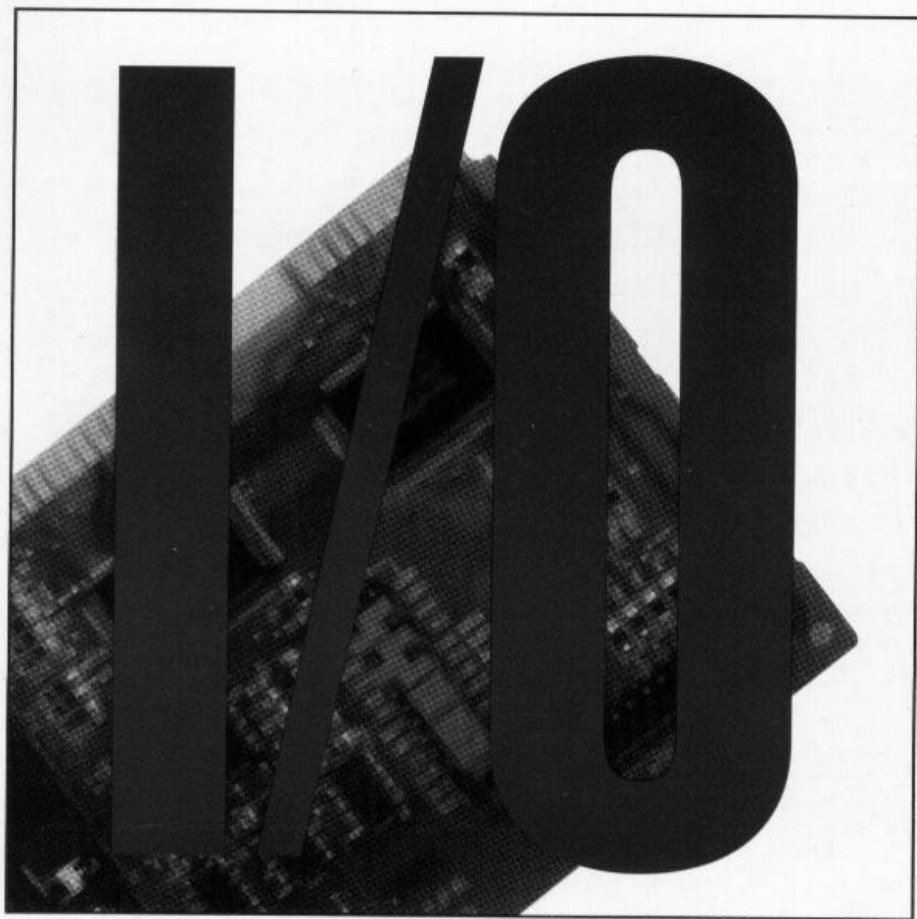# Complete I/O Series

## I/O Adapter with Two Parallel and Two 16C450 Serial Ports

Product Code: IO450

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
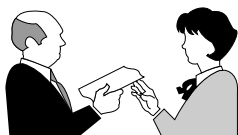
The dealer that you purchased this product or your computer from is the first place you should go for technical assistance. The dealer is usually the most qualified source of help, and is most familiar with your system and how this product should be installed. Many dealers have customer service and technical 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)

*Technical
Support Fax*
407-997-0918

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

The Standard Free Technical Support number is for quick answers to specific inquiries on product features and technical questions (call **407-241-8088**; M-F, 8 am to 6:30 pm EST). Direct access to technical support representatives is provided on a limited basis. If you require immediate attention or in-depth help with the installation of the product, please call our 900-priority support number for service. This number gives you immediate access to senior-level technicians. The number is **900-555-4900**. You will be charged $2.00 per minute. The charges will appear on your next phone bill.

Damaged or Missing Items

We use many world-class quality assurance programs to ensure the product you purchased is of the highest caliber. Sometimes, however, a component may be missing from the box, or is damaged or corrupt in some way. If this happens, immediately return the entire package to your place of purchase so you may exchange it for a new one. Your dealer should be able to provide you with an exchange far more quickly than by contacting us directly. If for some reason you are unable to return the product directly to its place of purchase, refer to the "Servicing Your Product" and "Warranty" sections in this manual for instructions.

