Boca's Family of Ethernet Products

Fast Ethernet
BOCALANcard-100/10

PRODUCT CODE: BE100/10

Before You Begin your Installation

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

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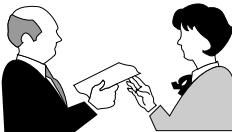
The dealer that you purchased this product or your computer from is the first place you should go for technical assistance. The dealer is usually the most qualified source of help, and is most familiar with your system and how this product should be installed. Many dealers have customer service and technical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

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

Boca BBS
407-241-1601

Standard Free
Technical Support
407-241-8088

Automated
Fax Retrieval
System
407-995-9456

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

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-

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

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

Getting Started

Congratulations on the purchase of your Fast Ethernet Adapter BOCALANcard-100/10 (BE100/10) from Boca Research, Inc., a leader in high-tech computer enhancement products. Get started with the streamlined *EXPRESS* Install on pages 7-9, which is intended for more experienced and knowledgeable users. The balance of the manual contains a product overview, detailed installation instructions, troubleshooting, and technical specifications.

3.5-inch driver diskette

installation guide
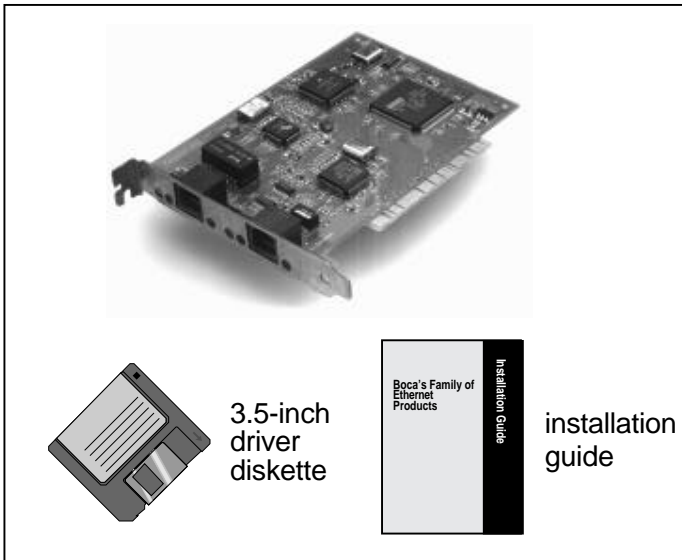
If any items are missing or appear incomplete or damaged, contact your dealer for assistance.

EXPRESS **Hardware Installation**

START HERE!

Turn OFF your computer.

⬇

Remove your system cover and any existing network card.

⬇

Insert the board into a PCI bus-master slot.

⬇

Replace your system cover.

**RJ-45
Connector***

**Wall
Jack**

**or 100Base-T
concentrator**

RJ-45 Cable

***NOTE: Top RJ-45 connector
is for Fast Ethernet (100Mb/s).
If using this connector, you
must be attached to a hub
that supports 100Mb/s)**
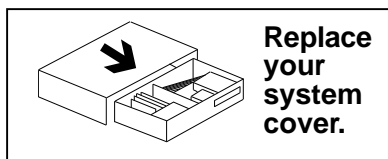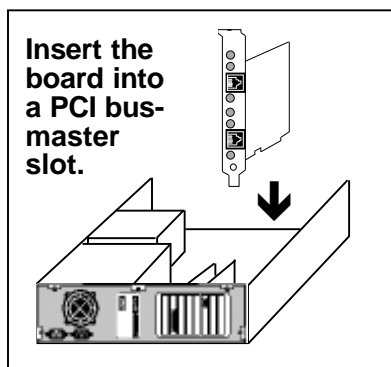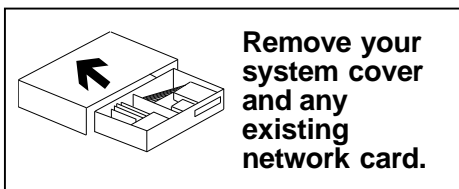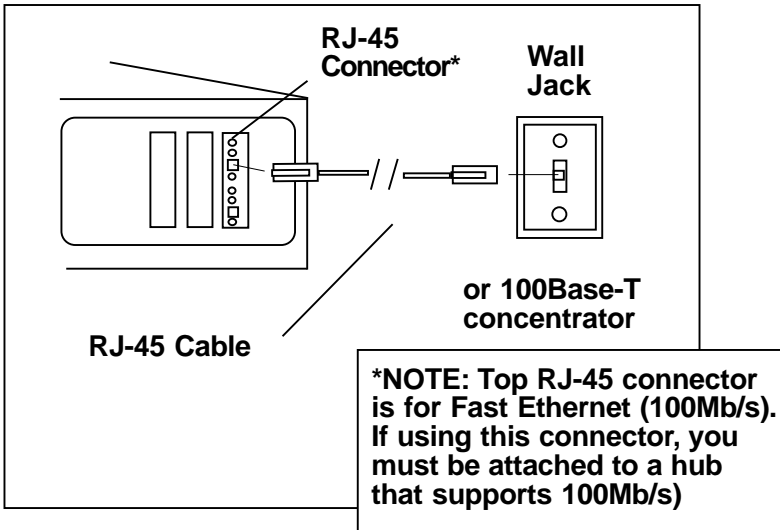
Turn ON your computer.

