



*Magic I/O<sup>TM</sup>  
Input/Output  
Adapter for the  
IBM PC/XT/AT*

**OWNER'S MANUAL AND REFERENCE GUIDE  
EV-170B  
(VERSION 4.0)**

*EVER for EXcellence*

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*Magic I/O<sup>TM</sup>*  
*Input/Output*  
*Adapter for the*  
*IBM PC/XT/AT*

**OWNER'S MANUAL AND REFERENCE GUIDE**  
**EV-170B**  
**(VERSION 4.0)**

**EVEREX SYSTEMS, INC.**  
**48431 MILMONT DRIVE**  
**FREMONT, CA 94538**

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# *Notice*

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# Warning

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## CLASS B Computing Device

**WARNING:** This equipment generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, it may cause interference to radio and television reception. The product has been certified and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turn the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Ensure that card mounting screws, attachment connector screws, and ground wires are tightly secured.
2. Reorient the computer about the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into a different outlet so that computer and receiver are on different branch circuits.
5. Reorient the receiving antenna.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4 (FCC, Part 15.838 b).

### IMPORTANT NOTICE

**THIS PRODUCT REQUIRES THE USE OF SHIELDED INTERCONNECT CABLES, CONNECTORS AND POWER CABLES FOR PROPER INSTALLATION AND CONNECTION TO PERIPHERAL DEVICES AND TO INSURE COMPLIANCE WITH FCC CLASS B LIMITS FOR RADIO FREQUENCY EMISSIONS.** Shielded cables are available from authorized dealers. The manufacturer is not responsible for any radio or television interference caused by using other than the recommended cables or by unauthorized modifications to this equipment.

# *Notes*

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# *Checklist*

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Besides this manual, your Magic I/O carton should contain the following:

- Magic I/O Input/Output Adapter
- Everex Systems Utility software diskette
- Owner's Registration and Warranty Card
- 16-pin Game Port cable
- Foam padding and packaging materials

## **Optional Items:**

- 10-to-25 pin ribbon cable, one for each optional serial port.
- One 16450, 8250A, or 8250 communications chip (IC) for each optional serial port.

If any of these items are missing or damaged, please consult your place of purchase.

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**NOTE 1: Please save the packaging materials that accompany your board. If you ever ship the Magic I/O to Everex Systems for any reason without adequate packaging, your warranty may be affected.**

**NOTE 2: Circuit boards are sensitive to static electricity, which can damage their delicate electronics. You can easily pick up static electricity in dry weather or by walking on a carpeted floor. Protect your board by grounding yourself: touch the metal chassis of your computer before you pick up your circuit board, and handle the board by the edges only.**



# *Section 1: How to Use This Manual*

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**Section 2** presents the features and physical layout of the Magic I/O. If you are a first-time user, read Sections 3 and 4 for comprehensive configuration and installation instructions. If you are already familiar with input/output adapters, you can use the installation summary in Section 2.3 to get the Magic I/O working immediately.

**Section 3** provides the default jumper and dipswitch settings for the Magic I/O and explains how to reconfigure these settings to match your system. The easiest way to set up the Magic I/O is with the Everex utility program called EV170B; however, Section 3 also includes directions for configuring without the software.

**Section 4** guides you through the installation and testing of your Magic I/O.

**Section 5** tells you how to get assistance if you encounter any difficulties installing or operating the Magic I/O.

**Appendix 1** contains a schematic of the Magic I/O handshaking operation.

## *Section 2: Introduction*

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### **2.1 Features**

The Everex Magic I/O is one of the most versatile multifunction I/O cards you can buy. With a parallel printer port, three serial ports (one standard and two optional), and a game port, the Magic I/O packs more features and connectors on a true five-inch short card than most full-length multifunction cards provide.

