

8-PORT ETHERNET NETWORK

BOCA NET-8 ETHERNET KIT



Before You Begin your Installation

The product you have purchased is designed to be easily installed with 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 opposite page.

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.



Boca BBS
561-241-1601



***Automated
Fax Retrieval
System***
561-995-9456



***Technical
Support Fax***
561-997-2163



***Standard Free
Technical Support***
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Priority Service
900-555-4900
(\$2 per minute)

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



Contents

Part I: Introduction and Package Contents 8

Part II: The BOCA NET-8 Hub

Section One: Installation	14
Section Two: Network Configuration	15
2.1 Small Stand-Alone Network	15
2.2 Cascaded Network	16
Section Three: Cabling Characteristics	18
3.1 Cable Type	18
3.2 Pin Assignments	18
3.3 Crossover Function	19
3.4 Straight-Through Wiring	20
3.5 Crossover Wiring	20

Part III: The 10Base-T Network Card

Section One: Installation	21
1.1 Inserting the Adapter	22
1.2 Adapter Configuration	25
Single Board	25
Multiple Board	25

Section Two: Configuration	26
2.1 Driver Support	26
2.2 Installation Notes	26
2.3 Configuration	32
2.4 Windows 95 Driver Installation	32

Part IV: Troubleshooting

1.1 BOCA NET-8 Hub	35
1.2 10Base-T Network Card	38

Part V: Appendices

Appendix A: Specifications	42
Appendix B: Pin Assignments	44
Appendix C: NET.CFG Options for NetWare	45
Appendix D: Installing Boot ROMs	48
Appendix E: FCC Compliance	50
Appendix F: Servicing Your Boca Product	51
Appendix G: Warranty	53

PART I: Introduction and Package Contents

Congratulations on purchasing the BOCA NET-8 Ethernet kit, which provides everything you need for your network in one box. Our compact hub, which fits conveniently on the corner of a desk is fully compliant with IEEE 802.3 standards. Its highly integrated single-chip solution constantly monitors signal quality ensuring reliability of your network reliability.

In addition, your 10Base-T Ethernet cards get you started in connecting your ISA bus-based (or compatible) systems to an Ethernet network. The 10Base-T card features an RJ45 connector for easy connection to the supplied 8-port via twisted-pair connector cables from Belkin (supplied).

Features of the BOCA NET-8:

- High-performance, highly integrated one-chip solution from Advanced Micro Devices.
- The 8-port concentrator allows you to connect up to eight nodes using unshielded twisted-pair cabling.
- A crossover switch for “cascading” multiple units to support flexible growth.
- Status LEDs monitor status and operation at all times.
- Automatic partitioning disables ports that experience collisions and automatically reconnects those ports when the error condition is cleared.

Features of the 10Base-T Network Card:

- 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.
- Designed to work with 286, 386, 486, and Pentium-based systems.
- Plug and Play compatible (ISA Plug and Play, v. 1.0a)
- Full-duplex capability with a full-duplex hub (not supplied)
- Jumperless adapter—all features such as interrupt channel 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 (GREEN) status LED indicator and one transmit (RED) status LED indicator.
- NE2000/NE2000+ compatible.

Functional Description for the BOCA NET-8

The BOCA NET-8 is an implementation of an IEEE 802.3/Ethernet repeater or hub. It provides eight 10Base-T ports in a compact package. The BOCA NET-8 complies with the full set of repeater basic functions as defined in section 9 of ISO 8802.3 (ANSI/IEEE 802.3c). These functions are defined below:

Repeater Function

If any single network port senses the start of a valid packet on its receive lines, then the BOCA NET-8 will re-transmit the received data to all other enabled network ports.

Signal Regeneration

When re-transmitting a packet, the BOCA NET-8 ensures that the outgoing packet complies with the 802.3 specification in terms of preamble structure, voltage amplitude, and timing characteristics.

Jabber Lockup Protection

The BOCA NET-8 implements a built-in jabber protection scheme to ensure that the network is not disabled due to the transmission of excessively long data packets.

Collision Handling

The BOCA NET-8 will detect and respond to collision conditions as specified in 802.3. It will also protect the network from an excessive duration of, or frequent collisions by “partitioning” the offending port from the rest of the network. Once a port is partitioned, the data received from that port will not be repeated. However, any other data on the network will be re-transmitted on that port.

If the collisions that cause the partitioning cease, the port will be re-connected to the rest of the network.

The status of the partitioning scheme can be checked at any time by moving the LNK/PRT switch on the front of the BOCA NET-8 to the PRT position. If any ports are currently partitioned, the corresponding LED will come ON.

