Getting Started with Your
GPIB-PCII/IIA and
the NI-488.2™ Software
for MS-DOS/Windows Graphics
Applications

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National Instruments Corporate Headquarters

6504 Bridge Point Parkway
Austin, TX 78730-5039
(512) 794-0100
Technical support fax: (800) 328-2203
                        (512) 794-5678

Branch Offices:

Australia (03) 879 9422, Austria (0662) 435986, Belgium 02/757.00.20,
Canada (Ontario) (519) 622-9310, Canada (Québec) (514) 694-8521,
Denmark 45 76 26 00, Finland (90) 527 2321, France (1) 48 14 24 24,
Germany 089/741 31 30, Italy 02/48301892, Japan (03) 3788-1921,
Mexico 95 800 010 0793, Netherlands 03480-33466, Norway 32-84 84 00,
Singapore 2265886, Spain (91) 640 0085, Sweden 08-730 49 70,
Switzerland 056/20 51 51, Taiwan 02 377 1200, U.K. 0635 523545

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This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual, may cause interference to radio and television reception. This equipment has been tested and found to comply with the following two regulatory agencies:

Federal Communications Commission

This device complies with Part 15 of the Federal Communications Commission (FCC) Rules for a Class B digital device. A Class B device is distinguishable from a Class A device by the appearance of an FCC ID number located on the Class B device.

Canadian Department of Communications

This device complies with the limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications (DOC).

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe B prescrites dans le règlement sur le brouillage radioélectrique édicté par le ministère des communications du Canada.

Instructions to Users

These regulations are designed to provide reasonable protection against interference from the equipment to radio and television reception in residential areas.

There is no guarantee that interference will not occur in a particular installation. However, the chances of interference are much less if the equipment is installed and used according to this instruction manual.

If the equipment does cause interference to radio or television reception, which can be determined by turning the equipment on and off, one or more of the following suggestions may reduce or eliminate the problem.

- Operate the equipment and the receiver on different branches of your AC electrical system.

- Move the equipment away from the receiver with which it is interfering.

- Reorient or relocate the receiver's antenna.

- Be sure that the equipment is plugged into a grounded outlet and that the grounding has not been defeated with a cheater plug.

Notice to user: Changes or modifications not expressly approved by National Instruments could void the user's authority to operate the equipment under the FCC Rules.

If necessary, consult National Instruments or an experienced radio/television technician for additional suggestions. The following booklet prepared by the FCC may also be 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 Number 004-000-00345-4.

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About This Manual

This manual contains instructions for installing and configuring the
National Instruments GPIB-PCII/IIA interface board and the NI-488.2
software handler for MS-DOS/Windows graphics applications.

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Introduction and Hardware Installation*, lists what you need
  to get started and optional equipment you can order, gives a brief
  description of the hardware and the NI-488.2 software, and contains
  instructions for installing your GPIB-PCII/IIA.

- Chapter 2, *NI-488.2 Software Files*, describes the software files
  contained on your NI-488.2 distribution diskette.

- Chapter 3, *Software Installation*, contains instructions for installing the
  NI-488.2 software files.

- Appendix A, *Hardware Specifications*, describes the electrical,
  environmental, and physical characteristics of the GPIB-PCII/IIA and
  the recommended operating conditions.

- Appendix B, *Changing Board and Device Characteristics*, contains
  instructions for changing the default board and device characteristics of
  the NI-488.2 handler for MS-DOS/Windows.

- Appendix C, *Hardware and Software Configuration*, contains
  instructions for changing the configuration settings of your
  GPIB-PCII/IIA.

- Appendix D, *Interactive Software Installation*, contains instructions for
  running the interactive version of INSTALL.

- Appendix E, *Customer Communication*, contains forms you can use to
  request help from National Instruments or to comment on our products
  and manuals.

- The *Glossary* contains an alphabetical list and description of terms used in this manual, including abbreviations, acronyms, metric prefixes, mnemonics, and symbols.

Conventions Used in This Manual

Throughout this manual, the following conventions are used to distinguish elements of text:

bold	Bold text denotes menus, menu items, dialog buttons, or options.
italic	Italic text denotes emphasis, a cross reference, or an introduction to a key concept.
bold italic	Bold italic text denotes a note, caution, or warning.
`monospace`	Text in this font denotes text or characters that are to be literally input from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, variables, filenames, and extensions, and for statements and comments taken from program code.
`italic monospace`	Italic text in this font denotes that you must supply the appropriate words or values in the place of these items.
<>	Angle brackets enclose the name of a key on the keyboard—for example, <Ctrl>.
-	A hyphen between two or more key names enclosed in angle brackets denotes that you should simultaneously press the named keys— for example, <Ctrl-Alt-Del>.
<Shift>	Key names are capitalized.