**Install drivers.
Go to *EXPRESS*
Software
Installation on
next page, or
Section Three,
page 18.**
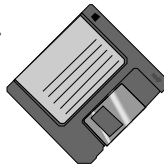
EXPRESS Software Installation

BOOT YOUR SYSTEM AND GO TO THE C:\ DOS PROMPT.

INSERT THE BOCA RESEARCH BE100/10 DISKETTE IN THE A:\ DRIVE.

TYPE A:\INSTALL AND PRESS ENTER.

SELECT THE NETWORK DRIVERS YOU WISH TO INSTALL BY PRESSING THE SPACEBAR FOR EACH. FOLLOW ALL ON-SCREEN INSTRUCTIONS.

PRESS ENTER TO COPY THE DRIVERS TO YOUR HARD DRIVE.

NOW, GO TO SECTION THREE, PAGE 18, FOR INSTRUCTIONS ON HOW TO CONFIGURE YOUR NETWORK OPERATING SYSTEM FOR USE WITH THE BE100/10 DRIVERS.

Section One : Product Overview

This Boca Ethernet adapter is compatible with network hardware which complies with IEEE Ethernet 802.3 standards. The "Fast Ethernet" BOCALANcard-100/10 offers two unshielded twisted-pair (UTP) connectors (RJ-45s), one for standard UTP 10Mbps. data transfer and one for "Fast" Ethernet with a data transfer rate of 100Mbps.

Features of the Boca Ethernet Adapter:

• Based on the DECchip 21140 PCI chip.

• Compliant with Revision 2.0 of the PCI Local-Bus standard.

• Provides a 32-bit PCI Local-Bus interface.

• Provides six diagnostic LEDs.

• Provides one RJ-45 connector for 10Base-T connection and one RJ-45 connector for 100Base-TX connection.

• Supports Category 3/4/5 UTP cable for 10Mbps data transfer and Category 5 UTP cable for 100Mbps data transfer.

• Autoconfigures for 100Mbps/10Mbps data

• Jumperless configuration. The PCI BIOS controls the IRQ and I/O addressing.

- FCC: Complies with CLASS A specifications.

- Driver support for:
    - Novell NetWare ODI DOS Client/Server
    - NDIS 3.0
        (Windows 95, Windows for Workgroups 3.11,
        Windows NT)
    - NDIS 2.0
        (DOS, Pathworks for DOS, OS/2, Windows for
        Workgroups 3.1)

Benefits
- Easy installation
- Provides high-speed data transfers
- Minimizes CPU overhead
- Allows for future migration from 10Base-T to 100Base-TX
  networks
- 5-year limited warranty
- Free technical support

System Requirements
- Any Pentium or 486 PC with bus-mastering 32-bit PCI Rev.
  2.0 bus slot.
- If using MS-DOS, version 3.0 or higher
- If using EMM386, version 4.49 or higher

Dimensions
- L 6" X 3 7/8"

Hardware Installation

The default settings for the adapter are as follows:

    PCI Interrupt   A
    Bus Master

You will be inserting the adapter into a PCI-Bus master slot. There are normally three PCI expansion slots, depending on your system. PCI (Peripheral Component Interconnect) is a new standard in motherboard configurations. Using a 32/64-bit bus and BIOS-configurable adapter cards, a PCI motherboard promotes conflict-free expansion.

NOTE: If your particular PCI motherboard comes with a "slave" PCI slot, do NOT insert the board into that slot. It will not work. The board must be inserted into a "master" slot.

The PCI BIOS communicates with PCI adapter cards and dynamically configures each card during installation. The BE100/10 does not allow end-user selection of DMA, IRQ, or port addresses. This is done using the PCI standard.
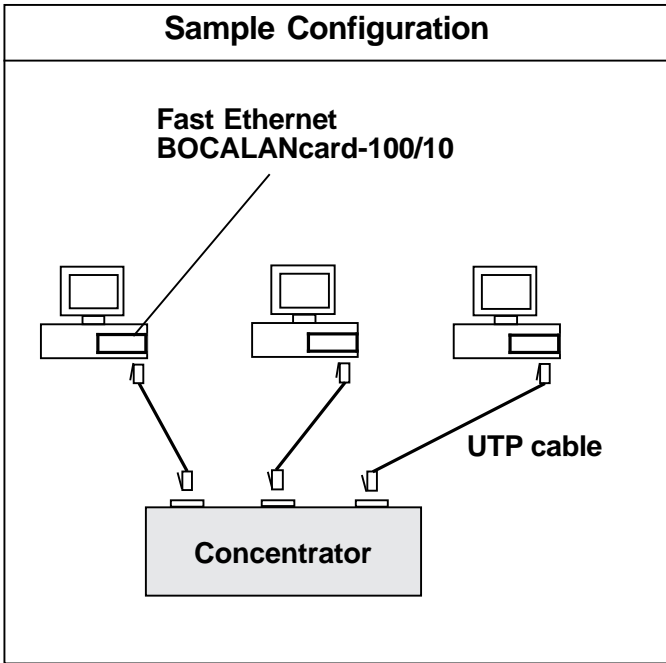
Driver Installation

It will be necessary to install drivers after you've inserted the Ethernet adapter into your system. Drivers for the more popular network operating systems are included on the device driver diskette which came with this package. These drivers are standard implementations for their respective systems.

