

Boca's Family of Ethernet Products

NE2000-compatible

BOCALANcard 2000

**PRODUCT CODE:
BE2000/T
BE2000/2**

Before You Begin your Installation

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



How to get Technical Assistance

The dealer that you purchased this product or your computer from is the first place you should go for technical assistance. The dealer is usually the most qualified source of help, and is most familiar with your system and how this product should be installed. Many dealers have customer service and technical support programs, with varying levels of support offered, depending on your needs and computer knowledge. ***Please contact the dealer first whenever a problem occurs.***



If your Dealer Can't Assist you

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



Boca BBS
407-241-1601



Technical Support
Fax
407-997-0918



Automated Fax
Retrieval System
407-995-9456



Standard Free
Technical Support
407-241-8088



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

On-Line Support!
CompuServe: GO BOCA
Internet:

email: support@boca.org
World-wide on the 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

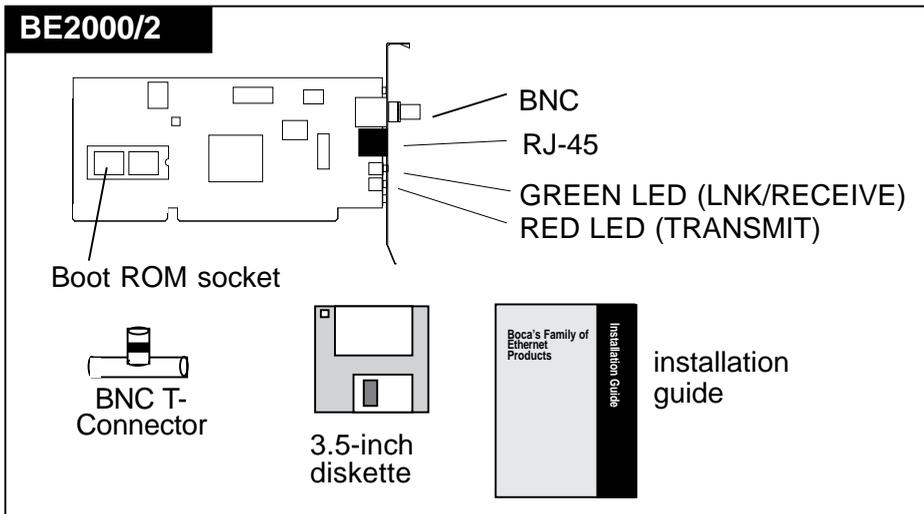
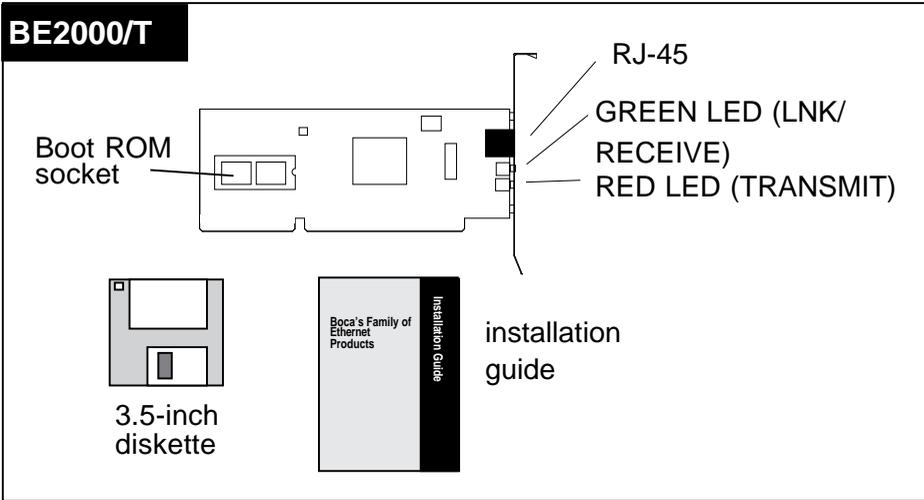
We use many world-class quality assurance programs to ensure the product you purchased is of the highest caliber. Sometimes, however, a component may be missing from the box, or is damaged or corrupt in some way. If this happens, immediately return the entire package to your place of purchase so you 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

The Contents of Your Package	6
Quick Start (for Experienced Users)	7
Section One: Introduction	9
Section Two: Installation and Configuration	10
2.1 Inserting the Adapter	10
2.2 Adapter Configuration	13
2.2.1 Single Board	13
2.2.2 Multiple Board	13
2.3 The BENCFG.EXE Program	14
Section Three: Troubleshooting	16
Appendix A: Specifications	20
Appendix B: Pin Assignments	21
Appendix C: NET.CFG Options for NetWare	22
Appendix D: Installing Boot ROMs	25
Appendix E: FCC Compliance	27
Appendix F: Servicing Your Boca Product	28

The Contents of Your Package

The contents of the Boca Research Ethernet product package are listed below. If any items are missing or appear incomplete or damaged, contact your dealer for assistance.