Contents

Section One: Introduction

Congratulations on purchasing the Complete I/O450 by Boca Research for the IBM and compatible family of personal computers.

The I/O450 has two 25-pin parallel ports and two 9-pin serial ports. The address and interrupt used for each port are selected using jumpers on the board.

Using two high-speed GM82C455 UART-compatible chips for the serial ports, the I/O450 board is specifically designed to work with ATs and compatibles. This manual has been written using the AT computer as the standard example, however the I/O450 can also be used with any standard 8-bit PC-bus style computer, such as IBM PCs, XTs, PS/2 Models 25 and 30, or compatibles.

Please read the entire I/O450 Manual before attempting to install the I/O450 board.

Section Two: Getting Started

Before going any further, please be sure that the following items have been included in your I/O450 package:

• The I/O450 board

• a 9-pin serial and 25-pin parallel cable and bracket assembly

Please examine the I/O450 board for any visible damage which may have occurred during shipment. If damage exists or if any items are missing, please contact the vendor from whom you purchased the I/O450. See following page for board detail.

25-PIN PARALLEL PORT B   9-PIN SERIAL PORT B

J1   J3   J4

J2

9-PIN
SERIAL
PORT A

J7

25-PIN
PARALLEL
PORT A
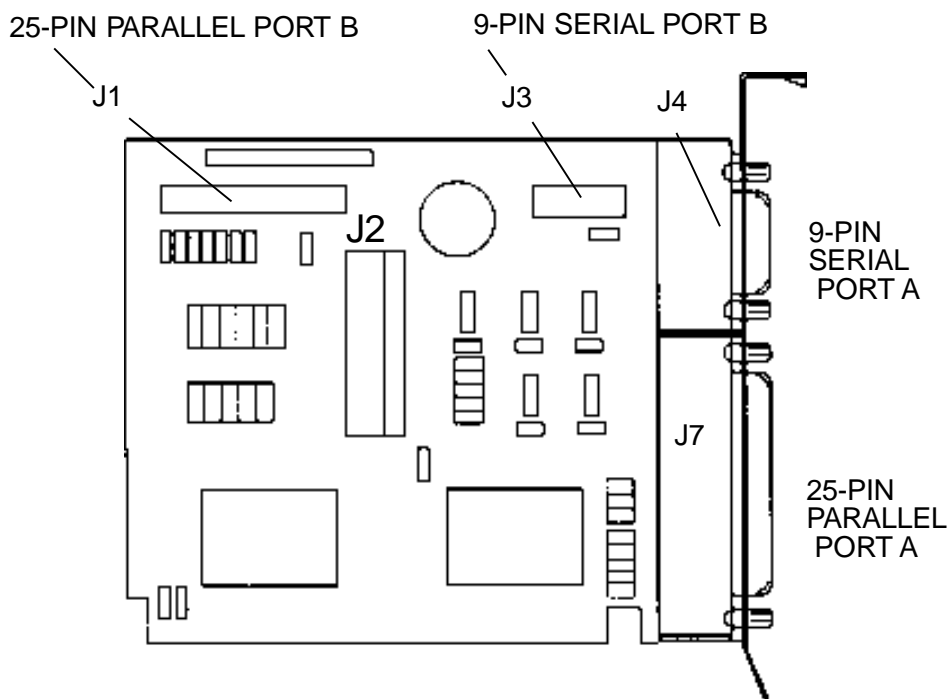
Section Three: Features and Capabilities

You can define each port for a specific application as necessary.

3.1 Parallel Printer Interface "A"

The parallel printer interface "A" has a 25-pin female D-shell connector, and is designed to connect to parallel printers via a Centronics printer cable. This port is IBM PC/AT compatible. This parallel port can be set via a jumper for one of the following options:

LPT1 (378h) - First parallel port
DISABLED - No port is visible to system

The interrupt for the parallel port is IRQ5 or IRQ7.