NOTE: Some network operating systems require some of their original installation diskettes. See your network installation manuals.

If you have any difficulty installing the drivers, then refer to *Section Three: Driver Installation* and Network Operating system documentation for particular instructions for your system. There is one README file in the root directory. Review this file for the latest information about drivers and installation instructions.

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 Four: Troubleshooting*.

100Mb/s Link/Receive

100Mb/sTransmit

100Mb/s RJ-45

100Mb/s Select

10Mb/s Link/Receive

10Mb/sTransmit

10Mb/s RJ-45

10Mb/s Select

Sample Configuration

**Fast Ethernet
BOCALANcard-100/10**

UTP cable

Concentrator
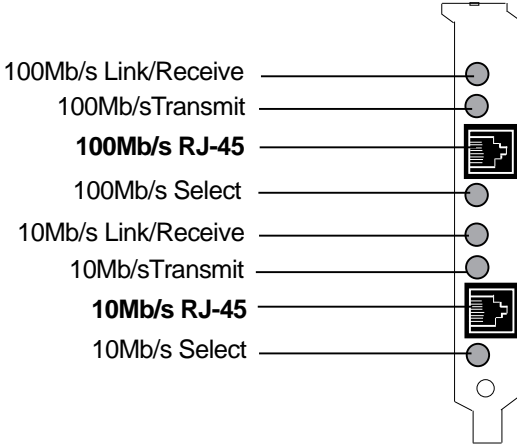
Section Two: Installation

STEP 1: Insert the Adapter

A. Power-down your system and remove the power cord.

B. 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.

C. Carefully remove the cover. Be careful not to let the cover catch on internal cables to disk drives, controllers, or the power supply.

The BOCALANcard-100/10 must be installed in a PCI-bus Master compatible connector. There are normally three PCI expansion slots, which are shorter than standard ISA slots.

PCI SLOTS ISA SLOTS
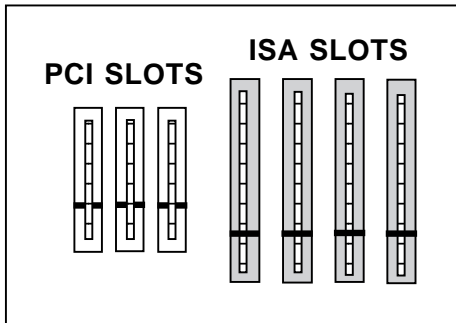
IMPORTANT: PCI slots are configured by the system BIOS, or by jumpers on the motherboard. Be sure the slot you choose is configured for one of the supported IRQs on the PCI card. Refer to your motherboard's documentation for more information.

D. Select a PCI Local Bus compatible connector in which you will install the BE100/10 board.

E. Remove the cover plate of the selected expansion slot if one is present. Save the mounting screw.

F. Insert the board so that the edge connector on the bottom rear of the board mates with the PCI socket on the motherboard. Secure the board with the mounting screw you just removed.

Unlike ISA-based adapter boards, the connectors are on the left side of the board (component side up).

G. Replace the system cover and secure it with the screws you removed in step B.

STEP 2: Make Network Connections

A. Re-attach all other external cables and power cords to
their original position.

B. Connect cables.

When attaching to an unshielded twisted-pair network,
connect one end of the 10base-T cable to the RJ-45
connector on the board. **NOTE: The top RJ-45 connector
is for Fast Ethernet at 100Mb/sec. while the lower RJ-45
connector is for standard Ethernet at 10Mb/sec. UTP
network.** Attach the remaining end to a network outlet,
hub, or concentrator as shown below:
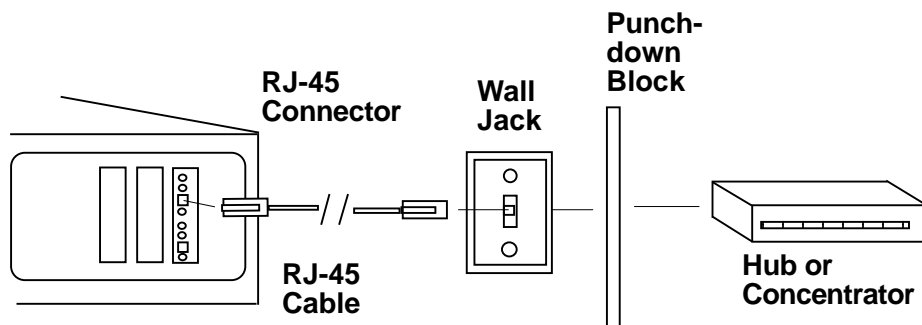
Section Three: Driver Installation

To install drivers from the driver diskette to your computer's
hard-disk, run the install program that is on the diskette. To
run the install program, type in the following commands
(depending on your system):

A:INSTALL or B:INSTALL [ENTER]

After an introductory screen, you are asked which drivers
you wish to install. Follow all on-screen instructions. Please
note that for some applications, such as Windows For
Workgroups, you will use the setup utilities provided with
those applications to load the drivers from the driver
diskette. Review the README.TXT file for additional drivers
and information not included in the manual or in the install
program.