All of the functions of the Magic I/O are fully configurable; you can easily select interrupts, LPT ports, COM ports and other values to customize the Magic I/O to any IBM-compatible system. This flexibility is your guarantee that the Magic I/O will work in more systems, with more combinations of hardware and software, than any other I/O card on the market.

To complement its many features, the Magic I/O comes with a menu-driven diagnostics/set-up utility program, **EV170B.EXE**, which will guide you through the configuration of your board and will test the board once it is installed.

## 2.2 Physical Layout

Figure 1 presents the Magic I/O, with all the jumpers and dipswitches you need to know.

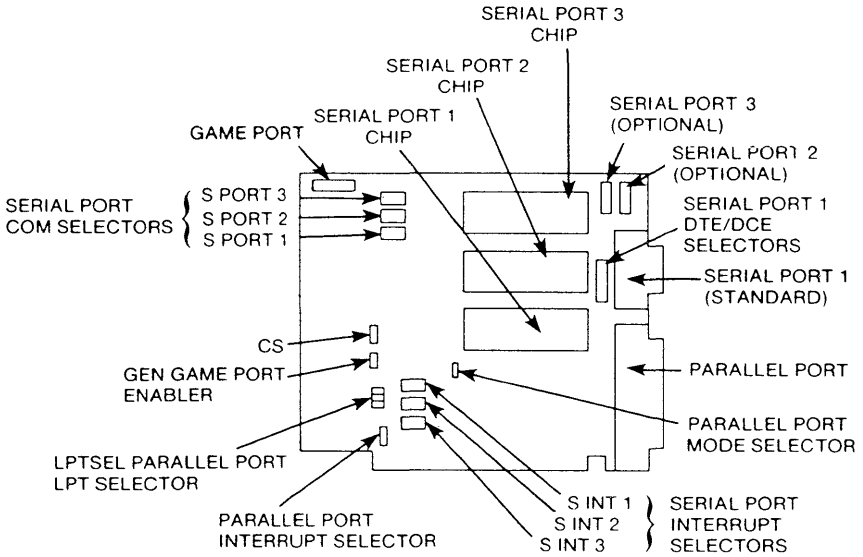


Figure 1. The Magic I/O

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## 2.3 Installation Summary

The following outline presents the steps needed to configure and install the Magic I/O.

1. Check the Magic I/O default configuration (Section 3.1). Do you want to change the default settings?\*

If YES, reconfigure as needed, using the EV170B software or Section 3.4.

2. Install the Magic I/O (Section 4.1).
3. Boot up with DOS, run the Setup program, and test the Magic I/O (Section 4.2).
4. Replace the system's cover, and the Magic I/O is ready to go.

\* If you want to change the default configuration, you must do so before you install the Magic I/O.

## Section 3: Configuration

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### 3.1 Default Settings

Before you install the Magic I/O, you need to configure it to suit your particular system. Table 1 lists the Magic I/O's default settings and their locations.

If you want to change any of these settings, the main menu of the Everex utility program called EV170B.EXE includes an *Installation Setup* option. The EV170B.EXE program is designed to simplify configuration of the Magic I/O; however, you may refer to the tables in Section 3.4 if you prefer to configure without the software.

---

**TABLE 1**  
**Magic I/O Default Settings**

<b>Jumper/Switch</b>	<b>Default Setting and Definition</b>
LPT.SEL (W3 & W4)	Sets the parallel port's I/O address: default is LPT2 with a port address from 378 to 3BF.
S.PORTs 1 - 3 (W7, W6 & W5)	Select the COM ports for the serial ports: default is COM 1 for Serial Port 1. Serial ports 2 and 3 are disabled.
S.CH 1 (W20,21)	Set Serial Port 1 as DCE or DTE. Only Serial Port 1 can be configured; Serial Ports 2 and 3 are fixed as DTE. Default for Serial Port 1 is DTE (six shunts connecting both columns of pins).
PTRINT (W8)	Sets the default interrupt of the parallel port as IRQ 7.
PIO (W19)	Selects either printer or bi-directional general purpose I/O mode for the parallel port: default is printer mode.
SINT 1 - 3	Selects the Serial Channel Interrupt for each serial port: default is IRQ4 for COM 1.

