADIAN STANDARDS ASSOCIATION
This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouiller du Canada.

Industry Canada Information

The Industry Canada 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. 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 a representative 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.

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consists of any combination of
devices subject only to the requirement that the sum of the Ringer Equivalence numbers of all the devices does not exceed 5.

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.

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

The RAL number of this equipment is 0.7. This number denotes the number of items that may be attached to a telephone line. The sum of all the items connected to a line should not exceed a sum of 5.

This device is not intended to be used in parallel with other devices. The operation of this equipment on the same lines as telephones or other equipment with audible warning devices or automatic ring detectors may give rise to bell tinkle or noise and may cause tripping of the ring detector. The user should not report such occurrences as faults.

When relocating the equipment, always disconnect the telecomm line connection before the power, and reconnect the power first.

NOTE THAT FAILURE TO MEET THE ABOVE REQUIREMENTS MAY NEGATE THE USER RIGHTS UNDER THE TELECOMM TERMS OF SERVICE

COMPLIANCE INFORMATION STATEMENT

We,

Boca Research, Inc.
1377 Clint Moore Road
Boca Raton, FL 33487
(561-997-6227)

declare under our sole responsibility that the product,

Type of Equipment: **112Kbps Dual Line Modem**

Model Numbers: **MDDL56I**

to which this declaration relates is in conformity with the Title 47 of the U.S. Code of Regulations, Part 15, covering Class B personal computers and peripherals.

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTICE ON FAX TRANSMISSIONS

The *Telephone Consumer Protection Act of 1991* makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message **unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual.** (The telephone number provided may not be a 900 number or any other number for which charges exceed local or long-distance transmission charges.)Consult the procedures in the documentation for the fax software you are using with this modem product for the best way to accomplish the above requirements.

WARNING / ATTENTION

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

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

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

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

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

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

CAUTION: Telecommunications voltages and currents can exceed the limits of safety extra low voltage (SELV), resulting in personal injury. Do not touch any components on the modem's printed circuit board when power is applied, or the telephone cable is plugged in.

Avoid installing, handling the telephone cable, or changing the jumper settings on the modem during any weather activity where lightning strikes may occur.

This unit is intended for installation in computing devices that are non-operator accessible. Installation is to be performed by qualified service personnel only

Appendix C: Modem Command Reference

NOTE: AT command functionality may vary in international settings. Command definitions listed in subsequent pages reflect domestic (U.S.) functionality. Also, AT command functionality may vary slightly from model to model.

BASIC AT COMMANDS (default values are highlighted)

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

Dial Modifiers

Dial	Options	Description
ATD	0-9,*,#	DTMF digits
	L	Re-dial last number.
	P	Pulse (rotary) dial. 10 pulses per second.
		***Not supported in Holland, Norway, Sweden, and Denmark**
	T	Touch tone dial (DTMF).
	W	Wait for dial tone for 1-255 seconds. Default is 50 seconds (this value is set by the S7 register).
	,	(Comma) Pause for 0-255 seconds. Default is 2 seconds (this value is set by the S0 register.
	@	Wait for quiet answer.
	!	Initiate hook flash.
	,	Return to command state after dialing.
	^	Disable calling tone.
	S=n	Dial stored number. (See AT&Z). n=0-3.

Command	Description

Command Character Echo

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

Command	Description
Disconnect (hang-up)	
ATH0	Instructs modem to go on-hook.
ATH1	Instructs modem to go off-hook.
Identification	
ATI0	Displays the product identification code. Example: 33600
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.
ATI7	Reports DAA code (e.g., 000 for U.S. / Canada; 016 for Japan, 033 for Belgium, 034 for Finland, 035 for France, 037 for Italy, 038 for Netherlands, 039 for Sweden, 040 for Switzerland, 041 for U.K.
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 on when receiving carrier and during dialing, but off during answering.
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)**

Command	Description
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).
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, NO DIAL TONE, NO ANSWER and CONNECT XXXX result codes.

Command	Description
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.
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.
AT&C1	**DCD on indicates presence of data carrier. (default)**
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.
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. (default)**
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.**
AT&F0	Restore factory configuration 0.
AT&F1	Restore factory configuration 1.
DTE/Modem flow control	
AT&K0	Disable flow control.
AT&K3	**Enable RTS/CTS (default for data mode)**
AT&K4	Enable XON/XOFF.
AT&K5	Enable transport XON/XOFF.
AT&K6	**Enable both RTS/CTS and XON/XOFF (default for fax modem and voice modes)**

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	**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 become active after answer tone has been detected and inactive after carrier has been lost.