3.1 NDIS 3.0

3.1.1 Windows 95

1. In the Windows 95 Control Panel Group, open the Network option.

2. In the Network's Configuration applet, press the [Add...] button.

3. Click Adapter and press the [Add...] button.

4. In the Select Device dialog box, press the [Have Disk ...] button

5. When the Install from diskette dialog box prompts you for installation disk, insert the driver installation diskette into the drive, press the [Browse...] button and select the A:\WIN95 (or B:\WIN95) subdirectory.

6. Select the "BEN100/10" from the adapters list.

7. The Advanced option in the driver's Properties applet allows you to change the following:

- BurstLength: Specifies the length of the DMA data transfer within a PCI burst (1dword = 4 bytes)

    1_dword
    2_dwords
    4_dwords
    8_dwords
    16_dwords (default)
    32_dwords

- Bus Number: Specifies the PCI Bus Number the adapter is plugged in. Should be modified only for adapter plugged over a PCI to PCI bridge.

    0 (default)
    1
    2

- ConnectionType: Specifies the selected Media port.

    AutoSense. Dynamically senses the media ports supported by the adapter.

    100Mbps. Connects 100BaseT Ethernet hubs

    100Mbps Full_Duplex. Connects 100BaseT Full Duplex hubs

    10Mbps (Default). Connects 10BaseT Ethernet hubs

10Mbps Full_Duplex. Connects 10BaseT Full
Duplex hubs

- PciMechanism: Specifies the mechanism access to the PCI
  configuration space.

    AutoDetect. Detects the system's PCI mechanism
    automatically.

    Mechanism 1. Forces PCI mechanism #1 accesses to
    the PCI configuration space.

    Mechanism 2. Forces PCI mechanism #2 accesses to
    the PCI configuration space.

- ReceiveBuffers: Specifies the size of the receive buffer's
  ring.

    8 ... 64 (default 16)

8. Complete the driver installation.

9. Shut down and reboot the system.

10. To install multiple BE100/10 boards, repeat the procedure
    above.

3.1.2 Windows for Workgroups 3.11

1. In the Windows for Workgroups Network Group, open the Network Setup option.

2. In the Network Setup applet, press the [Drivers...] button.

3. In the Network Drivers applet, press the [Add_Adapter...] button.

4. Select the [Unlisted or Updated Network Adapter] option and click [OK].

5. When the Insert Driver dialog box prompts you for a disk, insert the driver installation diskette into the drive, press the [Browse...] button and select the A:\WFW311 (or B:\WFW311) subdirectory, then OK.

6. Select "BE100/10" from the Network Adapters list:

7. The driver's [Setup...] option allows you to change the following driver's properties:

• BurstLength: Specifies the length of the DMA data transfer within a PCI burst (1dword = 4 bytes)

   1_dword
   2_dwords
   4_dwords
   8_dwords
   16_dwords (default)
   32_dwords

- Bus Number: Specifies the PCI Bus Number the adapter is plugged in. Should be modified only for adapter plugged over a PCI to PCI bridge.

  0 **(default)**
  1
  2

- ConnectionType: Specifies the selected Media port.

  AutoSense: Dynamically senses the media ports supported by   the adapter.

  100Mbps. Connects 100BaseT Ethernet hubs

  100Mbps Full_Duplex. Connects 100BaseT Full Duplex hubs

  10Mbps (Default). Connects 10BaseT Ethernet hubs

  10Mbps Full_Duplex. Connects 10BaseT Full Duplex hubs

- PciMechanism: Specifies the mechanism access to the PCI configuration space.

  AutoDetect. Detects the system's PCI mechanism automatically.

Mechanism 1. Forces PCI mechanism #1 accesses to the PCI configuration space

Mechanism 2. Forces PCI mechanism #2 accesses to the PCI configuration space

• ReceiveBuffers. Specifies the size of the receive buffer's ring.

8 ... 64 (default 16)

8. Click [OK] and [Close] to complete the driver installation, then OK at the Network Setup Dialog box..

9. Exit Windows and reboot the system.

10. To install multiple BE100/10 boards, repeat the procedure above.

3.1.3 Windows NT 3.5

1. From the Windows NT Main Menu, select the Control Panel icon.

2. From the Control Panel menu select the Network icon. If a dialog box asks you "Do you want to install NT Network?" select YES and Continue.

3. You will see several messages. To add a network adapter, select Yes and then Continue.

4. For each additional message, select continue.

5. From the Add Network Adapter dialog box, scroll through the menu to select Other.

6. When the Insert Diskettes menu prompts you for a disk, insert the driver installation diskette. Type in A:\WINNT (or B:\WINNT), then select OK.

7. Select "BEN100/10" from the Select OEM Option box, then select OK.

8. A Dialog box pops up to select the:

• ConnectionType:

   AutoSense. Dynamically senses the media ports
   supported by the adapter:

   100Mbps (Default). Connects 100BaseT Ethernet hubs

   100Mbps Full_Duplex. Connects 100BaseT Full Duplex
   hubs

   10Mbps. Connects 10BaseT Ethernet hubs

   10Mbps Full_Duplex. Connects 10BaseT Full Duplex
   hubs

9. Upon completion, the BE100/10 appears in the Installed
   Adapter Cards list of the Network Setting box (n is the
   adapter number).