3.2 Parallel Printer Interface "B"

The parallel printer interface "B" has a 25-pin female D-shell connector. Parallel interface "B" can be used with the same type of devices as Parallel "A" described previously. This parallel port can be set via a jumper for one of the following options:

LPT2 (278h) - Second parallel port (IRQ7 or 5)
DISABLED - No port is visible to system

The interrupt for parallel port "B" can be IRQ7 or IRQ5. Parallel port "B" can be configured using the same IRQ as parallel port "A.

3.3 Serial Device Interface "A"

The I/O450 board is designed using a high speed, AT-type GM82C455-compatible chip for the serial ports. Serial device interface "A" has a 9-pin male D-shell connector, and is used to connect to any asynchronous serial device using a standard EIA RS-232 interface. Serial port "A" can be set via a jumper for one of the following options:

COM1 (3F8h) - First serial port (IRQ3, 4, 5, 9)
COM3 (3E8h) - Third serial port (IRQ3, 4, 5, 9)
DISABLED - No port is visible to system

If you do not have a specific need for this option, select DISABLED. Refer to Disabling an Unused Device or IRQ in Section Four. *NOTE: Serial ports cannot share a common interrupt, nor can they share the same physical port.*

3.4 Serial Device Interface "B"

This serial device interface has a 9-pin male D-shell connector. Serial device interface "B" can be used with the same types of devices as serial device interface "A" described above. Serial port "B" can be set via jumper for one of the following options:

COM2 (2F8h) - Second serial port (IRQ3, 4, 5, 9)
COM4 (2E8h) - Fourth serial port (IRQ3, 4, 5, 9)
DISABLED - No port is visible to system

NOTE: COM3 and COM4 are not supported by IBM's system BIOS. IBM never intended COM3 or COM4 to be initialized during boot-up. It will be necessary for your application software to initialize these COM ports. The BIOS in some later systems may allow initializing for these ports. Check your system documentation.

SERA ENA		DIS
SERB ENA		DIS
PARA ENA		DIS
PARB ENA		DIS
SERA COM1		COM3
SERB COM2		COM4
PARA IRQ5		IRQ7
PARB IRQ5		IRQ7
IRQ3		IRQ3
IRQ4		IRQ4
IRQ5		IRQ5
IRQ9		IRQ9
	SER	
	A-INT-B	
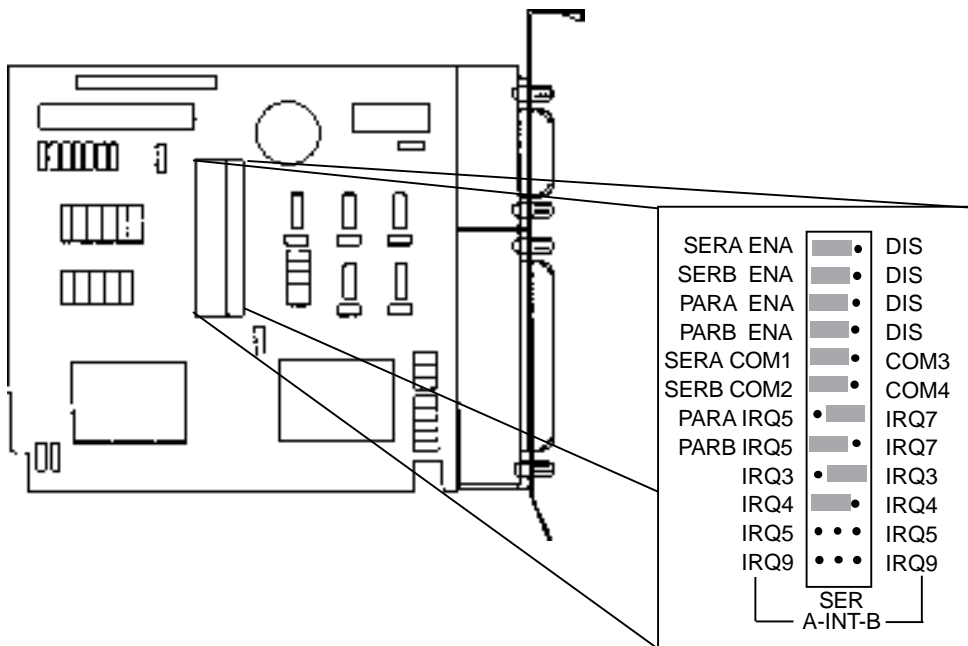
Default Settings for the I/O450 Board