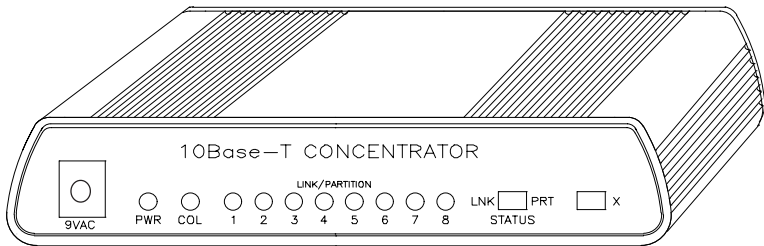
Link Test

The BOCA NET-8 implements the Link test function as specified in the 802.3 10Base-T standard. It transmits Link test pulses to any port after that port's transmitter has been inactive for a short period of time. The device connected to the port will respond in the same manner.

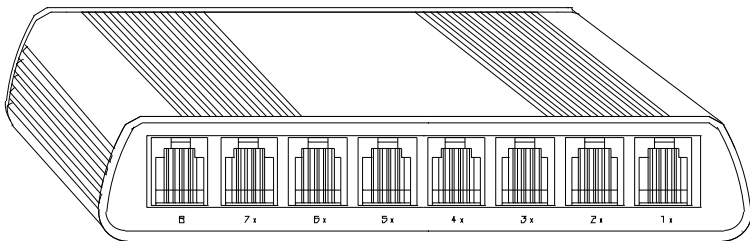
The Link Status can be viewed on the LEDs of the BOCA NET-8 when the LNK/PRT switch is in the LNK position. If a successful link has been established, the corresponding LED will be ON.

Polarity Reversal

The BOCA NET-8 automatically detects and adjusts to reversed polarity of received data.

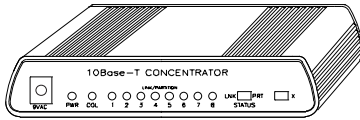


FRONT VIEW OF BOCA NET-8

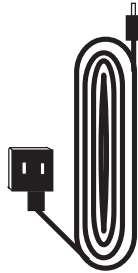


REAR VIEW OF BOCA NET-8

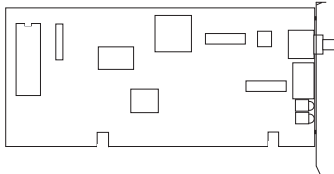
Contents of Your Package



The BOCA NET-8 Hub



AC Power adapter



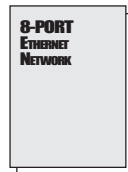
10Base-T Network Cards (2)



RJ-45 Belkin 15' cables (2)



Driver diskette



installation guide

PART II: The BOCA NET-8 Hub

Section One: Installation

1. Connect the appropriate end of the power cord to the front of the BOCA NET-8 (marked 9VAC) and insert the remaining end to any conveniently accessible wall outlet.



2. Check the front panel LEDs. If the power (PWR) LED is not ON, turn to *Part IV: Troubleshooting*.

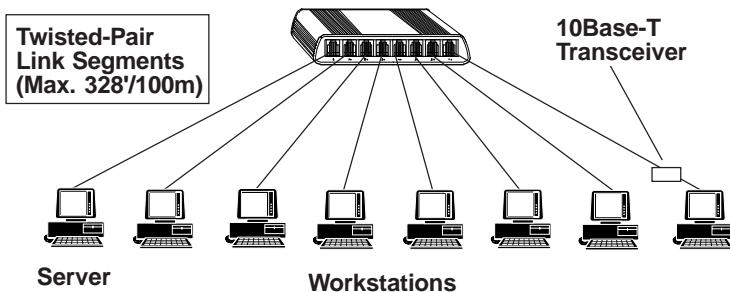
Section Two: Network Configuration

The BOCA NET-8 is intended to connect multiple personal computers (stand-alone) and/or other concentrators to an Ethernet star topology network.

2.1 Small Stand-Alone Network

A single BOCA NET-8 can support a maximum of eight nodes, one per port. Each device is connected directly to the twisted-pair port (RJ-45 connector) via a twisted pair link segment (RJ-45 cable).

If the Ethernet adapter in any given machine in the stand-alone network does not have an RJ-45 connector, a transceiver may be connected to interface the adapter to an RJ-45 connector. The other end of the transceiver is then connected to an RJ-45 port on the concentrator with a twisted-pair link segment (RJ-45 cable). In the example below, work station number 8, with an Ethernet adapter without an RJ-45 connector, requires a transceiver. **NOTE: Maximum RJ-45 cabling distance is 100 meters (328 feet).**