Quick Start (for Experienced Users)

This section is intended for knowledgeable and experienced network installers who will be using the default settings.

Other Items You May Need to Complete the Installation:

- Suitable tools to install the BOCALANcard Ethernet Adapter in your computer.
- Some network operating systems require some of their original installation diskettes. See your network installation manuals.

Hardware Installation

The default settings for the adapter are as follows:

IRQ	3
Base I/O Address	300h
Memory Address Boot ROM	disabled

If you need to change any of the default settings, refer to Section Two for instructions. Otherwise, insert the adapter into a 16-bit slot.

Note on NE2000

The BOCALANcard 2000 is compatible with existing NE2000 drivers shipped with the Novell operating system.

Troubleshooting

If the adapter does not function after you have installed it with the necessary software, be sure the adapter is seated firmly and that you have set all options correctly. If you still have difficulty, refer to Section Three: Troubleshooting.

Section One: Introduction

The BE2000 products allow you to connect the IBM personal computer ISA-bus (or compatible) to an Ethernet network. The 10Base-T adapter (BE2000/T) provides an RJ45 for connecting to an unshielded twisted-pair network (10Base-T). The Combo Ethernet adapter (BE2000/2) provides this plus a 10Base2 BNC connector to attach to thin coax.

Features of the BOCALANcard Ethernet Adapter:

- Compliant with ISO/ANSI IEEE 802.3 specifications
- High-performance, highly integrated one-chip solution
- On-board support for connecting to a 10Base-T network (BE2000/T) or 10Base2 (BE2000/2).
- Designed to work with 286, and high-speed 386 and 486-based systems
- Jumperless adapter—all features such as interrupt channel, memory address, and I/O address are software-selectable.
- Easy installation and maintenance.
- Uses existing NE2000 drivers—no need to install new drivers.
- Low-cost solution for networks requiring 10Base-T or 10Base2 connection.
- One link/receive status LED indicator and one transmit status LED indicator.
- NE2000-compatible.

Section Two: Installation and Configuration

The BOCALANcard Ethernet Adapter is compatible with network hardware which complies with IEEE Ethernet 802.3 standards. The BE2000/T offers a twisted-pair connector while the BE2000/2 offers this plus a BNC connector.

2.1 Inserting the Adapter

Removing the System Cover

These instructions assume an AT-style or compatible machine.

1. Power-down your system and remove the power cord.
2. Use a screwdriver to remove the screws which hold the cover in place. Obviously, locations and types of screws as well as type of case cover will vary based on your particular system. Refer to your computer system documentation for assistance.
3. Carefully slide the cover forward—away from the rear panel. Be careful not to let the cover catch on internal cables to disk drives, controllers, or the power supply.

Inserting the Board

4. Select an empty 16-bit slot and remove the screw and metal plate that covers the external access to the slot you have selected.
5. Insert the board in the slot you have selected so that the edge connectors on the bottom of the board mate with the slot on the motherboard. Press down firmly on the board and secure it with the screw you removed in step 4.

Replacing the System Cover

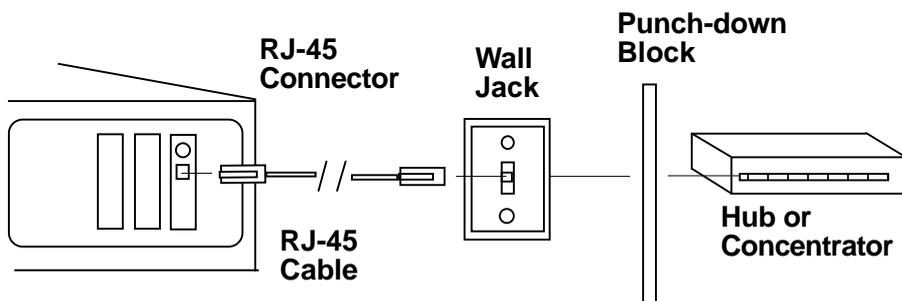
6. Slide the cover back over the chassis, again exercising care not to let it catch on any cabling. Once the cover is back in place, replace all the screws you removed in step 2.