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## 3.2 Setting Jumpers and Switches

The Magic I/O uses several different types of switches. Please check your board to be sure that you know how to set your switches ON or OFF. All four of the different types of switches pictured below have positions 1-4 ON, and 5-8 OFF.

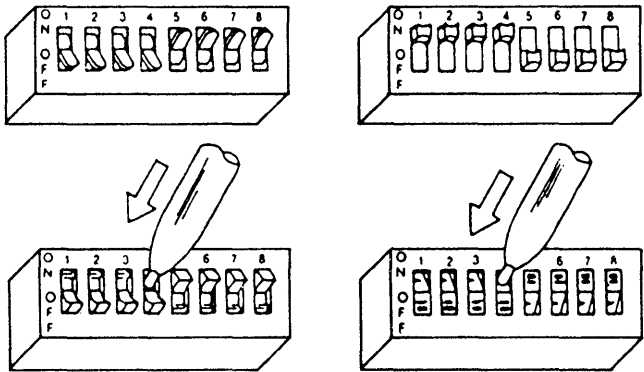


Figure 2. The Different Types of Switches

---

You "set" a jumper by positioning a plastic jumper shunt over the pins. To set the jumper "Off," cover only one of the two pins in the jumper group and leaving the other pin exposed. This has the same effect as completely removing the jumper clip, but retains the clip for future use.

To remove or adjust a jumper shunt, bend a paper clip, insert the bent end into the hole in the shunt and pull the jumper up. (See Figure 3.)

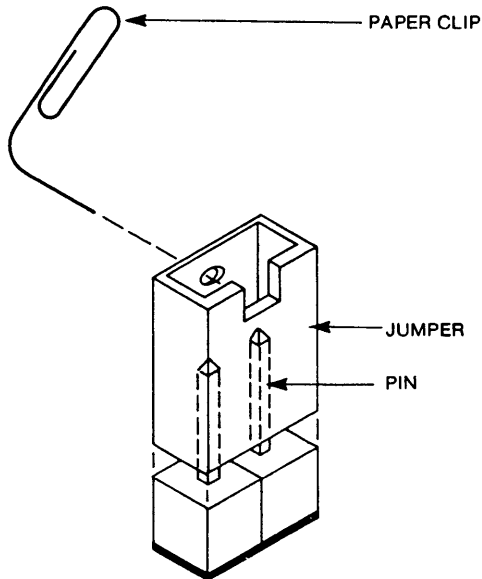


Figure 3. Moving Jumper Shunts



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## 3.3 Using the Software to Configure the Magic I/O

This section describes how to access and use the *Installation Setup* option to configure your Magic I/O. If you prefer to configure without the software, go on to Section 3.4.

1. Boot up your computer with DOS, and insert the Magic I/O Utility diskette into Drive A.
2. At the A> prompt type:

**EV170B [ENTER]**

**NOTE:** To choose an option, use the arrow keys to move the highlight to the option you desire, then hit the [ENTER] key to activate your choice.

The utility main menu will appear on the screen. Since you are preparing to install your Magic I/O, choose the *Installation Setup* option.

3. To simplify configuration, have the board in front of you as you go through the *Installation Setup* program.

- 
4. The software will prompt you to choose which adjustments you want to make. Make your selections on the screen.
  5. The screen will display a picture of the Magic I/O and will show you what jumpers and switches you need to set. Physically set the switches/jumpers on your board to correspond with those "set" on the screen.
  6. Congratulations! You have completed the configuration of your board, and can go on to Section 4 to install and test the Magic I/O.

---

## 3.4 Configuring Without the Software

Although you are encouraged to use the *Installation Setup* software to configure the Magic I/O, you can also change the jumper and switch settings with the information in this section.