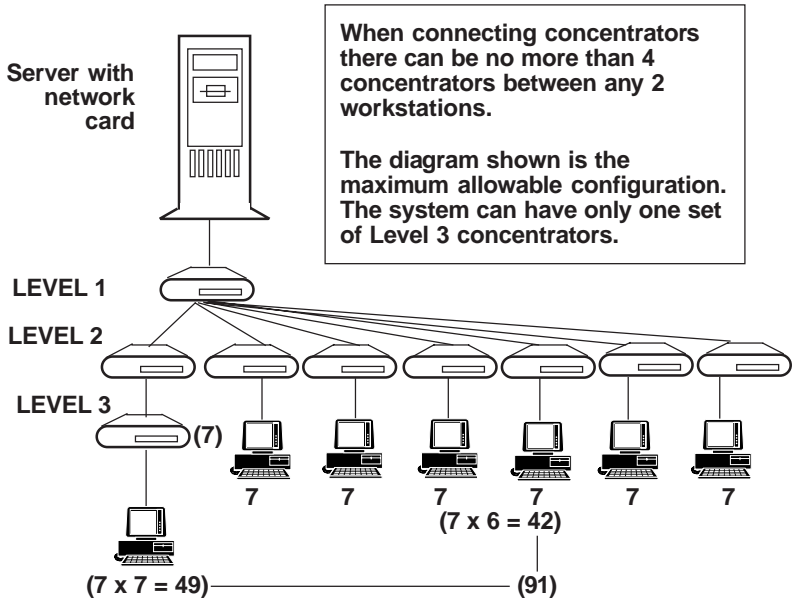


2.2 Cascaded Network

The star network may be expanded to a maximum of 91 stations through “cascading”. This amounts to 3 levels of concentrators as shown on the next page. The **first** is the main concentrator. One of its eight ports is connected to a network card in the server. The remaining 7 ports are connected to 7 concentrators. This makes up the **second** level. Six of the 7 concentrators have 7 ports available which are connected to 7 workstations for a total of **42 stations on Level 2**.

Seven ports on the remaining concentrator are connected to 7 additional concentrators. This makes up the **third** level. Seven workstations may be connected to each of these concentrators for a total of **49 stations on Level 3**. 49 on Level 3 and 42 on Level 2 yield a total of 91 stations. See diagram on following page.

When cascading from one BOCA NET-8 to a second BOCA NET-8, set port 8 on the first BOCA NET-8 to the non-X position Use a straight-through cable from port 8 on the first BOCA NET-8 to any one port (1-7) on the second BOCA NET-8.



NOTE: Maximum RJ-45 cabling distance is 100 meters (328 feet).

This is only a sample configuration. Other configurations are possible.

Section Three: Cabling Characteristics

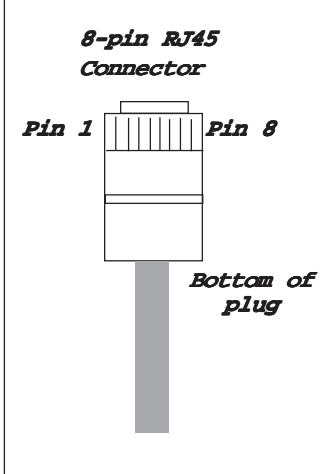
3.1 Cable Type

NOTE: If purchasing additional cables, read this section, otherwise, continue with Part III.

Cable:	UTP (Unshielded Twisted Pair)
Type:	100 Ohm UTP 22-26 AWG (0.4-0.6 mm) 2 pairs minimum; category 3 or higher
Male Connector:	8-pin RJ-45
Distance:	Maximum: 100m (328'); Minimum: .6m (2')

3.2 10Base-T Pin Assignments

An Ethernet twisted pair link segment calls for two pairs of wires, with each pair differentiated by color. Each twisted pair link segment must have an RJ-45 male connector attached to both ends. Pins 1 and 2 on the RJ-45 connector are for transmitting data while pins 3 and 6 are for receiving data. See chart below:

Looking into the RJ-45 connector on the network card	
RJ-45 Assignment 1 Tx+ This is standard for Ethernet devices . The BOCA NET-8 is crossed over (except for port 8) 2 Tx- 3 Rx+ 6 Rx-	
Looking into the RJ-45 connector on the BOCA NET-8	
RJ-45 Assignment 1 Rx+ This is the concentrator scheme for Ports 1-7. 2 Rx- 3 Tx+ 6 Tx-	

* The “+” and “-” signs are used to represent the polarity of the two wires that make up each wire pair.

NOTE: Each wire pair must be connected to the RJ-45 connectors in a specific orientation. Refer below to 3.3 Crossover Function for details.

3.3 Crossover Function

Two Ethernet 10Base-T devices can communicate only if the transmitter on one device is connected to the receiver of the other device. The 10Base-T specification suggests that the crossover function be implemented in the concentrator itself. On the BOCA NET-8, this crossover function is implemented in all ports. However, the last port can be switched to straight-through to simplify installation when cascading concentrators. This switch is labelled “X” and located on the front of the BOCA NET-8.