Enter   *Enter* is reserved to mean that the commands immediately succeeding the word must be typed into the computer, and then executed by pressing the <Enter> key on the keyboard.

IEEE 488 and   IEEE 488 and IEEE 488.2 refer to the
IEEE 488.2   ANSI/IEEE Standard 488.1-1987 and the ANSI/IEEE Standard 488.2-1987, respectively, which define the GPIB.

Abbreviations, acronyms, metric prefixes, mnemonics, symbols, and terms are listed in the *Glossary*.

Related Documentation

The following documents contain information that you may find helpful as you read this manual.

- ANSI/IEEE Standard 488.1-1987, *IEEE Standard Digital Interface for Programmable Instrumentation*

- ANSI/IEEE Standard 488.2-1987, *IEEE Standard Codes, Formats, Protocols, and Common Commands*

- *Microsoft MS-DOS User's Guide,* Microsoft Corporation

- *Microsoft Windows User's Guide,* Microsoft Corporation

Customer Communication

National Instruments wants to receive your comments on our products and manuals. We are interested in the applications you develop with our products, and we want to help if you have problems with them. To make it easy for you to contact us, this manual contains comment and configuration forms for you to complete. These forms are in Appendix E, *Customer Communication*, at the end of this manual.

Chapter 1
Introduction and Hardware Installation

This chapter lists what you need to get started and optional equipment you can order, gives a brief description of the hardware and the NI-488.2 software, and contains instructions for installing your GPIB-PCII/IIA.

What You Need to Get Started

❑   GPIB-PCII/IIA interface board set for one of the following modes:
    GPIB-PCIIA
    or
    GPIB-PCII

❑   3.5 in. *NI-488.2 Distribution Diskette for Graphics Applications MS-DOS/Windows*

❑   One of the following operating systems installed on your computer:
    MS-DOS version 3.0 or higher (or equivalent)
    or
    Windows version 3.1 or higher

Optional Equipment

You can contact National Instruments to order any of the following optional equipment.

- GPIB Bus Extenders
  Parallel – 100 to 120 VAC
  Parallel – 220 to 240 VAC
  Fiber-optic – 100 to 120 VAC
  Fiber-optic – 220 to 240 VAC
  Coaxial – 100 to 120 VAC
  Coaxial – 220 to 240 VAC

- GPIB Connector Extender

- GPIB-SWITCH Box

- Shielded GPIB Cables*
  Type X1 single-shielded cables (1 m, 2 m, or 4 m)
  Type X2 double-shielded cables (1 m, 2 m, or 4 m)

*   To meet FCC emission limits for this Class B device, you must use a shielded (Type X1 or X2) GPIB cable. Operating this equipment with a non-shielded cable may cause interference to radio and television reception in residential areas.

Hardware Description

The GPIB-PCII/IIA interface board combines the functionality of the National Instruments GPIB-PCII and GPIB-PCIIA interface boards. It can be configured to function as either a GPIB-PCII or a GPIB-PCIIA, depending on the setting of the configuration switches on the board. To verify the GPIB-PC mode setting of your board, refer to *Verifying the GPIB-PC Mode Setting* in Appendix C, *Hardware and Software Configuration*, later in this manual.

The GPIB-PCII/IIA, equipped with the NAT4882 ASIC, transforms any IBM PC, PC/XT, PC AT, or compatible computer into a full-functioning IEEE 488.2 Talker/Listener/Controller. The NAT4882 controller chip is fully compatible with the IEEE 488.2 standard.

You can use standard GPIB cables to connect the GPIB-PCII/IIA with up to 14 instruments. If you want to use more instruments, you can order a bus extender or expander from National Instruments. Refer to Appendix A, *Hardware Specifications*, for more information about the GPIB-PCII/IIA hardware specifications and recommended operating conditions.

Software Description

Your kit includes NI-488.2 software, which National Instruments has developed for use with the GPIB-PCII/IIA. The NI-488.2 software and the GPIB hardware transform a general-purpose PC into a GPIB Talker/Listener/Controller that has complete communications and bus management capability. Your kit includes the NI-488.2 software for MS-DOS and for Windows.