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 modem for a digital loopback test.
AT&T5	**Instructs the modem to deny a request from a remote modem for a digital loopback test. (default)**
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 34 digit dial string.
AT&Z1=	Stores a 34 digit dial string.
AT&Z2=	Stores a 34 digit dial string.
AT&Z3=	Stores a 34 digit dial string.

MNP Operation

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

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)

Command **Description**

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

Single Line Connect Message Enable

Selects the operating mode the modem uses while connected.

AT\V0	Connect messages are controlled by the command settings X, W, and S95
AT\V1	Connect messages are displayed in single line format.

AT Commands for V.42/V.42bis

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

Command **Description**

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)**

Command Description

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.

Report Line Signal Quality

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

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.

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 table on the following page 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	2	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 (0.6)	Carrier detect.
S10	1-255	seconds	14 (1.4)	Lost Carrier to Hang Up Delay.
S11	50-255	ms	95 ms	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	0-255	seconds	0	AutoSync options.
S20	0-255	seconds	0	AutoSync HDLC address.
S21	V.24/General Bit Mapped		52(34h)	Bit mapped registers.
S22	Speaker Results Status		117(75h)	Bit mapped registers.
S23	Bit Mapped		62(3Dh)	Bit mapped registers.
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		73(49h)	Bit mapped registers.
S28	Bit Mapped		0	Bit mapped registers
S29	0-255	ms	0	Flash Dial Modifier Time.

Reg.	Range	Units	Default	Definition
S30	0-255	tens of seconds	0	Disconnect Inactivity Timer.
S31	Bit Mapped		194 (C2h)	
S32	0-255	ASCII	17(11h)	XON Character.
S33	0-255	ASCII	19(13h)	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

S38	0-255	seconds	20	Delay Before Forced Hangup.
S39	Flow Control Status		3	Bit Mapped Registers.
S40	Bit Mapped		104(68h)	Bit Mapped Registers.
S41	Bit Mapped		195(C3h)	Bit Mapped Registers.
S46	136, 138		138	Data Compression Control.

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

Reg.	Range	Units	Default	Definition
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.

S82			128(40h)	Break Handling Option.
S86	0,4,5,9,12,13,14		NA	Connection Failure Cause Code.
	0 =	Normal disconnect; no error occurred.		
	4 =	Loss of carrier		
	5 =	V.42 negotiation failed to detect an error-correction remote modem.		
	9 =	The modems could not find a common protocol.		
	12 =	Normal disconnect initiated by the remote modem.		
	13 =	Remote modem does not respond after 10 re-transmissions of the same message.		
	14 =	Protocol violation.		
S91	15	dBm	15	PSTN Transmit Level.
S92	15	dBm	15	Fax Transmit Level.
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.

AT+MS Command (Modulation Select)

This extended-format command selects the modulation and, optionally, enables or disables automode, specifies the lowest and highest connection rates, selects m-Law or A-Law codec type, and enables or disables robbed bit signaling generation (server modem) or detection (client modem) using one to five subparameters. The command format is:

56K:

+MS=<mod>[,[<automode>][,[<min_rate>][,[<max_rate>][,[<x_law>][,[<rb_signal>][,[Maxup_rate>]]]]]]<CR>

33.6:

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

Notes:

1. For 14400 bps and lower speeds, the Nn command and S37 register can alternatively be used, in which case the +MS subparameters will modified to reflect the Nn 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.)
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 using the following command:

+MS?

The response is:

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

For example:

+MS: 56,1,300,56000,0,0 [56Kbps default values]
+MS: 11,1,300,33600,0,0 [33.6Kbps default values]
+MS: 10,1,300,14400,0,0 [14.4Kbps default values]

Reporting Supported Options

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

+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), (list of supported <x_law> values), (list of supported <rb_signaling> values)

For example,

+MS: (0,1,2,3,9,10,11,56, 64,69),(0,1),(300-33600),(300-56000),(0,1),(0,1)
[56000]: maximum rate

+MS: (0,1,2,3,9,10,11,64,69),(0,1),(300-33600),(300-33600),(0,1),(0,1)
[33600]: maximum rate

+MS: (0,1,2,3,9,10,64,69),(0,1),(300-14400),(300-14400),(0,1),(0,1)
[14400]: maximum rate

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:

<mod>	Modulation	Possible Rates (bps)*
0	V.21	300
1	V.22	1200
2	V.22 bis	2400 or 1200
3	V.23	1200**
9	V.32	9600 or 4800
10	V.32 bis	14400, 12000, 9600, 7200, or 4800 (Default for RC144)
11	V.34	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400 (Default for RC56/RC336/RC288) [RC56/RC336/RC288 only]
56	K56flex	56000, 54000, 52000, 50000, 48000, 46000, 44000, 42000, 40000, 38000, 36000, 34000, 32000 [RC56 only]
64	Bell 103	300
69	Bell 212	1200

Notes:

1. See optional <automode>, <min_rate>, and <max_rate> subparameters.

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

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

a. 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.