The BOCA NET-8 features internal cross-over for each port. So, when a BOCA NET-8 port labelled with an “X” is connected to a network card that does not feature internal crossover, then straight-through wiring must be used.

When connecting two identical twisted-pair ports (that is, ports that either BOTH support or NOT support the crossover function), a crossover must be implemented in the wiring (see 3.5).

3.4 Straight-Through Wiring

If the twisted pair link segment is to connect two devices and only one of the devices features an internal crossover, the two pairs of wires must be straight-through:

STRAIGHT-THROUGH RJ-45 PIN ASSIGNMENTS

Device 1 Device 2

1 (Rx+) — 1 (Tx+)
 2 (Rx-) — 2 (Tx-)
 3 (Tx+) — 3 (Rx+)
 6 (Tx-) — 6 (Rx-)

The assignments will vary if both are "X", or both are NOT "X".

3.5 Crossover Wiring

If you are connecting two devices directly that do not implement internal crossover, then the crossover must be implemented in the wiring.

CROSSOVER RJ-45 PIN ASSIGNMENTS

Device 1 Device 2

1 (+) — 2 (-)
 2 (-) — 1 (+)
 3 (+) — 6 (-)
 6 (-) — 3 (+)

NOTE ON SIGNAL POLARITY

If a receive data pair has the "+" and "-" signals unintentionally reversed, the BOCA NET-8 automatically detects and adjusts this reversal so the data path will function properly.

Part III: The 10Base-T Ethernet Network Card

Section One: Installation

The 10Base-T Ethernet Network Card is compatible with network hardware which complies with IEEE Ethernet 802.3 standards. The card offers a twisted-pair connector, plus a BNC connector. The network card is compatible with existing NE2000 drivers shipped with Novell and other operating systems. In addition, drivers are also provided for full-duplex operation when network switches are used. Throughput may then reach as high as 20Mb/s.

PNP OR JUMPERLESS MODE

This selects the operating mode of the 10Base-T Network Card: PNP (Plug and Play) or Jumperless (configured by BENCFG.EXE).

1. **If either your BIOS is Plug and Play, or you have Windows 95**, do not install the **10Base-T Network Card** Configuration Utility. Leave the card in the default Plug and Play mode.

NOTE: If you have a Plug and Play system, but do not have Windows 95, you will need to know the system resources assigned to the card. Run a utility such as Isolate to provide this information.

2. **If you do NOT have Windows 95, and your BIOS is NOT Plug and Play**, then you must install the **10Base-T Network Card** Configuration Utility (see *Part III, Section Two*). Run BENCFG and set the mode to "jumperless". Press **F10** to save changes made in BENCFG.

1.1 Inserting the Adapter

Removing the System Cover

These instructions assume an IBM-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 remove the cover from the computer. Be careful not to let the cover catch on internal cables to disk drives, controllers, or the power supply.

Inserting the Network Card

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 adapter 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.

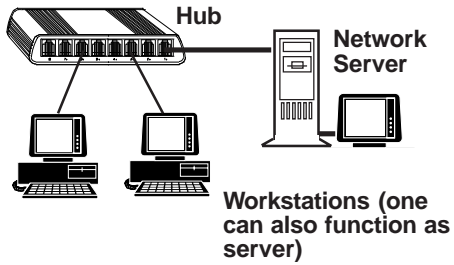
Replacing the System Cover

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.

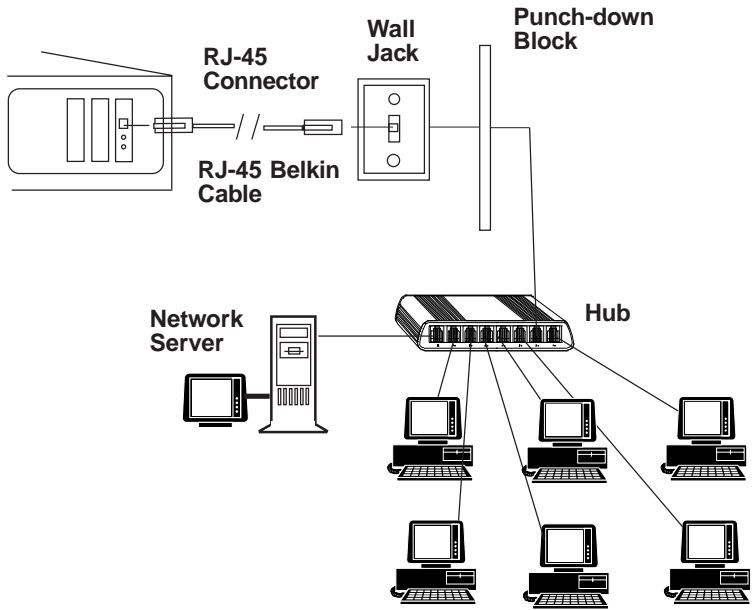
Connecting Cables

7. Connect one end of the Belkin 10Base-T cable to the RJ-45 connector on the board. Attach the remaining end to a network outlet, hub, or concentrator as shown in the sample configurations on the following page.
8. Re-attach all other external cables and power cords to their original position. Installation of the hardware is now complete. Go to section *1.2 Adapter Configuration*.