Installing the GPIB-PCII/IIA

Warning: *Several components on your GPIB-PCII/IIA board can be damaged by electrostatic discharge. To avoid such damage in handling the board, touch the antistatic plastic package to a metal part of your computer chassis before removing the board from the package.*

Perform the following steps to install the GPIB-PCII/IIA:

1. Turn off your computer and all external devices, such as monitors or tape drives.

2. Unplug the power cord from the wall outlet.

3. Remove the top cover or access port of the I/O channel.

4. Remove the expansion slot cover on the back panel of the computer.

5. Insert the GPIB-PCII/IIA into any unused slot with the GPIB connector sticking out of the opening on the back panel, as shown in Figure 1-1. It might be a tight fit, but do not force the board into place.

1   GPIB-PCII/IIA board
2   Back panel
3   PC AT plug-in board
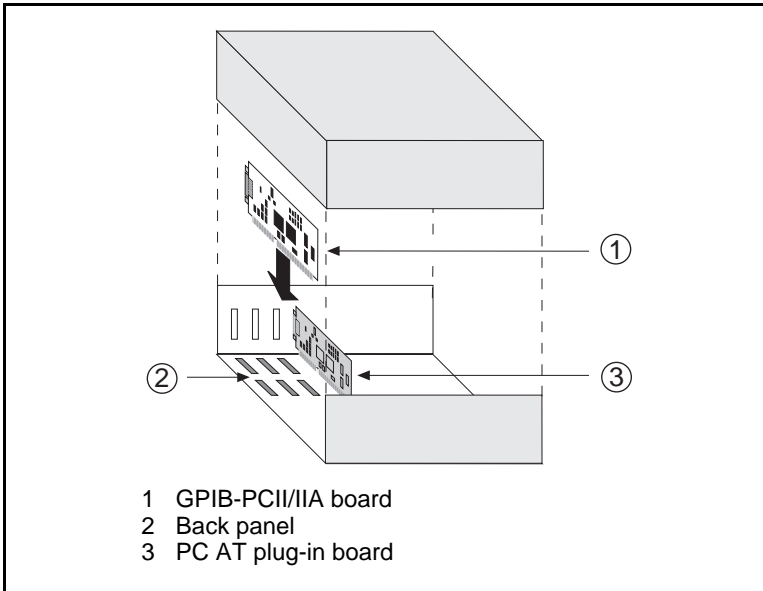
Figure 1-1. Installing the GPIB-PCII/IIA

6.   Screw the mounting bracket of the GPIB-PCII/IIA to the back panel rail of
     the computer.

7.   Verify that the GPIB-PCII/IIA is securely installed.

8.   Replace the retaining screw of the expansion slot cover if there is one.

9.   Replace the cover on the computer.

10. Plug the power cord into the wall outlet.

11. Turn on your computer and external devices.

The GPIB-PCII/IIA interface board is now installed.

Note: ***Do not attach the GPIB cable to the extension receptacle on the
            board until after you run the hardware and software diagnostic
            programs,*** `IBDIAG` ***and*** `IBTEST`***, which are explained in
            Chapter 3,*** *Software Installation.* ***These programs may not
            function properly if the GPIB cable is attached.***

Chapter 2
NI-488.2 Software Files

This chapter describes the software files contained on your NI-488.2 distribution diskette.

If you are using the NI-488.2 software for Windows, skip to *NI-488.2 Software Programs and Files for Windows*, later in this chapter. If you are using the NI-488.2 software for MS-DOS, proceed with the next section, *NI-488.2 Software Programs and Files for MS-DOS*.

NI-488.2 Software Programs and Files for MS-DOS

The NI-488.2 software for MS-DOS contains the following programs and files.

- `GPIB.COM` is the NI-488.2 software handler file that is loaded at system startup by DOS. *Handler* is a term used by National Instruments to refer to a loadable device driver.

- `IBDIAG.EXE` is a program that tests the hardware installation. After the handler is installed, `IBTEST.BAT` confirms that both the software and hardware are installed and functioning properly.

- `INSTALL.EXE` is a multipurpose, menu-driven program that installs the NI-488.2 software and tests the hardware and software configuration. When `INSTALL.EXE` installs the NI-488.2 software, it updates `CONFIG.SYS`, the MS-DOS system configuration file.

- `IBTEST.EXE` is a program that tests the installation of the NI-488.2 software.

- `IBCONF.EXE` is a software configuration program that changes the configuration parameters of the NI-488.2 software handler.

- `IBIC.EXE` is an interactive control program that executes GPIB functions you enter from the keyboard. It helps you establish communication between your computer and your graphics device.

- `README.DOC` is a Readme file that discusses the NI-488.2 handler.

After you have reviewed all the programs and files on your distribution diskette, skip to Chapter 3, *Software Installation*.

NI-488.2 Software Programs and Files for Windows

The NI-488.2 software for Windows contains the following programs and files.