### 3.4.1 The Serial Ports and Serial Port Interrupts

#### Serial Ports

Each serial port in your system must be assigned to a different COM port, which allows the CPU to send and receive data through the serial port. Each COM port has a corresponding port address, so by selecting the COM port, you are also setting the port address. Check to see what COM ports your software will respond to, and configure your software to run with the same configuration as your Magic I/O.

Jumpers S.port 1 through S.port 3 select the COM ports for Serial Ports 1 through 3 respectively. The factory default setting is COM 1 for Serial Port 1; Serial Port 2 and Serial Port 3 are disabled. For each group of four jumper positions, select the COM port by setting the jumper on the corresponding pins. Use TABLE 1A to configure the port(s).

---

## Assigning Serial Port Interrupts

Each peripheral device uses an IRQ (Interrupt ReQuest line) to inform the computer that it is ready for instructions. IBM Personal Computers have eight levels of hardware interrupts:

Interrupt 0	=	timer
Interrupt 1	=	keyboard
Interrupt 2	=	reserved
Interrupt 3	=	COM 2
Interrupt 4	=	COM 1
Interrupt 5	=	fixed drive
Interrupt 6	=	floppy drive
Interrupt 7	=	printer

Each serial port in your system also requires an interrupt level. The serial port interrupts are selected by the jumpers at location **SINT** (Serial Channel Interrupt). Generally, COM Port 1 uses interrupt 4 and COM Port 2 uses interrupt 3. Many software programs support COM Ports 3 and 4 which share the same interrupt levels as COM Ports 1 and 2; COM Port 3 uses interrupt 4 and COM Port 4 uses interrupt 3. Use TABLE 1B to configure the serial port interrupts.

---

## The Serial Ports as DTE or DCE:

A communication device can either be Data Terminal Equipment (DTE) or Data Communication Equipment (DCE). In order for two communication devices to transfer data, an exchange of control signals must occur. The control signals are carried through the interface (or connection) of the DTE connector and the DCE connector.

The arrangement of the control signals is predetermined and will vary depending on whether the device is DTE or DCE. The exchanging of control signals between the DTE device and the DCE device is called *handshaking*.

For the 9-pin serial port there is a block of DCE/DTE jumpers on the Magic I/O labeled W20 and W21. In the factory default DTE setting, all six shunts are connecting both columns of pins. To set the serial port for DCE, change the connections of the shunts as shown in Figure 4.

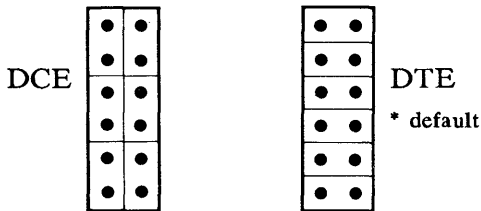


Figure 4. DCE vs. DTE

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**Note: Only Port 1 can be configured. The two optional serial ports are fixed as DTE.**

Most serial devices are DCE devices which require the Magic I/O serial ports to be set as DTE to enable communication. Since there are exceptions, you should determine if your serial device is DCE or DTE and set the Magic I/O accordingly (refer to the manual of your serial device for this information).

If a serial device attached to the Magic I/O is not working, make sure that all the other jumper and switch settings related to the serial port are set correctly. If you can't determine whether your serial device is DCE or DTE and the serial device isn't functioning properly with the default DTE setting, try changing the setting to DCE.

**NOTE: The board comes with no force-trues on lines RI, DCD, DSR, and CTS.**

---

## Assigning Serial Ports and Serial Port Interrupts

Table 1A provides the jumper settings for the COM ports you can choose from and lists the corresponding fixed I/O Port Addresses. (These settings apply to S.port jumpers 1, 2, and 3.)