Section Four: Setting the Jumpers

Before you install the I/O450 board, you need to set the jumpers for your configuration. Always turn the system off before attempting the reconfiguring, removal, or installation of the I/O450 board.

4.1 Introduction

You can change configurations on the I/O450 to suit your needs simply by moving a jumper or combination of jumpers from one pair of pins to another. The default settings for an I/O450 being installed in an IBM AT or compatible are illustrated in the previous section. In that example, the I/O450 is the first I/O board being added to the system and is configured as:

SERIAL A: COM1/IRQ4   SERIAL B: COM2/IRQ3

PARALLEL A: LPT1/IRQ7   PARALLEL B: LPT2/IRQ5

The jumpers on the I/O450 board also clearly labelled for ease of use as shown on the opposite page.

4.2 Changing the Default Configuration Jumpers

Locate the **J2** jumper array in the upper central portion of the board (with the bracket to your right). This array consists of 12 rows of pins (3 pins each row). The silk-screen labeling clearly identifies which pins to jumper for enabling and disabling the serial ports and parallel ports, as well as setting interrupts for those ports. When removing a jumper, pull straight up from the board. To insert a jumper, line up the jumper with the pins and gently push downward until the bottom of the jumper is flush with the base of the pins.

4.2.1 Configuring the Parallel Ports

The third row of pins (going from top to bottom) is used to enable (ENA) or disable (DIS) Parallel Port A. Jumper the pair of pins closest to PARA ENA to enable that port. Jumper the pair of pins closest to DIS to disable that port. Do the same for Parallel Port B (fourth row of pins). Unlike the serial ports, more than one parallel port can be set using the same IRQ. **NOTE: XENIX and UNIX environments require separate IRQs for each parallel port (e.g., parallel A/IRQ7; parallel B/IRQ5).**

4.2.2 Configuring the COM Ports

Locate the first row of pins (going from top to bottom). This is used to enable (ENA) or disable (DIS) Serial Port A. Jumper the pair of pins closest to SERA ENA to enable that port. Jumper the pair of pins closest to DIS to disable that port. Do the same for Serial Port B (second row of pins).

COM port designations COM1 or COM3 may be assigned to Serial Port A. Locate the fifth row of pins (from top to bottom). Jumper the pair of pins closest to COM1 to select serial port A as COM1 at address 3F8. Jumper the pair of pins closest to COM3 to select serial port A as COM3 at address 3E8.

COM port designations COM2 or COM4 may be assigned to Serial Port B. Locate the sixth row of pins (from top to bottom). Jumper the pair of pins closest to COM2 to select serial port B as COM2 at address 2F8. Jumper the pair of pins closest to COM4 to select serial port B as COM4 at address 2E8.

Generally, COM1 uses IRQ4 and COM2 uses IRQ3, if your system already contains either of these ports (COM1 or COM2), then you must disable that IRQ, or assign a different IRQ on the board. If the IRQ is used by two ports, a conflict will result.

4.3 Configuring for Interrupts

Locate the J2 jumper array in the upper central portion of the board (with the bracket to your right). This array consists of 12 rows of pins (3 pins each row). The silk-screen labeling clearly identifies which pins to jumper for selecting and changing interrupts for the COM ports.

When removing a jumper, pull straight up from the board. To insert a jumper, line up the jumper with the pins and gently push downward until the bottom of the jumper is flush with the base of the pins.