Small Office Configuration



Multiworkstation Configuration



1.2 Adapter Configuration

Loading a Single Board

The 10Base-T Network Card is a software-configurable Ethernet adapter. 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.

Loading Multiple Boards

To load more than one 10Base-T Network Card in your machine, you must configure each one separately. Configure each board to a different interrupt and I/O base address. Insert one card 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

Section Two: Software Configuration

2.1 Driver Support

The 10Base-T Network Card is NE2000 and NE2000+ compatible. High-speed (full-duplex) drivers support the following operating systems:

- Windows 95 (see p. 33 for Windows 95 driver installation)
- Novell Server 3.x and 4.x
- Novell ODI Workstation
- Windows for Workgroups 3.11
- Windows NT 3.51
- Packet Drivers

2.2 Installation Notes

Installation of the drivers and utilities is only necessary if either of the following two conditions are true:

1. You are operating in a non Plug and Play environment. You should then install the configuration utility BENCFIG.EXE.
2. You want to install high-speed drivers for Novell Client ODI, Novell Server drivers, or packet drivers.

NOTE: For operating systems such as Windows 95, Windows for Workgroups 3.11, and Windows NT, drivers are installed via a facility in the operating system. You will need to follow the instructions in this manual, as well as those supplied in your network operating system documentation.

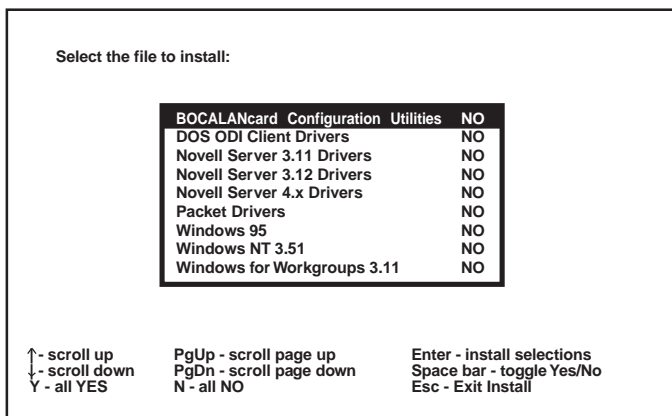
High-speed drivers for the 10Base-T Network Card for these operating systems are provided in the following subdirectories on the driver diskette as listed below.

Windows 95	\WIN95 (see Part III; section 2.4)
Windows NT	\WINNT
Windows for Workgroups	\WFW311

To start installation, type **A:\INSTALL** (or **B:\INSTALL**) and the following introductory screen is displayed. **NOTE: Make sure you have exited Windows completely before starting the installation.**



This program installs the 10Base-T Network Card configuration utility and drivers on your computer. Press the escape key [ESC] at any time to abort the installation. Each question has a default answer. If the default is correct, press ENTER in response. Otherwise, type the correct answer and press ENTER. If you make a mistake, press the BACKSPACE key and retype the answer. The Installation Option screen then appears:



The choices are as follows:

- 10Base-T network Card Configuration Utilities
- DOS ODI Client Drivers
- Novell Server 3.11 Drivers
- Novell Server 3.12 Drivers
- Novell Server 4.x Drivers
- Packet Drivers
- Windows 95
- Windows NT 3.51
- Windows for Workgroups 3.11

2.3 Configuration

Configuration is “automatic” when running a Plug and Play system. Otherwise, the 10Base-T Network Card is configured with the BENCFG.EXE program, which is installed when you select “10Base-T Network Card Configuration Utilities” from the installation menu. The card can operate in one of two modes:

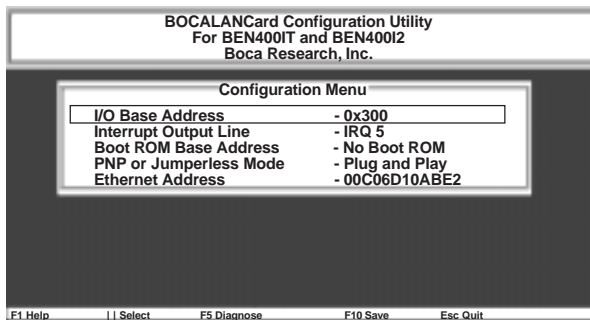
1. Non Plug and Play Systems:

- Software-configurable by the BENCFG.EXE program (jumperless), or

2. Plug and Play Systems:

- Plug and Play Mode (factory default). If you have Plug and Play, running or installing BENCFG.EXE is NOT necessary.