10. Click on [Close] to complete the Network Setting
    initialization.

11. Shut down and reboot the system.

12. To install multiple BE100/10 boards, repeat the procedure
    above.

3.2 NDIS 2.0

Various network operating systems (LAN Manager, Windows for Workgroups, and Pathworks) provide utility programs for installing drivers.

This installation diskette provides support for these utility programs, FOR THE FIRST BOARD INSTALLED ONLY. If multiple boards are installed, the second and subsequent boards must be installed manually. (Consult the Appendix).

3.2.1 Installing the NDIS2 DOS driver
Installation with Microsoft LAN Manager 2.x

Automatic installation using the LAN Manager Setup Program:

1. Start the LMSETUP program.

2. Select <Configuration> from the Main Menu.

3. Select <Network Driver> from the Configuration Menu.

4. Remove the old adapter using <Remove Configuration>.

5. Select <Add Configuration>.

6. Select <Other Drivers> and follow the directions.

Installation with Microsoft Windows for Workgroups Version 3.1

Automatic installation using the Network Setup Program

1. Select the Control Panel icon.

2. Select the Network Program icon.

3. Select <Adapter> option.

4. Select <Remove> to remove the old adapter.

5. Select <Add> to add the BE100/10 adapter.

6. Select <Unlisted or Updated Network Adapter>.

7. Type in A:\NDIS2 (or B:\NDIS2) when prompted for path, and follow the Windows for Workgroups instructions.

8. Select "BE100/10" from the Network Adapter list.

9. After completing the adapter and driver installation, edit your CONFIG.SYS (in your C:\ directory) and add the line: DEVICE=C:\WINDOWS\DC21X4.DOS *after* the line DEVICE=C:\WINDOWS\PROTMAN.DOS... and *before* the line DEVICE=C:\WINDOWS\WORKGRP.DOS.

3.2.2 Installation with PATHWORKS for DOS Version 4.1

NOTE: The Pathworks scheduler (SCHK) must be started with the switch /N. If /N is not used, initialization may fail with the following message:

"No NIS Interrupt Activity. Maybe NI_IRQ set wrong or cable not attached or hardware/DLL broken"

Automatic Installation for DOS Pathworks Using the Netsetup Utility:

If you install PATHWORKS for the first time or update it using installation program NETSETUP respond to the following prompts as shown

1. Select your desired choices for:

Type of configuration
Destination Drive (boot device)
LK250 Keyboard setup information.

2. Select <Ethernet> network adapter type.

3. Select <Other NDIS> Ethernet adapter.

4. For full DRIVE:\PATH\FILENAME for NDIS driver, enter

A:\NDIS2\DC21x4.DOS (or B:\...)

5. For full DRIVE:\PATH\ for the PROTOCOL.INI stub, enter A:\NDIS2\DC21x4.DOS (or B:\...).

The files are copied from this installation diskette to its directory.

NOTE: If PATHWORKS is updated using the NETSETUP installation program, we suggest you back up the CONFIG.SYS and PROTOCOL.INI files before starting NETSETUP.

3.2.3 Installing the NDIS2 OS/2 driver

Installation with Microsoft LAN Manager 2.x for OS/2

Automatic installation using the LAN Manager Setup Program:

1. In the \LANMAN directory, start the SETUP program

2. Select <Configuration> from the Main Menu.

3. Select <Network Driver> from the Configuration Menu.

4. Remove the old adapter using <Remove Configuration>.

5. Select <Add Configuration>.

6. Select <Other Drivers> and follow the directions.

3.3 Novell ODI DOS Client

To install the Novell NetWare ODI Client Device Driver:

1. Run the Install program to copy the files from the following directory to a user- specified directory:

A:(or B:\)\NOVELL\WKSTN\DOSODI

2. Copy the following files provided by Novell to the same user-specified directory as step 1:

LSL.COM (version 2.11or higher)
IPXODI.COM (version 2.20 or higher)
NETX.COM or VLM.EXE (version 1.11 or higher)

3. Edit the NET.CFG file if necessary to select protocol and media type options.

NOTE: THERE IS NO NEED TO SPECIFY SLOT NUMBER, BUS ID OR INTERRUPT NUMBER! If you specify Bus ID please note that for PCI bus you write BUS ID PCI 4 in NET.CFG.

If you specify Slot Number please note that SLOT 1 means the first board found in system.

4. To connect to a server, use the following loading sequence:

LSL
DC21X4
IPXODI
NETX or VLM
LOGIN

Parameters

The following parameters can be used in order to control part of the driver's operation.

These parameters are added to the driver's entry in NET.CFG. For NetWare standard parameters, please refer to NetWare user's manual.

TP_FULL_DUPLEX selects twisted pair connection to work in full duplex mode.

TURBO fixes a problem of multiple transmit underflow and receive overflow (i.e., loss of packets) in systems that use certain PCI chipsets.

LINE_SPEED selects line speed between 10Mbps and 100Mbps.