TABLE 1A  
COM Port Jumper Settings  
For the Serial Ports  
(S.port 1, 2, and 3)

COM	Jumper				I/O Port
	1	2	3	4	Address
1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3F8 - 3FF
2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2F8 - 2FF
3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3E8 - 3EF
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2E8 - 2EF
DISABLED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**NOTE: Do NOT assign two COM ports to the same serial port.**

TABLE 1B provides the jumper settings for the serial port interrupts. For Serial Port 1, you will use jumper SINT 1; for Serial Port 2, you will use jumper SINT 2; for Serial Port 3, you will use jumper SINT 3.

**TABLE 1B**  
**Interrupt Jumper Settings**  
**For the Serial Ports**

Serial Port Interrupt	SINT Jumper Settings			
IRQ2	:	:	:	☐
IRQ3	☐	:	:	:
IRQ4	:	☐	:	:
IRQ5	:	:	☐	:
DISABLED	:	:	:	:

**NOTE:** IRQ2 becomes IRQ9 if the Magic I/O is installed in an IBM AT or compatible.



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TABLE 1C lists the default interrupt and COM port for Serial ports 1 through 3.

TABLE 1C  
Serial Port Defaults

Serial Port	Default Interrupt and Serial Port
1	IRQ4 + COM1 enabled
2	IRQ + Serial Port Disabled
3	IRQ + Serial Port Disabled

### 3.4.2 Enabling the Serial Ports

When you order a Magic I/O with one or more optional serial ports, you should receive a special ribbon cable for each port with a 10-pin female connector at one end and a 25-pin male connector at the other end. The optional serial ports are the 10-pin connectors at J3 (Port 2) and at J2 (Port 3) in the upper right corner of the Magic I/O. Connect the 10-pin end of the cable(s) to J3 (and J2). See Figure 5.

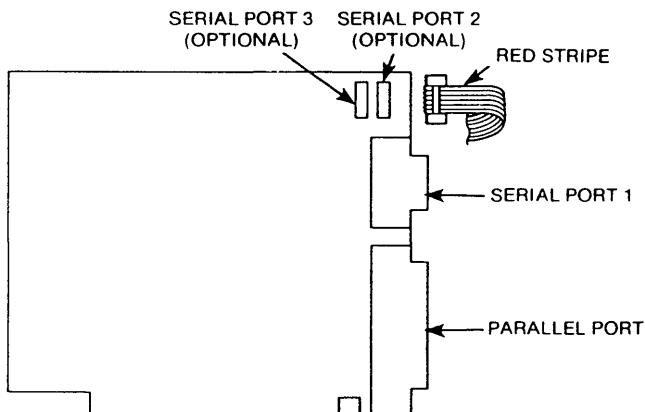


Figure 5. Serial Port Connectors and Chips.

**NOTE:** The connectors that correspond to each serial port are permanently assigned and cannot be reversed.

In addition to the special cable, a special IC chip is required to implement each optional serial port. These chips are not present on the Magic I/O with one serial port. The chips (labeled 16450, 8250A, or 8250) should be installed at U14 (for Serial Port 2) and U11 (for Serial Port 3).

**NOTE:** IC chips are VERY sensitive to static electricity. To avoid damaging the chips, touch the metal chassis of your computer before you handle the chips.

---

The chips have a pin 1 which is marked with a notch or a dot. If you look carefully at the Magic I/O board, each chip socket has the outline of a notched chip in the proper orientation. (See Figure 6.) Be sure to insert the chip following this orientation. To install the chips, insert the tips of the pins into the holes in the socket. Make sure the alignment is exactly right, then press the chips into place.

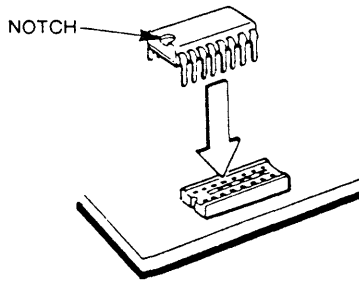


Figure 6. Installing an IC Chip

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### 3.4.3 The Parallel Port

The Magic I/O's parallel port is configured at the factory as a printer port. PIO is a three-pin connector that selects whether the parallel port will function as a printer port (default configuration) or as a bi-directional general purpose I/O port. PIO is located at W19 on the Magic I/O.