When you run BENCFG.EXE, the following main selection screen is displayed:



The options are summarized as follows:

I/O Base Address: Changes the board's I/O address when in "jumperless" mode.

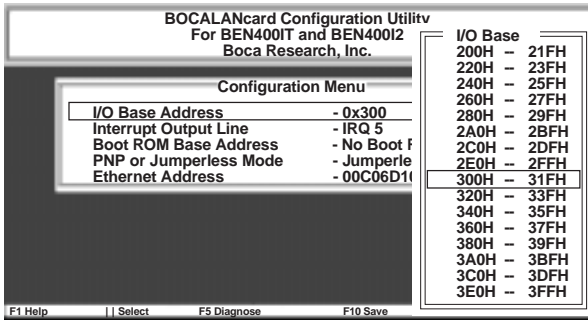
Interrupt Output Line: Changes the board's IRQ when in "jumperless" mode.

Boot ROM Base Address: Specifies Boot ROM options or no Boot ROM.

PNP or Jumperless Mode: Specifies Plug and Play or jumperless mode.

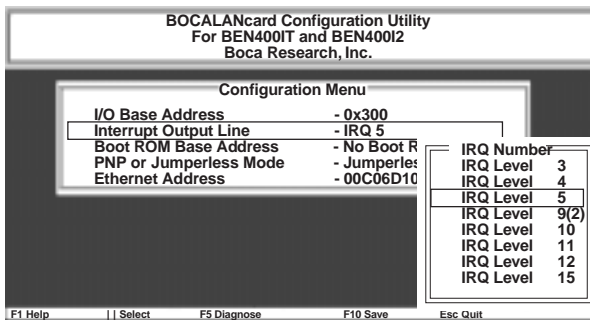
Ethernet Address: Displays the IEEE Ethernet address assigned to the board (this is never user-configurable).

I/O Base Address



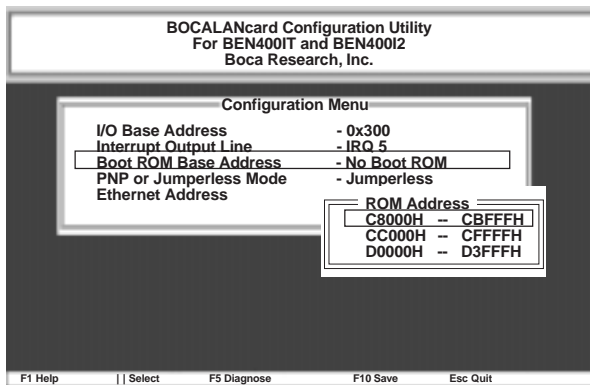
The 10Base-T Network Card can operate in a range from 0200h to 03E0h, requiring an address window of 1Fh. If the board is in Plug and Play mode, you will not be able to change the I/O address because the Plug and Play configuration is responsible for the configuration of Plug and Play boards. Also, if the board is in non Plug and Play (or “jumperless” mode), the BENCFG.EXE program determines which I/O addresses are in use by other devices and “grays” out (disables) these choices.

IRQ



The 10Base-T Network Card can operate with the following IRQ settings: 3, 4, 5, 9(2), 10, 11, 12, or 15. Note that most secondary IDE hard-disk controllers operate on IRQ15, so if the system is not a “diskless workstation”, IRQ15 should be avoided.

BOOT ROM BASE ADDRESS



The **10Base-T Network Card** is compatible with an NE2000-type Boot ROM. Refer to the documentation provided with your boot ROM for configuration instructions. Do NOT enable this option unless there is a boot ROM present. The default setting is NO BOOT ROM.

Notes on Using the 10Base-T Network Card in Plug and Play Mode without Using a Plug and Play Operating System

It is possible to use the 10Base-T Network Card in Plug and Play mode without using a Plug and Play operating system. Your operating system vendor may provide software utilities to do so. For example, Intel Corp. provides the “ISA Plug and Play Kit” for MS-DOS type computers. These utilities configure the **10Base-T Network Card** when in Plug and Play mode. The BENCFG program can report how the utility configured the card (I/O Address, IRQ) so that you can set up your operating system accordingly.

2.4 Windows 95 Driver 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, continue with page 33. If your version is not 4.00.950 B, you have an earlier release of Windows 95. In that case, go to “Earlier Versions of Windows 95” on page 34.

For Windows 95 Version 4.00.950 B:

1. With the 10BaseT/2 Network Card installed in your system, start Windows 95 as you normally would.
2. When Windows 95 detects new hardware, it starts the “**Update Device Driver Wizard**”.
3. Insert the “Boca BEN400 Driver Disk” and click **Next**.