Format: LINE_SPEED <value>
Allowed values are: 10,100

3.4 Novell ODI Server

3.4.1 NetWare v3.1x Installation

1. Copy the \NOVELL\SERVER\3.1X\DC21X4.LAN to the SYS:\SYSTEM directory on the NetWare server.

2. Add to your AUTOEXEC.NCF the line required to load the DC21X4.LAN and bind it. Refer to the sample AUTOEXEC.NCF for more information (according to the type of NetWare you are using, i.e. v3.1x or 4.x).

3.4.2 NetWare v4.x Installation

1. On the server's prompt type: LOAD INSTALL

2. When the install program comes up, choose the menu item that refers to NETWORK DRIVERS. Note that this menu item is on different place on different NetWare versions (i.e., v4.0x vs. 4.1x).

3. Install the network driver: \NOVELL\SERVER\4.X\DC21X4.LAN according to the NetWare manual, or use the on-line instructions and help.

Parameters

The following parameters belong on the server's command line, or in the load line inside the AUTOEXEC.NCF. The general way of using these parameters is:

LOAD <driver name> <PARAMETER NAME>...
<PARAMETER NAME[=VALUE]>

Example:

LOAD <driver name> TURBO SLOT=16
FRAME=Ethernet_802.2

Driver specific parameters list: (as for NetWare standard parameters, please see the NetWare user's manual):

TP_FULL_DUPLEX   selects twisted pair connection to work in full duplex mode.

TURBO fixes the problem of multiple transmit underflows and receive overflows (i.e. loss of packets) in systems that use certain PCI chipsets.

BIOS16 instructs the driver to access the PCI BIOS using 16-bit real mode calls, instead of the PCI32 mechanism. This is not recommended, and should be used ONLY on motherboards that have a known problem in the PCI BIOS implementation.

LINE_SPEED selects line speed between 10MBPs and 100MBPs.
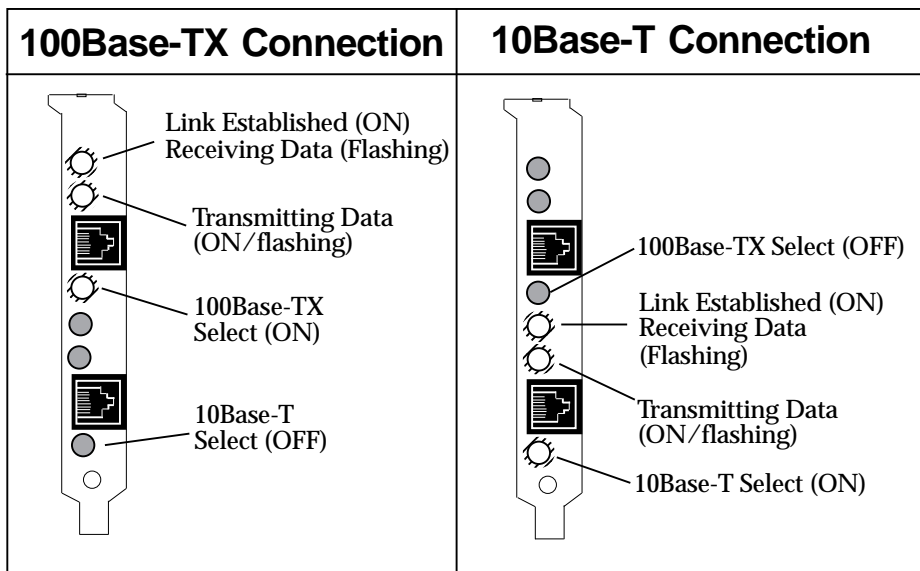Format: LINE_SPEED=<value>
Allowed values are: 10,100

Section Four: Troubleshooting

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

Check the following:

• **STATUS LEDs**. The Boca Ethernet adapters have six LEDs that are visible from the bracket-edge of the board as shown below:

100Base-TX Connection	10Base-T Connection
Link Established (ON) Receiving Data (Flashing)	100Base-TX Select (OFF)
Transmitting Data (ON/flashing)	Link Established (ON) Receiving Data (Flashing)
100Base-TX Select (ON)	Transmitting Data (ON/flashing)
10Base-T Select (OFF)	10Base-T Select (ON)

• **BOARD SETTINGS.** If you are using a Novell network, make sure that the settings in the NET.CFG file are correct. Also, when DC21X4.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 all settings are correct.

Review the installation again and check software setup.

• **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 THE ADAPTER HAS BEEN INSERTED IN A PCI-BUS MASTER SLOT.**

• **MAKE SURE YOU ARE USING THE DC21X4 DRIVERS. YOU CANNOT USE NE2000 DRIVERS WITH THE BE100/10.**

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

Appendix A: Specifications

- Ethernet controller: Digital Equipment DC21140

- Topology: Star

- Connectors: Two RJ-45 connectors (10Mb or
                                       100Mb)

- Diagnostic LEDs: Transmit; link/receive

- Network cabling: Category 3/4/5 UTP or STP cable
                                       for 10Mbps network speed

                                       Category 5 UTP or STP cable for
                                       100Mbps network speed