You don't need to change this setting if you want the parallel port to remain in the printer mode; however, if you want to change the port to a general purpose I/O port, configure it according to Table 3.

TABLE 3  
Setting the Parallel Port (W19)

PIO Set as	Printer Port	General Purpose I/O Port
1	■	■
2	■ *	■
3	■	■

\* Default Setting

---

## The Parallel Port in Printer Mode

When you turn your computer on, it searches for the number of printer ports installed in your system. The computer can recognize up to three printer ports. The computer follows a priority for these ports and logically designates them as LPT1, LPT2, and LPT3. The I/O port address 3BC-3BF is the highest priority printer address so it is logically known as LPT1 or PRN. The lowest priority address is 278-27F so it is logically known as LPT3. The Magic I/O leaves the factory configured as LPT2 with the second priority address at 378-37F.

If there is only one parallel port in your system, it is referred to as LPT1 regardless of the I/O port address where it resides. However, if there are several parallel ports, the LPT's are assigned according to the priority of the port address.

The IBM Monochrome Display Adapter and most compatibles have a built-in printer port configured as LPT1 with the port address 3BC-3BF. Therefore, to avoid conflicts with most monochrome display adapters, the Magic I/O printer port is configured as LPT2 with the port address 378-37F, and with a default interrupt of 7. It is possible to change the I/O port address of the Magic I/O to LPT1 or LPT3 if the I/O address 378-37F conflicts with another parallel device in your system.

If you have a graphics adapter with a parallel port configured for a port address starting at 3BC, confirm that the Magic I/O's port address is 378 or 278. To set the port address of the parallel port and the LPT name (the logical designation), adjust the jumpers at LPT.SEL (W3 and W4) as shown in Table 4.

TABLE 4  
LPT Jumper Settings (W3, W4)

LPT	PORT ADDRESS	LPTSEL SETTING	
		W3	W4
LPT 1	3BC-3BF	<input type="checkbox"/>	<input type="checkbox"/>
LPT 2*	378-37F	<input type="checkbox"/>	<input type="checkbox"/>
LPT 3	278-27F	<input type="checkbox"/>	<input type="checkbox"/>
DISABLED	N/A	<input type="checkbox"/>	<input type="checkbox"/>

\*Default Setting

NOTE 1: The settings shown on the Magic I/O's silkscreen are as follows:

LPT1: 378-37F

LPT2: 278-27F

LPT3: 3BC-3BF

Refer to the settings in Table 4, NOT to the settings shown on the board.

NOTE 2: Every parallel port in your computer must have its own I/O port address. This manual refers to the parallel port at I/O address 3BC as LPT1, the port address at 378 as LPT2, and the port address at 278 as LPT3.



---



Refer to more detailed documents on the printer port if you want to tailor the parallel port for your own specific applications.

### 3.4.4 The Game Port

The game port is enabled with the two pins connected at jumper location G.EN. The game port is at I/O port address 200-203 HEX. To disable the game port, remove the jumper shunt from the two pins and place the shunt on one pin for safekeeping.

Follow Table 6 to enable or disable the game port.

TABLE 6  
Game Port (G.EN)

Port Address	G.EN Setting	
202-203	Enable*	
	Disable	

\* Default Setting

#### Attaching The Game Port Cable:

You can attach an analog joy stick to the game control port. The 16-pin jumper connector at location J1 allows you to attach a game paddle or joy stick to the system. This game connector is compatible with most software game and joy sticks.