To install Full-Duplex drivers under Windows 95, continue below, otherwise, complete driver installation with step 4:

CAUTION: Using this driver with a half-duplex hub can result in diminished performance.

- Click **Next**. Windows 95 searches for updated drivers.
- After Windows 95 finishes its search, click on **Other Locations**.
- Enter the path **A:\WIN95\FLDPX** and click **OK**.
- Next, the “**Network Card Properties**” screen is displayed. Note the following selections under “Property”:

EARLYTRANSMIT (enables early transmit; allows processing of data while still **receiving** data from the network, increasing overall throughput).

EARLYRECEIVE (enables early receive; allows processing of data while **sending** data to the network, increasing overall throughput).

FULL DUPLEX (enables full duplex; allows the **Network Card** to transmit and receive data at the same time without causing a collision. This increases and width from 10Mbps to 20Mbps. Note that the use of a full duplex Ethernet switch is required.)

Under “**Value**”, select **Enable** for all three of these properties (highlight each one by one).

- Select **OK**. Files are then copied to your system. You may be prompted for your original Windows 95 CD or diskettes from which files will be copied. Installation of the Windows 95 Full-Duplex driver is complete.
4. After Windows 95 finishes searching for updated drivers, click on the **Finish** button. Congratulations! Setup is complete for Windows 95 users.

For Earlier Versions of Windows 95:

1. With the 10BaseT/2 Network Card installed in your system, 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. Insert the “Boca BEN400 Driver Disk” in your floppy drive.

To install Full-Duplex drivers under Windows 95, continue below, otherwise, complete driver installation with step 5:

CAUTION: Using this driver with a half-duplex hub can result in diminished performance.

- Enter the path **A:\WIN95\FLDPX** and click **OK**.
- Next, the **“Network Card Properties”** screen is displayed. Note the following selections under **“Property”**:

EARLYTRANSMIT (enables early transmit; allows processing of data while still receiving data from the network, increasing overall throughput).

EARLYRECEIVE (enables early receive; allows processing of data while sending data to the network, increasing overall throughput).

FULL DUPLEX (enables full duplex; allows the **Network Card** to transmit and receive data at the same time without causing a collision. This increases and width from 10Mbps to 20Mbps. Note that the use of a full duplex Ethernet switch is required.)

Under **“Value”**, select **Enable** for all three of these properties (highlight each one by one).

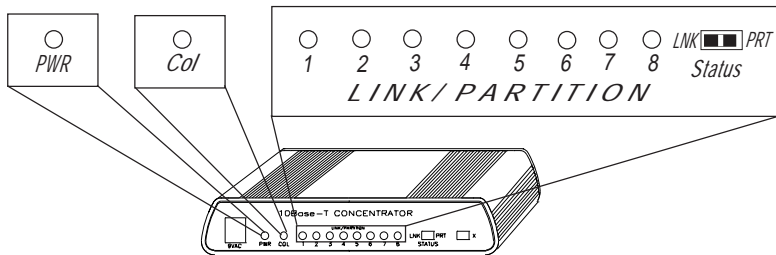
- Select **OK**. Files are then copied to your system. You may be prompted for your original Windows 95 CD or diskettes from which files will be copied. Installation of the Windows 95 Full-Duplex driver is complete.
5. Enter the path **A:\WIN95** (or **B:\WIN95**) and click **OK**. After the driver is copied, may be prompted for your original Windows 95 CD or diskettes from which files will be copied. Congratulations! Setup is complete for Windows 95.

Part IV: Troubleshooting

1.1 BOCA NET-8 Hub

Status/Diagnostic LEDs

The BOCA NET-8 features a total of ten front panel LEDs to aid in testing the installation and the diagnosing of problems. There are eight LINK/PARTITION LEDs, one Power LED, and one Collision LED.



Ports one through eight feature an associated Link/Partition LED. A switch is used to toggle between the **LINK** and **PARTITION** display status.

When set to **LINK**, the status LED will be **ON** continuously for a given port IF a device is physically attached and functioning normally. If the LED is **OFF** or **FLASHING**, there is a problem with the corresponding device.

When set to **PARTITION**, the LED will be **OFF** continuously for a given port IF a device is physically attached and functioning normally. If the LED is **ON**, the associated device has been isolated from the network because of a **COLLISION** (concentrator receiving data from two or more nodes at the same time).

Each BOCA NET-8 concentrator also has:

- A GREEN power LED to indicate that the BOCA NET-8 has power.
- One RED collision LED to signal a network collision. If this light goes ON, toggle the LNK/PRT switch to PRT (for PARTITION), to isolate which device is causing the collision.