Configuring Interrupts for the COM Ports

For serial ports A and B, you may select IRQs 3, 4, 5, or 9. Locate the bottom four rows of pins (going from top to bottom). To select IRQs for Serial Port A, jumper the two pins closest to IRQ3, IRQ4, IRQ5, or IRQ9 on the *left*-hand column (also marked on the bottom of the jumper array). To select IRQs for Serial Port B, jumper the two pins closest to IRQ3, IRQ4, IRQ5, or IRQ9 on the right-hand column (also marked on the bottom of the jumper array).

Section Five: Physical Installation

The I/O450 board is simple and quick to install—even for the novice computer user. Take a few moments to read over the directions before you begin.

5.1 Basic Installation

1. Remove your system cover, remembering to power down your system first. You may find it necessary to remove other adapter boards or detach cables. If so, make note of where everything goes. Now, select an empty expansion slot. The I/O450 functions equally well in either an 8- or 16-bit slot. Choose either depending on convenience. Remove the screw and the metal plate that covers the external access to the slot you have selected.

2. Insert the I/O450 board in the slot you have selected so the edge connector on the bottom rear of the board mates with the socket on the motherboard. Press down firmly on the board. Use the removed screw to secure the board.

3. Slide the cover back over the chassis taking care not to let it catch on the disk drive or power cables. Replace any other adapter boards you may have removed and re-attach any detached internal cables. Once the cover is in place, replace all the screws that you removed earlier. Reconnect all previously removed external cables.

4. Attach the cable(s) for the device(s) you will be using to the appropriate connector and tighten them down with screws attached to the end of the cable(s).

5.2 Installing the Second Serial/Parallel Device Interface

The I/O450 board is shipped with the 9-pin serial and 25-pin parallel device interface for serial port "B" and parallel port "B."

1. Locate an available expansion slot in your computer.

2. Remove the metal bracket that covers the external access to the slot you have selected (if it is present). It should be attached with one screw. Save the screw for when you secure the serial device interface bracket.

3. Attach the ribbon cable to the I/O450 board at the connector labeled serial "B" and at the connector labeled parallel "B," which is located along the top of the board. The colored stripe on the cable (often red) should be toward the left side of serial "B" and the left side of parallel "B."

4. Install the metal bracket which contains the 9-pin serial and 25-pin parallel in the slot you prepared in step 2. Secure the bracket to the frame with the screw.

GOES IN
ADJACENT
BRACKET
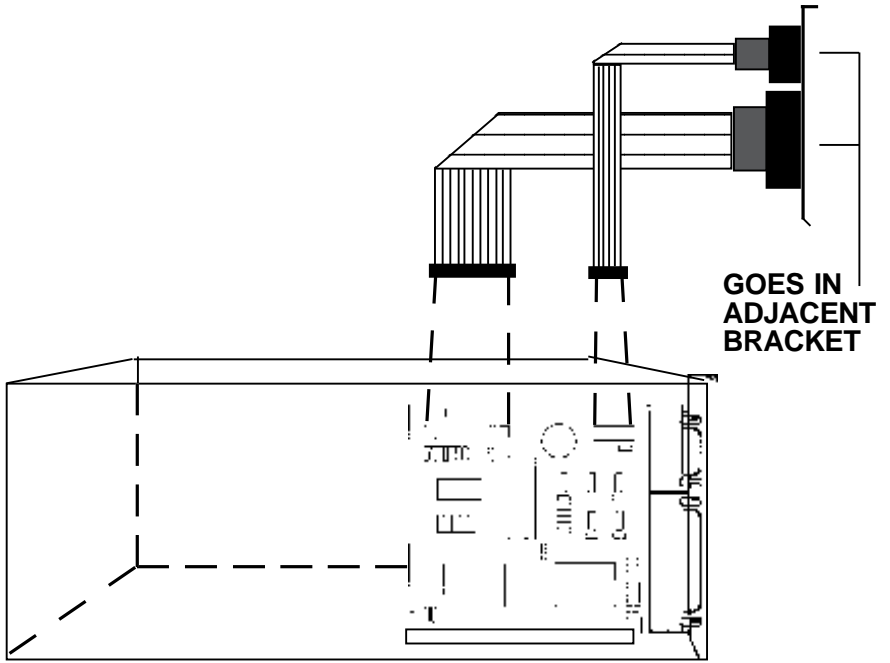
Connecting the Ribbon Cable to the I/O450 Board

Appendix A: Pin Assignments

This section provides the pin assignments for each port on the I/O450.