---

The EV-170B includes a 16-pin game port cable. To attach the cable, follow these steps:

1. Make sure the game port is enabled with the jumper shunt setting over the two pins at G.EN (default setting).
2. Locate the 16-pin game port connector at J1.
3. Align the colored stripe on the cable to the left of the game port connector at J1 (the colored stripe should be attached to pin 1 of the J1 connector).
4. Insert the small rectangular connector of the cable into the J1 connector.
5. Plug the larger end of the cable into the connector on your joy stick.

---

### 3.4.5 Short Slot 8 on the IBM XT

If you are going to install the Magic I/O into short slot 8 of the IBM XT, you must place a jumper shunt over both pins of the System Select jumper CS at location W1. See Figure 7.

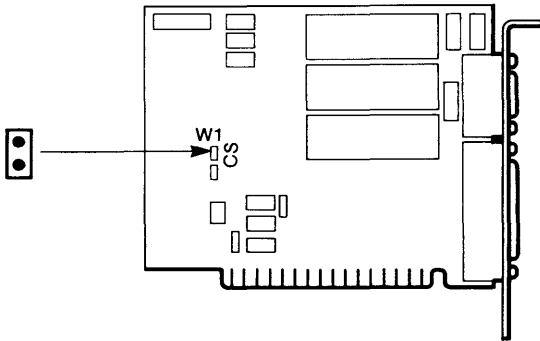


Figure 7: Setting CS at W1

## Section 4: Installation

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### 4.1 Physical Installation

Once the jumpers have been set and the cables and chips have been installed, you can install the board into your computer.

1. Turn OFF the power to your computer, and remove the cover of your system. **Make sure there is no power going to your system!**
2. Choose any expansion slot on the motherboard.
3. Remove the **expansion slot cover** from the back of the chosen expansion slot. (To do this, unscrew the screw which holds the metal cover in place. Save the screw, since you will need it to secure the Magic I/O in place.)

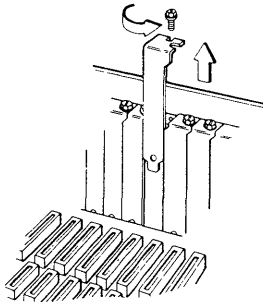


Figure 8: Removing The Slot Cover

- 
4. Gently, but firmly, insert the Magic I/O card all the way into the expansion slot. Make sure the gold connecting fingers snap all the way into place. See Figure 9.

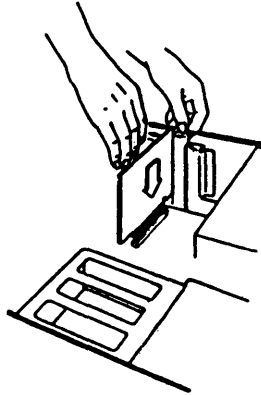


Figure 9 : Installing the Magic I/O

5. Use the screw which you removed from expansion slot cover to secure the Magic I/O in place.
6. If you will be using the parallel port or any of the serial ports, plug the appropriate device into the appropriate port (connector).
7. Replace the cover to your system and any cables you disconnected earlier.
8. Boot up your system from DOS.
9. Go on to Section 4.2 to test the Magic I/O.

---

## 4.2 Testing the Magic I/O

The Everex Utility software diskette includes a program which will check to see if the jumpers have been set properly. This program will only take a few minutes to run and will assure you that the installation has been performed properly and that all of the chips on your Magic I/O are good.

To run the Magic I/O test:

1. Boot your system with DOS, insert the Magic I/O utility diskette into Drive A, and type:

**A:EV170B**

2. The Magic I/O main menu will appear on the screen. Select the *Test Chip Functions* option. Go through each Chip Test. The chips will be tested sequentially. The chips under evaluation will blink in the diagram on your screen until they have been tested and their status is displayed.
3. Congratulations! You have completed your installation. Reinsert the cover of your computer, and it will be ready for use. If you are using an AT, you will need to run the Setup utility at this point. See your AT manual for instructions.