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

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

3. <automode> is an optional numeric value which enables or disables automatic modulation negotiation using V.8 bis/V.8 or V.32 bis Annex A. The options are:

<automode>	Option Selected
0	Automode disabled
1	Automode enabled using V.8 bis/V.8 or V.32 Annex A (Default)

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>. For example:

   +MS=10,0,1200,4800,0,0,4800 selects V.32 bis 4800 bps 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. For example:

+MS=10,0,2400,50000,0,0,14400 selects V.32 bis 14400, 12000, 9600, 7200, or 4800 bps.

c. To emulate issuance of the 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. For example:
+MS=11,0,16800,16800,0,0,21600 selects V.34 16800 bps fixed mode (no comparable S37 command).
+MS=10,0,12000,12000,0,0,14400 selects V.32 bis 12000 bps fixed mode (same as N0S37=10).

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

The modem connects at the highest possible rate in accordance with V.8 bis/V.8, or V.32 bis Annex A if V.8 bis/V.8 is not supported by the remote modem.

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 the selected modulation. For example:
+MS=10,1,1200,24000,0,0,14400 selects automoding down from V.32 bis 14400 bps.

b. To emulate issuance of the 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.21 300 bps. For example:
+MS=11,1,300,16800,0,0,28800 selects automode starting at V.34 16800 bps (no comparable S37 command).
+MS=9,1,300,12000,0,0,12000 selects automode starting at V.32 bis 12000 bps (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 2400 bps. 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 14400 bps. The default is 28800 for 28800 bps.

5. <x_law> **(56K only)** is an optional number which specifies the codec type. The options are (μ-Law):

   0 = μ-Law
   1 = A-Law

6. <rb_signaling> **(56K only)** is an optional number which enables or disables robbed bit signaling generation in a server modem or enables or disables robbed bit signaling detection in a client modem. The options are:

   0 = Robbed bit signaling generation (server modem) or detection (client modem) disabled (default)

   1 = Robbed bit signaling generation (server modem) or detection (client modem) enabled

Note that ATZ will reset the <rb_signaling> selection to 0 (disabled).
Result Codes:

OK	Valid subparameter string
ERROR	Otherwise.

7. <maxup_rate> This is the maximum upload rate (default is 33600). **(56K only)**

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 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.
CONNECT 7200	13	Connected as data modem during an answer.

Result Code	Numeric Value	Description
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 230400	20	Connection made at 230,400bps.
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.
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.

Result Code	Numeric Value	Description
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.
CARRIER 12000	51	Carrier rate of 12000 bps.
CARRIER 14400	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.

Result Code	Numeric Value	Description
CARRIER 28800	58	Carrier rate of 28800 bps.
CONNECT 16800	59	Connect speed of 16800 bps.
CONNECT 21600	61	Connect speed of 21600 bps.
CONNECT 24000	62	Connect speed of 24000 bps.
CONNECT 26400	63	Connect speed of 26400 bps.
CONNECT 28800	64	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.
COMPRESSION: NONE	69	The modem has connected without data compression and COMPRESSION message reporting has been enabled.
PROTOCOL: NONE*	70	Modem has connected without any form of error connection.
PROTOCOL: LAPM*	77	Modem has connected in the V.42 LAPM mode of error correction.
CARRIER 31200	78	Carrier rate of 31200 bps.
CARRIER 33600	79	Carrier rate of 33600 bps.

Result Code	Numeric Value	Description
PROTOCOL: ALT	80	Modem has connected in the MNP mode of error correction.
PROTOCOL: ALT	81	Modem has connected in the MNP10 mode.
CONNECT 33600	84	Connect speed of 33600 bps.
CONNECT 31200	91	Connect speed of 31200 bps.
CARRIER 32000	150	Carrier speed of 32000bps.
CARRIER 34000	151	Carrier speed of 34000bps.
CARRIER 36000	152	Carrier speed of 36000bps.
CARRIER 38000	153	Carrier speed of 38000bps.
CARRIER 40000	154	Carrier speed of 40000bps.
CARRIER 42000	155	Carrier speed of 42000bps.
CARRIER 44000	156	Carrier speed of 44000bps.
CARRIER 46000	157	Carrier speed of 46000bps.
CARRIER 48000	158	Carrier speed of 48000bps.
CARRIER 50000	159	Carrier speed of 50000bps.
CARRIER 52000	160	Carrier speed of 52000bps.
CARRIER 54000	161	Carrier speed of 54000bps.
CARRIER 56000	162	Carrier speed of 56000bps.