Connecting Cables

7. Connect cables.

Boca's Ethernet products use standard pinouts. Refer to Appendix B for pin assignments.

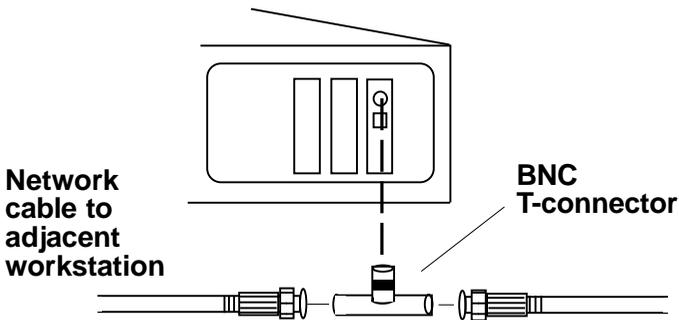
- a. **If attaching to an unshielded twisted-pair network**, connect one end of the 10Base-T cable to the RJ-45 connector on the board. attach the remaining end to a network outlet, hub, or concentrator as shown below



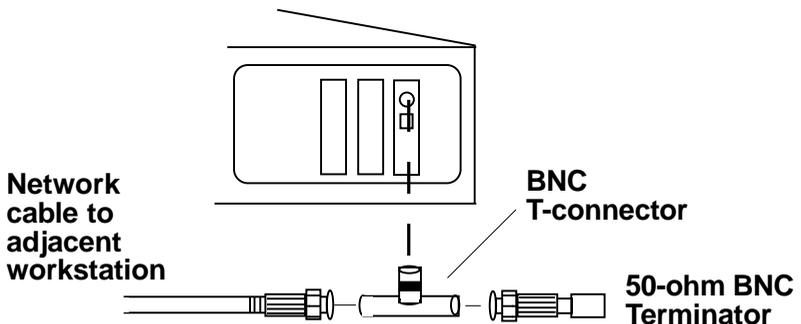
b. If attaching to “thin coax” cable:

1. Attach a BNC T-connector to the BNC port on the board. Align the notches on the card’s BNC connector with those on the T-connector. Twist clockwise approximately one-quarter turn.
2. Is the workstation at the end of the cable segment?

If **NO**, attach the BNC connector on the cable from each adjacent workstation to the two open ends of the T-connector as shown below.



If **YES**, attach a terminator to the open end of the T-connector as shown below:



8. Re-attach all other external cables and power cords to their original position. Installation of the hardware is now complete. Go to section 2.2 Adapter Configuration.

2.2 Adapter Configuration

2.2.1 Loading a Single Board

The BOCALANcard Ethernet Adapter is a software-configurable Ethernet adapter. No jumpers are necessary. In order to change parameters, run the configuration utility, **BENCFG.EXE**, to specify the following options:

I/O Base Address, Interrupt Number, Run Diagnostics, and Boot ROM Address. The default settings are Port 300, IRQ3, and no boot ROM installed. If you are using those settings, running BENCFG is not required.

2.2.2 Loading Multiple Boards

To load more than one BOCALANcard Ethernet Adapter in your machine, you must configure each one separately. Configure each board to a different interrupt and I/O base address. Insert each card one at a time and run **BENCFG.EXE**. When all cards have been correctly configured, power down and re-insert all adapters. The network driver must be loaded again for each new adapter board installed in the system. For example, to load three boards in a NetWare server environment, the following must be entered.