Appendix B: 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 C: 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 Boca Research product (board only)**
   • **copy of the original invoice**
   • **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 # _____
   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.
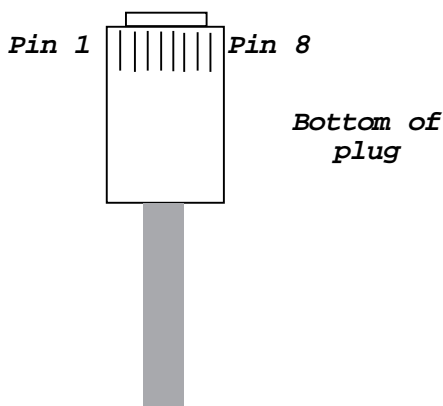
Appendix D: Pin-Out Assignments

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

Boca's Ethernet products use an 8-pin 10BASE-T connector. The pin assignments are as follows:

1	Tx+
2	Tx-
3	Rx+
6	Rx-

8-pin RJ45 Connector

Pin 1   *Pin 8*

Bottom of plug

Appendix E: Manual Installation of Drivers

Manual Installation for DOS LAN Manager

If LAN Manager is already installed and configured and you do not wish to use the installation program, you have to perform the following steps manually:

1. Create DC21x4 Driver directory.

:\LANMAN.DOS\DRIVERS\ETHERNET\DC21x4

2. Copy the files:

MSLANMAN.DOS\DRIVERS\ETHERNET\DC21x4\DC21x4.DOS

and

\MSLANMAN.DOS\DRIVERS\ETHERNET\DC21x4\PROTOCOL.INI

to the new directory.

3. Copy the file:

\MSLANMAN.DOS\DRIVERS\ETHERNET\DC21x4\DC21x4.NIF

to the directory:

:\LANMAN.DOS\DRIVERS\NIF

4. Add the following line to your CONFIG.SYS to load the driver:

DEVICE=<DRIVE>:\LANMAN.DOS\DRIVERS\ETHERNET\DC21x4\DC21x4.DOS

5. Modify your PROTOCOL.INI file using any DOS Editor by appending the PROTOCOL.INI stub (included with this kit) to the end of your old PROTOCOL.INI file. The stub contains the following information:

[DC21x4_NIF]
DRIVERNAME=DC21X4$

6. Modify TCPIP_XIF and NETBEUI_XIF modules in the PROTOCOL.INI file by changing the value of the BINDINGS keyword

　　from BINDINGS = driverlabel
　　to   BINDINGS = DC21x4_NIF

Manual Installation for Windows for Workgroups 3.1

If you do not wish to use network installation program 'Network'from the Control Panel icon, you have to perform the following steps manually:

1. Copy the \NDIS2\DC21x4.DOS file from the driver diskette to the Windows directory

2. Add the following line to the CONFIG.SYS:

DEVICE=<DRIVE>:\WINDOWS\DC21x4.DOS

3. Modify your PROTOCOL.INI file using any DOS Editor by appending the PROTOCOL.INI stub (included with this kit) to the end of your old PROTOCOL.INI file. The stub contains the following information:

[DC21x4]
DRIVERNAME=DC21X4$

4. Modify the NETWORK.SETUP and MS$NETBEUI sections of your PROTOCOL.INI file as follows:

[network.setup]
version=0x3100
netcard=DC21x4,1,DC21x4
transport=ms$netbeui,MS$NETBEUI
lana0=DC21x4,1,ms$netbeui

[MS$NETBEUI]
DriverName=netbeui$
SESSIONS=6
NCBS=12
BINDINGS=DC21x4
LANABASE=0

Manual installation for DOS Pathworks

1. Copy the DC21x4.DOS file from this installation kit to the
   PATHWORKS directory. For example:

C:\DECNET>copy A:\NDIS2\DC21x4.DOS (or B:\...)

2. Add the following line to your CONFIG.SYS to load the
   driver:

DEVICE=<drive>:\DECNET\DC21x4.DOS

3. Modify your PROTOCOL.INI file using any DOS Editor
   by appending the PROTOCOL.INI stub (included with
   this kit) to the end of your old PROTOCOL.INI file. The
   stub contains the following information:

[DC21x4.DOS]
DRIVERNAME=DC21X4$

4. Modify the DATALINK and IPX4MAC sections of your
   PROTOCOL.INI file. Change the value of the BINDINGS
   keyword

from BINDINGS = driverlabel
to   BINDINGS = DC21x4.DOS

Manual Installation for OS/2 LAN Manager

If LAN Manager is already installed and configured and you do not wish to use the setup program, perform the following manual steps:

1. Create DC21x4 Driver directory.

:\LANMAN\DRIVERS\ETHERNET\DC21x4

2. Copy the files:

\MSLANMAN.OS2\DRIVERS\ETHERNET\DC21x4\DC21x4.OS2

and

\MSLANMAN.OS2\DRIVERS\ETHERNET\DC21x4\PROTOCOL.INI

to the new directory.

3. Copy the file:

\MSLANMAN.OS2\DRIVERS\NIF\DC21x4\NIF

to the directory

:\LANMAN\DRIVERS\NIF.

4. Add the following line to your CONFIG.SYS to load the driver:

DEVICE=<DRIVE>:\LANMAN\DRIVERS\ETHERNET\DC21x4\DC21x4.OS2.