Result Code	Numeric Value	Description
CONNECT 32000	165	Connect speed of 32000bps.
CONNECT 34000	166	Connect speed of 34000bps.
CONNECT 36000	167	Connect speed of 36000bps.
CONNECT 38000	168	Connect speed of 38000bps.
CONNECT 40000	169	Connect speed of 40000bps.
CONNECT 42000	170	Connect speed of 42000bps.
CONNECT 44000	171	Connect speed of 44000bps.
CONNECT 46000	172	Connect speed of 46000bps.
CONNECT 48000	173	Connect speed of 48000bps.
CONNECT 50000	174	Connect speed of 50000bps.
CONNECT 52000	175	Connect speed of 52000bps.
CONNECT 54000	176	Connect speed of 54000bps.
CONNECT 56000	177	Connect speed of 56000bps.
+FCERROR	+F4	Fax carrier error.

Hardware Diagnostics

The modem includes two tests which evaluate the operation of the modem and its connection to the local DTE. 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.**

NOTE: Make sure you have disabled error correction (AT\N0) and data compression (AT%C0).

Local Analog Loopback Test

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

1. Set the DTE speed.

2. Make sure the modem is in terminal 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.

2. Make sure the modem is in terminal 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).

Appendix D: Servicing Your Boca Product

If your Boca 112K DynamicDuo Modem requires service, first contact the authorized dealer from whom you purchased the product. 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 (561) 241-1601 and will support data transmission speeds up to 33.6Kbps with settings of N, 8, 1. If you have a modem, the BBS may be helpful (especially during off hours) if you have a question about product settings or compatibility, or if you wish to download driver software or utilities.

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

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

- Board name and part number (located on the board)
- Computer model
- Peripherals in system
- Computer manufacturer
- 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 Boca Research Technical Support Department between the hours of 8:00 a.m. and 6:30 p.m. EST at (561) 241-8088. A technical support specialist 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 suppliers 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 Boca Research modem **(board only)**
- your name
- your return street address (for UPS purposes)
- your 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 # _____
6500 West Rogers Circle
Boca Raton, FL 33487-2841

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

Appendix E: 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 an authorized dealer ("the Warranty Period"). Should the product fail to be in working order at any time during the five-year period, BRI, will at its option, repair or replace this product as described below, provided that in BRI's sole determination the part or product has not been abused, misused, repaired, or modified.

All products will be serviced and returned via ground at no charge to customers.

All returns for limited warranty service require a Return Merchandise Authorization (RMA). All customers are required to demonstrate proof of purchase when requesting an RMA. The period of warranty commences on the date of purchase. A dated 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, copy of canceled check (if any), and the Return Merchandise Authorization (RMA) number provided by BRI Technical Support. Refer to the Appendix in this 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. BRI does not make any warranties in respect to the product, either expressed or implied, including no implied warranties of merchantability or fitness for a particular purpose, except as expressly provided in this agreement. If any labor, repair, or parts replacement is required because of accident, negligence, misuse, theft, vandalism, fire, water or other peril; or because of conditions outside of specifications, including, but not limited to, electrical power, temperature, humidity or dust; or by moving, repair relocation, or alteration not performed by BRI, or by any other cause other than normal use, the warranty and maintenance obligations provided herein shall not apply.

BRI SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OR FOR LOSS, DAMAGE, OR EXPENSE DIRECTLY OR INDIRECTLY ARISING FROM CUSTOMER'S USE OF OR INABILITY TO USE THE EQUIPMENT EITHER SEPARATELY OR IN COMBINATION WITH OTHER EQUIPMENT, OR FOR PERSONAL INJURY OR LOSS OR DESTRUCTION OF OTHER PROPERTY, OR FROM ANY OTHER CAUSE.

Boca's products are manufactured from new and serviceable used parts tested to Boca Research's quality assurance standards. If the product proves to be defective, Boca Research will bear the costs of labor and materials for hardware replacement or repair during the above specified warranty period. Boca Research or its Authorized Service Providers shall have the option to replace any defective part(s) with new part(s) or, at the option of Boca Research, with serviceable used parts that are equivalent to new parts in performance. Boca Research shall also have the option to replace any defective product(s) with functionally equivalent product(s)

This warranty shall not be applicable to the extent that any provision of this warranty is prohibited by any Federal, state, or municipal law which cannot be preempted. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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