For first adapter board: `LOAD NE2000.LAN int=X1 Port=Y1`

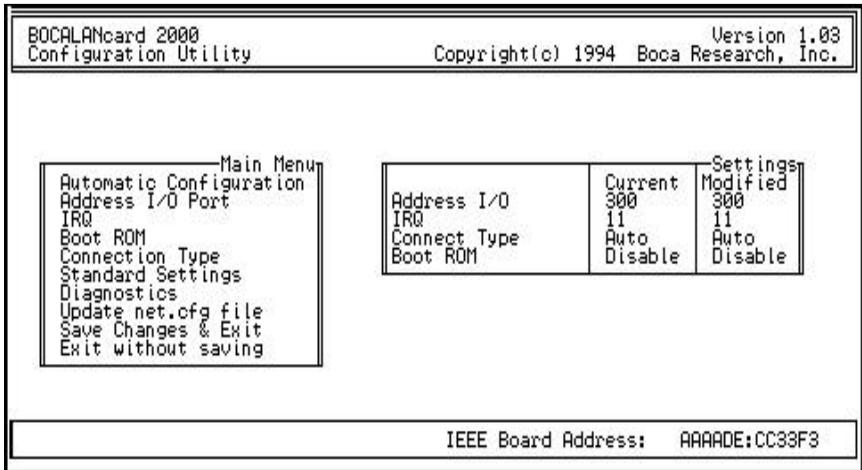
For second adapter board: `LOAD NE2000.LAN int=X2 Port=Y2`

For third adapter board: `LOAD NE2000.LAN int=X3 Port=Y3`

2.3 The BENCFG.EXE Program

The BENCFG program is used to set up the I/O address, IRQ, and boot ROM settings of the BOCALANcard 2000. To start the configuration utility, go to the directory where you installed the Boca Ethernet utilities, and type:
BENCFG [ENTER]

You will see a Main Menu and a settings window. The settings window allows you to view the current settings stored in the BOCALANcard Ethernet Adapter card. As you change the settings, the new settings will be displayed under the 'Modified' column of the settings window. Use your arrow keys to select one of the main menu options. The Main Menu options are displayed and described as follows:



Automatic Configuration: Suggests a configuration by examining the available resources in your computer.

Address I/O Port: Selects the base I/O address for the BOCALANcard Ethernet Adapter. (200h, 220h, 240h, 260h, 300h, 320h, 340h, 360h).

IRQ: Selects one of the eight hardware IRQ settings for the BOCALANcard Ethernet Adapter: 3, 4, 5, 9, 10, 11, 14, 15.

Boot ROM Address: Sets the Boot ROM I/O Address (C800, CC00, D000, Disabled).

Diagnostics: Performs a diagnostic on the BE2000 Ethernet adapter.

Save Changes & Exit: 'Reprograms' the Boca Ethernet card with the settings you have selected in the modified column.

Exit Without Saving: Exits the BENCFG utility without reprogramming the Boca Ethernet card.

Once the adapter(s) is configured, it is no longer necessary to run BENCFG.EXE.

Section Three: Troubleshooting

If you encounter difficulties with your BOCALANcard Ethernet product, the problem may be a faulty installation or configuration settings which conflict with other devices. Check the following:

- **STATUS LEDs.** The BOCALANcard Ethernet Adapters have two LEDs that are visible from the rear of the board. These status indicators show whether or not the cable is connected along with a programmable LED.

GREEN: **Link/Receive Status**

RED: **Transmit Status**

Power on the system, connect the network cable, and observe the LEDs. The green LED shows that it is connected with another 10Base-T transceiver. If the green light is ON, then the system is connected to the network. If the green light is flickering, the system is connected to **and** receiving data from the network. See charts explaining LED status on next page.

Using RJ45 with connection type set to Auto (default) or RJ-45		
LIGHT	CONDITION	STATUS
GREEN	ON	LINK established
	OFF	No LINK established
	Flickering	Receiving data from network
RED	ON	BE2000 NOT transmitting data to network.
	Flickering	BE2000 IS trasmitting data to network

Using BNC with connection type set to Auto (default)		
LIGHT	CONDITION	STATUS
GREEN	OFF	Always off.
RED	ON	BE2000 NOT transmitting data to network.
	Flickering	BE2000 IS trasmitting data to network

Using BNC with connection type set to BNC		
LIGHT	CONDITION	STATUS
GREEN	ON	BE2000 not receiving data from network
	Flickering	BE2000 IS receiving data from the network.
RED	ON	BE2000 NOT transmitting data to network.
	Flickering	BE2000 IS trasmitting data to network

- **BOARD SETTINGS.** If you are using a Novell network, make sure that the settings in the NET.CFG file are correct. Also, when NE2000.COM is executed, NET.CFG must be in the current default directory.

If you are using another type of network (NDIS, etc.), read the driver installation instructions again to be sure that I/O address and IRQ settings are correct.

Review the installation again and check software setup.

Also make sure that any of the setting selections you have made do not conflict with devices that are currently in your system. You may want to vary the settings on your board to see if it makes a difference. Remember to modify the NET.CFG or your batch files as well.