5. Modify your PROTOCOL.INI file using any OS/2 Editor by appending the PROTOCOL.INI stub (included with this kit) to the end of your old PROTOCOL.INI file. The stub contains the following information:

[DC21x4_NIF]
DRIVERNAME=DC21X4$

6. Modify TCPIP_XIF and NETBEUI_XIF modules in the PROTOCOL.INI file by changing the value of the BINDINGS keyword

from   BINDINGS = driverlabel
to   BINDINGS = DC21x4_NIF

Appendix F: Installing Multiple boards

To install more than one board, follow the manual installation procedures for your operating environment then add '2' (or '3', etc.) after 'DC21x4' in the PROTOCOL.INI file (so that each driver name and section is unique).

In other words, the drivers' device names are DC21x4$, DC21x42$, DC21x43$, DC21x44$, etc.

SLOT must be specified for multiple boards.

Here is an example of the PROTOCOL.INI for two DC21x4 boards installed under Windows for Workgroups, using Twisted Pair:

```
[network.setup]
version=0x3100
netcard=DC21x4,1,DC21x4
netcard=DC21x42,1,DC21x42
transport=ms$netbeui,MS$NETBEUI
lana0=DC21x4,1,ms$netbeui
lana1=DC21x42,1,ms$netbeui

[protman]
DriverName=PROTMAN$
PRIORITY=MS$NETBEUI
```

```
[MS$NETBEUI]
DriverName=netbeui$
SESSIONS=10
NCBS=32
BINDINGS=DC21x4,DC21x42
LANABASE=0

[DC21x4]
DriverName=DC21x4$
SLOT=16

[DC21x42]
DriverName=DC21x42$
SLOT=17
```

Appendix G: PROTOCOL.INI Parameters

The PROTOCOL.INI file stores configuration and binding information. It consists of a series of named sections, where the section name is in fact the module name from a module characteristics table. A set of configuration settings for the module in format is as follows.

Keyword = value

where value - appropriate value for corresponding Keyword.

The following sections describe the PROTOCOL.INI settings used for the BE100/10 driver, their default values, the range of values that can be given and value units.

Required Keyword

DRIVERNAME. Specifies the network device driver.

DRIVERNAME=DC21x4n$, where n is empty for the first board, 2 for the second, etc.

units:[text]
range:[DC21Xx4$ - DC21x48$]
default:[DC21x4$]

Optional Keywords in the DC21x4 section

SLOT. Specifies where the BE100/10 adapter is placed.

• A number from 1 to 15 specifies a slot number on the EISA bus

• A number from 16 to 26 specifies the relative position of an adapter on the PCI bus. 16 specifies the first BE100/10 adapter on the PCI bus, 17 the second such adapter, and so on.

If the slot value is not specified or is specified as 0, the driver scans for an EISA adapter; if no EISA adapter is found, it then scans for a PCI adapter.

Slot
units:[integer]
range:[1-26]
default:[16]

TP_FULL_DUPLEX. Specifies Full Duplex operation via the Twisted Pair transceiver. The adapter should be connected to another Ethernet station with a cable suitable for Full Duplex mode.

DATA_RATE. Defines the data rate at which the BE100/10 will operate.

   MB10 specifies a data rate of 10Mb (Suitable for standard Ethernet)

   MB100 specifies a data rate of 100Mb (suitable for fast ethernet). The keyword is valid only if the physical 100Mb port is connected to the net. The default is MB100.

SOFTWARE_CRC. Controls whether packet CRCs are calculated by software or appended by the BE100/10.

ENABLED means that the CRC will always be calculated by software, for packets greater than 144 bytes.

DISABLED means that the CRC will never be calculated by software (always appended by the BE100/10).

<absent> If this keyword does not appear in PROTOCOL.INI, packet CRCs will be calculated by software for DC21x4 chip revisions A-H (for packets longer than 144 bytes), and will be appended by the DC21x4 for chip revision J and later.

SOFTWARE_CRC
units:[text]
range:[ENABLED, DISABLED, <absent>]
default:[<absent>]

NUM_TX_BUFFERS. Specifies the number of transmit buffers the driver should use. The number of transmit buffers may vary between 4 and 16.

If this value is not specified, or the keyword is absent, the default number of transmit buffers is 8.

If the combined number of transmit and receive buffers is large, problems may arise. Specifically, in OS/2 environments the driver may be unable to load.

NUM_TX_BUFFERS
units:[integer]
range:[4-16]
default:[8]

NUM_RX_BUFFERS. Specifies the number of receive buffers the driver should use. The number of receive buffers may vary between 4 and 16.

If this value is not specified, or the keyword is absent, the default number of receive buffers is 12.

If the combined number of transmit and receive buffers is large, problems may arise. Specifically, in OS/2 environments the driver may be unable to load.

NUM_RX_BUFFERS

units:[integer]
range:[4-16]
default:[12]

TURBO. Controls whether host-to-PCI posting (HPPE) will be enabled or disabled. This is relevant only if the system's host-to-PCI bridge is INTEL's 82424 (CDC) or 82434 (PCMC) bridge.

ENABLED means that HPPE will be disabled. This may improve the performance of the BE100/10.

DISABLED means that the system configuration will remain as it is with no intervention by the driver.

<absent> If this keyword does not appear in PROTOCOL.INI, the driver will do nothing and leave system settings as they are.

TURBO
units:[text]
range:[ENABLED, DISABLED, <absent>]
default:[<absent>]

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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.

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