Parallel Port	
Line Name	**Pin Number**
-STROBE	1
DATA BIT 0	2
DATA BIT 1	3
DATA BIT 2	4
DATA BIT 3	5
DATA BIT 4	6
DATA BIT 5	7
DATA BIT 6	8
DATA BIT 7	9
-ACKnowledge	10
BUSY	11
Print End (out of paper)	12
SeLeCT	13
-AUTO FeeD	14
-ERROR	15
-INITialize printer	16
-SeLeCT INput	17
GROUND	18-25

Serial Port A (9-pin)	
Line Name	**Pin Number**
CARRIER DETECT	1
RECEIVE DATA	2
TRANSMIT DATA	3
DATA TERMINAL READY	4
SIGNAL GROUND	5
DATA SET READY	6
REQUEST TO SEND	7
CLEAR TO SEND	8
RING INDICATOR	9

Appendix B: Troubleshooting

Before calling Boca Research Technical Support, please review the following list of problems and solutions to see if any of them apply to your situation.

PROBLEM: No response from a peripheral device. (i.e. printer, plotter, modem, etc.).

   SOLUTION: Verify that the peripheral device is powered on, ready, on-line, and/or securely connected at BOTH ends of the cable.

   Be sure the application software is configured to recognize the port that you are attempting to use and that the port in question is actually the port intended to be active. Check the I/O450 jumper settings to insure that the intended port is enabled and that there are no conflicting ports or shared interrupts.

PROBLEM: LPT2: will not perform a print screen (shift-PrtSc).

   SOLUTION: The system is functioning normally. The print screen function defaults to LPT1. If you wish to test the port after installation copy an ASCII file to an active device, i.e. COPY AUTOEXEC.BAT LPT2 at the DOS prompt. (note: the example may not exist on your boot disk)

PROBLEM: COM3 and/or COM4 do not function.

   SOLUTION: The system is functioning normally; IBM never intended COM3 or COM4 to be initialized during boot-up. It will be necessary for your application software to initialize these COM ports. *Note: the BIOS in later systems may allow initializing of these ports. Check your system documentation.*

Appendix C: Servicing Your Boca Product

If your Boca product requires service, first contact the authorized Boca product 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 (28.8, 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 special software or utilities. If the Troubleshooting section (Appendix B) did not resolve your problem, you may call our technical support staff for assistance. If you haven't referred to the Troubleshooting section, do so now.

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

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

- **Board Name and part number (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. Eastern Time Monday through Friday 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 specific written authorization is received from you. The cost of parts and labor involved in making such repairs will be billed to you C.O.D.

5. When sending the Boca product to Boca Research, Inc. for repairs, please be sure to include:

- **the I/O450 (board only)**
- **copy of the original invoice**
- **your return street address (for UPS purposes)**
- **phone number**
- **the RMA number mentioned above**

Package the product securely in a container equivalent to the original packaging, and insure the package to protect against loss or damage during transit. Shipping charges must be prepaid; C.O.D. shipments will not be accepted. Please use the following address 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 Boca product were covered by the warranty, Boca Research, Inc. will return it prepaid via UPS.

Complete IOAT: I/O450

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 specified in the original sales contract ("the Warranty Period"). Should the product fail to be in working order at any time during the specified 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 shown below 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.

FCC Compliance

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference; (2) This device must accept any interference received, including interference that may cause undesired operation.

This 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 or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and the receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
• Consult the dealer or an experienced radio/TV technician for help.

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

BOCA
RESEARCH INC

Manual Part # 9455
Rev. 2.0