- **MAKE SURE THAT THE NETWORK YOU ARE CONNECTED TO IS FUNCTIONING.**
- **REPLACE THE ADAPTER WITH ANOTHER KNOWN TO FUNCTION AND TRY TO LOGIN AGAIN.**
- **TRY THE ADAPTER IN A DIFFERENT COMPUTER.**
- **MAKE SURE YOU ARE USING DRIVERS MADE FOR NE2000 COMPATIBILITY.**
- **REFER TO THE README FILE FOR A COMPREHENSIVE LIST OF POSSIBLE ERROR MESSAGES AND SUGGESTED REMEDIES.**

If none of the above isolates and solves the problem, refer to Appendix F: Servicing Your Boca Product.

Appendix A: Specifications

10Base-T Ethernet adapter (BE2000/T)

- 10Base-T twisted pair transceiver with RJ-45 connector
- 10Base-T operating distance 100 meters (328') maximum hub to node length
- Diagnostic LEDs: link/receive indicator and transmit indicator
- Software-Selectable interrupts, memory address, and a base I/O address.

10Base2 Ethernet adapter (BE2000/2)

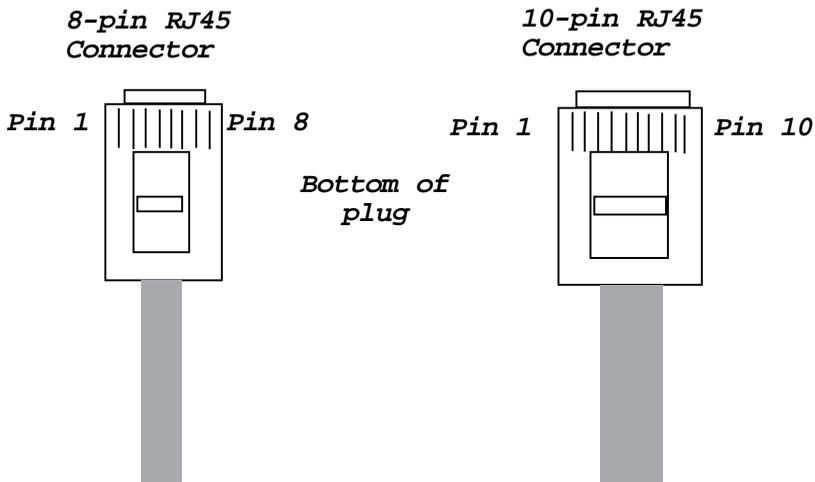
- All features as listed above plus:
- 10Base2 BNC connector for thin coax
- 10Base2 operating distance: 185 meters (607') maximum hub to node length

Appendix B: Pin-Out Assignments

Pin-out assignments for the 10Base-T connector are as follows:

8-pin		10-pin
NA	NC	1
1	Tx+	2
2	Tx-	3
3	Rx+	4
4	NC	5
5	NC	6
6	Rx-	7
7	NC	8
8	NC	9
NA	NC	10

Boca's Ethernet products use a 8-pin 10Base-T connector.



Appendix C: NET.CFG Options for NetWare

Included on the driver disk in the Novell ODI sub-directory is a file that establishes the base settings for your adapter. This file is called NET.CFG, and is a text file that describes these settings. If a configuration is different from the default settings or if you are using multiple protocols, you need to modify this NET.CFG file. This appendix explains how.

The NET.CFG file is a configuration file that contains section headings and options of the ODI software.

You may also need to see the documentation specific to your protocol for additional NET.CFG information. Use any DOS text editor to modify the file.

Conventions

Main section headings must be left-justified and are not case sensitive. The heading must precede the options you want to include in that section. Options are not case sensitive and must be preceded by a tab or hard spaces.

Precede comments with a semicolon (;). End each line with a hard return. Write all numbers in decimal notation except where noted otherwise.

Options

The following chart lists the driver options defined by the DOS ODI software. The options available for the BOCALANcard Ethernet Adapter driver and IPX protocol stack are shown in a sample NET.CFG file. Protocol stacks other than IPX may have additional options not listed here. Refer to the other protocol's documentation for more information. In this chart, the main NET.CFG section headings are shaded and flush with the left margin. NET.CFG options are listed under each heading and indented.