# *Section 5: Troubleshooting*

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## **5.1 How to Get Assistance**

In order to simplify the troubleshooting of your Everex product, the Technical Support Department recommends that you have the following items and information present before placing your call:

- Owner's Manual and Reference Guide for your Everex product.
- Version of DOS you are currently using
- Contents of your CONFIG.SYS file
- Contents of your AUTOEXEC.BAT file

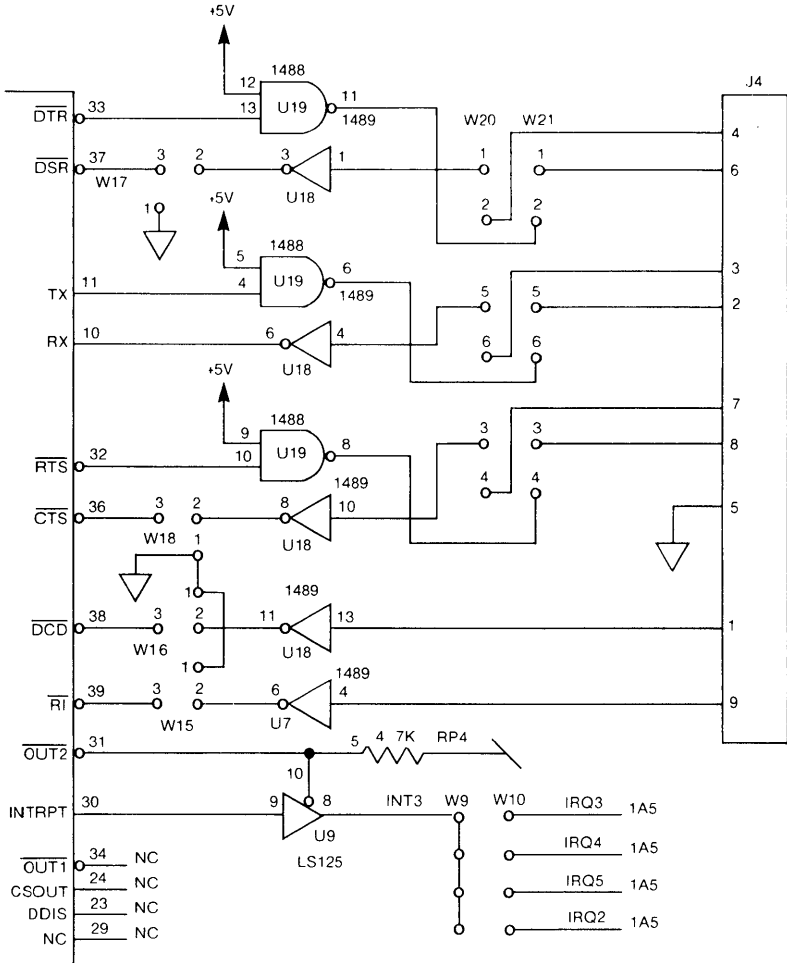
Use the following checklist to gather information which will help the Technical Support Department to give you faster and more efficient service.

- What brand name and model computer and monitor are you currently using?
- What brand and capacity hard disk drive(s) do you have?
- What other peripheral products are installed in your computer? (For example, do you have a modem, multifunction card, etc?)

- 
- Make note of any other facts or circumstances which seem strange or relevant to you.
  - If it does become necessary to return the unit to Everex for service, we will need the following additional information:
    - Serial number of your Magic I/O card (printed on a small white sticker, usually on the back side of the card).
    - Date and place of purchase.
  - Finally, when you call, please try to be near your computer, so you can follow the technician's suggestions while on the phone.

# Appendix 1: Handshaking Schematic

The following portion of the Magic I/O's schematic diagram details the handshaking functions performed by the DTE/DCE and force-true jumpers.



\* The two optional ports have similar schemes except for the force-true functions which are not implemented.







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**MAN-00063-40**