LED functionality is summarized as follows:

LED	COLOR	#	STATUS	MEANING
POWER	GREEN	1	ON	BOCA NET-8 has power.
COLLISION	RED	1	ON	A network collision has been detected. BOCA NET-8 is receiving data from two or more nodes at the same time.
PORT LINK STATUS (1-8)	GREEN	8	ON	The port is receiving a valid link test signal.
PORT PARTITION STATUS (1-8)	GREEN	8	OFF	Associated device is attached and functioning normally.
			ON	Device has been isolated because of COLLISION

Installation Test

1. POWER UP THE BOCA NET-8 AND CHECK THE LEDs

The Power LED should be ON. If the ports are connected to active devices, their LINK LEDs will remain on after power-on.

2. IF THE POWER LED IS NOT ON AND THE BOCA NET-8 SHOWS NO ACTIVITY

Check the connections between the concentrator, the power cord, and the wall outlet.

Try another AC power adapter that you know works. If the Power LED still fails to come ON, the BOCA NET-8 may be faulty. Call Technical Support.

3. IF THE LINK LEDs DO NOT RESPOND

Check that the LNK/PRT switch is set to LNK.

Check the connections between each network device and the concentrator port, including wiring. Make certain all devices have power and are working normally.

1.2 10Base-T Network Card

If you encounter difficulties with your 10Base-T Network Card, the problem may be a faulty installation or configuration settings which conflict with other devices. Check the following:

- **STATUS LEDs.** The 10Base-T Network Card has two LEDs that are visible from the rear of the board. These status indicators show whether or not the cable is connected along with transmit/receive activity.

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	Network Card NOT transmitting data to network.
	Flickering	Network Card IS transmitting data to network

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

Using BNC with connection type set to BNC		
LIGHT	CONDITION	STATUS
GREEN	ON	Network Card not receiving data from network
	Flickering	Network Card IS receiving data from the network.
RED	ON	Network Card NOT transmitting data to network.
	Flickering	Network Card IS transmitting 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 same directory as NE2000.COM.

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

BOCA NET-8 Hub

Operating Temperature:	20-50 Centigrade
Relative Humidity: (non-condensing)	70%
Power:	9vac @ 750mA
Twisted-Pair Cable Interface:	Unshielded Twisted Pair
Crossover Ports:	7 preset/1 switch-selectable
Connector:	RJ-45

10Base-T Network Card

- 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 (GREEN LED) indicator and transmit (RED LED) indicator
- Software-Selectable interrupts, memory address, and a base I/O address.

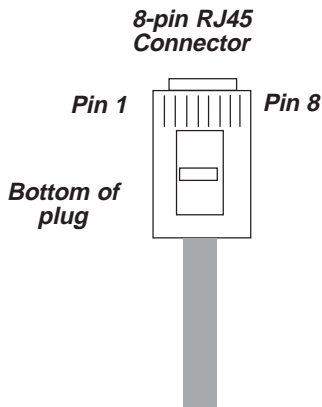
Appendix B: Pin-Out Assignments

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

8-pin

1	Tx+
2	Tx-
3	Rx+
4	NC
5	NC
6	Rx-
7	NC
8	NC

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 for 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 10Base-T Network Card 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 bold and flush with the left margin. NET.CFG options are listed under each heading and indented.

Link Driver <i>PNPODI.COM</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 10Base-T Network Card has these NET.CFG options available:

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

The NE2000 driver requires that the following lines be set accordingly:

```
INT  
PORT  
FRAME
```

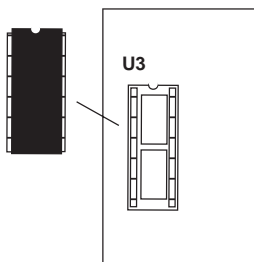
The following figure is a sample of the structure of any given NET.CFG file:

```
LINK DRIVER NE2000  
INT X (where X is the interrupt request for the Network Card  
PORT YYY (where YYY is the port address for the  
Network Card)  
FRAME ETHERNET_802.3
```

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 BENCFIG utility. Select Mode Settings, then Boot ROM Enable.
4. The Boot ROM will work only with the following three configurations:

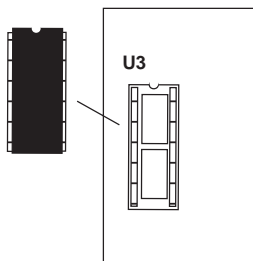


	I/O	INTERRUPT	BOOT ROM ADDRESS
CONFIG.1	300h	3	C800h
CONFIG.2	320h	5	CC00h
CONFIG.3	340h	4	D000h

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 re-boot the system.

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 BENCNFG utility. Select Mode Settings, then Boot ROM Enable.
4. The Boot ROM will work only with the following three 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 reboot the system.

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.

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 (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.

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 (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 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 **BOCA NET-8 concentrator and/or network cards 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 G: Warranty

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.

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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