Link Driver <i>BOCANW</i>
PORT [#1 #2] hex_starting_address [hex_number_of_ports] NODE ADDRESS hex_address SLOT number FRAME frame_type PROTOCOL name hex_protocol_IDframe_type SAPS number LINKS STATIONS number ALTERNATE MAX FRAME SIZE number CONNECTOR DIX INT[#1 #2]channel_number
Link Support
BUFFERS communication_number [size] MEMPOOL number[k]
Protocol <i>protocol name</i>
BIND #board_number

The BOCALANcard Ethernet driver has these NET.CFG options available:

- INTERRUPT#
- NODE ADDRESS
- FRAME
- PROTOCOL (such as IPX)
- PORT

The following figure is a sample of the structure of any given NET.CFG file:

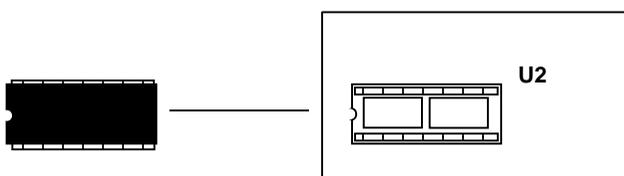
LINK DRIVER BOCANW

FRAME ETHERNET_802.3
PROTOCOL IPX 00 ETHERNET_802.3
INT 3
PORT 300

Appendix D: Installing Boot ROMs

Installing the ODI Boot ROM (must be NE2000-compatible)

1. Obtain a boot ROM
2. Put the Boot ROM in the 28-pin socket. Make sure you line up the notch on the Boot ROM with the notch on the socket.



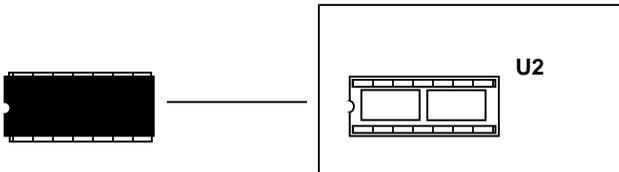
3. To enable the Boot ROM, run the BENCFG utility. Select Mode Settings, then Boot ROM Enable.
4. The Boot ROM will work only with the following four configurations:

	I/O	INTERRUPT	BOOT ROM ADDRESS
CONFIG.1	300h	3	C800h
CONFIG.2	320h	5	CC00h
CONFIG.3	340h	4	D000h

5. Follow the Boot ROM installation procedure given in the Novell Installation manual to create the Boot Image on the Novell Server.
6. Remove any boot drives from the workstation (A:, C:) and boot from the server.

Installing the NDIS Boot ROM

1. Obtain a boot ROM.
2. Put the Boot ROM in the 28-pin socket. Make sure you line up the notch on the Boot ROM with the notch on the socket.



3. To enable the Boot ROM, run the BENCFG utility. Select Mode Settings, then Boot ROM Enable.
4. The Boot ROM will work only with the following four configurations:

	I/O	INTERRUPT	BOOT ROM ADDRESS
CONFIG.1	300h	3	C800h
CONFIG.2	320h	5	CC00h
CONFIG.3	340h	4	D000h

5. Follow the LAN Manager server setup procedure for starting remote booting services on the LAN Manager server. Refer to the LAN Manager documentation.
6. Remove any boot drives from the workstation (A:, C:) and boot from the server.

Appendix E: FCC Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.”

CHANGES OR MODIFICATIONS TO THIS EQUIPMENT NOT EXPRESSLY APPROVED BY THE MANUFACTURER COULD VOID YOUR AUTHORITY TO OPERATE THE EQUIPMENT.

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BE2000.PM5

Appendix F: Servicing Your Boca Product

If your Boca product 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 (407) 241-1601 and will support data transmission speeds up to 28.8Kbps 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.

If the Troubleshooting section did not resolve your problem, you may call our technical support staff for assistance. If you haven't referred to the Troubleshooting section, there's a good chance the solution to your problem is there.

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 #
(located on the board)
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 Boca Research Technical Support Department between the hours of 8:00 a.m. and 6:30 p.m. Monday through Friday EST at (407) 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 we receive written authorization from you. Cost of parts and labor involved in making such repairs will be billed to you C.O.D.
5. When returning the product to Boca Research, Inc. for repairs, please be sure to include:
 - the **BE2000 (board only)**
 - **copy of the original invoice**
 - **your return street address (for UPS purposes),**
 - **your phone number,**
 - **and 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 product were covered by the warranty, Boca Research, Inc. will return it prepaid via UPS.

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 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 DURING the first year of service.

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.

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.



Manual Part # 9437
Rev. 3.1