- `GPIB.DLL` is a dynamic link library that is accessed by a Windows GPIB application as it executes. It contains all of the GPIB functions.

- `GPIB.INI` is the private profile file that `GPIB.DLL` uses to determine the software configuration parameters for each GPIB board and device in the system. You can modify it by using either the `WIBCONF.EXE` program or a text editor.

- `WIBCONF.EXE`, an MS-DOS application, is a software configuration program that you can use to change the software parameters and other data used by the handler. It operates in much the same way as the GPIB MS-DOS configuration program, `IBCONF`.

- `WIBCONF.PIF` contains configuration information about the program `WIBCONF.EXE` that is used by Windows when it is executed.

- `IBDIAG.EXE`, a DOS application, is a program that tests the hardware settings on your GPIB board. It ensures that the board is properly installed and that the hardware is accessible.

- `IBDIAG.PIF` contains configuration information about the program `IBDIAG.EXE` that is used by Windows when it is executed.

- `WIBTEST.EXE`, a Windows application, can be used to test the software handler. It verifies that the software configuration is consistent with the GPIB hardware.

- `WIBIC.EXE`, a Windows application, is the Windows Interface Bus Interactive Control program that executes GPIB functions that you enter from the keyboard. It can be used to establish communication between your computer and your graphics device.

After you have reviewed all the programs and files on your distribution diskette, proceed to Chapter 3, *Software Installation*.

Chapter 3
Software Installation

This chapter contains instructions for installing the NI-488.2 software files.

If you are using the NI-488.2 software for Windows, skip to the *Installing the NI-488.2 Software for Windows* section later in this chapter. If you are using the NI-488.2 software for MS-DOS, proceed with the following section, *Installing the NI-488.2 Software for MS-DOS*.

Installing the NI-488.2 Software for MS-DOS

Follow these steps to install the NI-488.2 software for MS-DOS applications.

Note: *You must have approximately 300 kilobytes of free disk space to install the NI-488.2 software files.*

Step 1. Run INSTALL

The quick version of the INSTALL program creates a directory, C:\GPIB-PC, and copies the NI-488.2 software files to that directory.

Note: *If you want to change the default file names and installation settings of the* INSTALL *program, refer to Appendix C, Interactive Software Installation, for information on running the interactive version of* INSTALL*.*

Complete the following steps to run the quick version of INSTALL.

1. Insert the NI-488.2 distribution diskette into an unused drive.

2. Install the software by entering the following command:

    x: install/q

where x is the letter of the drive containing the distribution diskette.

`INSTALL` copies the NI-488.2 software files to the directory
`C:\GPIB-PC`. It also modifies the `C:\CONFIG.SYS` file to include
the following line:

```
device = \gpib-pc\gpib.com
```

`INSTALL` then runs the GPIB-PCII/IIA hardware diagnostic program,
`IBDIAG`. `IBDIAG` confirms that the hardware is functioning properly,
and verifies that the software configuration settings are set correctly.

If `IBDIAG` returns an error message, check the GPIB-PCII/IIA to
ensure that it is not connected to a GPIB cable. `IBDIAG` may not
function properly if a cable is connected to the GPIB-PCII/IIA.

If `IBDIAG` still returns an error message, you may need to check the
hardware configuration switch and jumper settings. Refer to *Verifying
the Hardware Configuration Settings* in Appendix C, *Hardware and
Software Configuration*, for information on checking and changing the
GPIB-PCII/IIA hardware configuration settings.

3. Restart your computer.

Step 2. Test the Software Installation

The file `IBTEST.EXE` on your NI-488.2 distribution diskette is a program
that tests the installation of the software. Run `IBTEST` from the
GPIB-PCII/IIA directory created by `INSTALL` by entering the following
commands:

```
cd \gpib-pc
ibtest
```

If `IBTEST` returns an error message, check the following:

- If you changed any of the hardware configuration settings on the
  GPIB-PCII/IIA interface board, check the current software
  configurations of the GPIB-PCII/IIA in `IBCONF` to make sure that they
  match the hardware settings. If you make changes in `IBCONF`, be sure
  to save them. Refer to *Step 3. Configure the Software* in Appendix C,
  Hardware and Software Configuration, for information on changing
  the software configuration.

- Confirm that the following line appears in your CONFIG.SYS file:

  device = \gpib-pc\gpib.com

  Is the file GPIB.COM located in the GPIB-PC directory? If it is not, run INSTALL again and include it.

- Check the GPIB-PCII/IIA to ensure that it is not connected to a GPIB cable. IBTEST may not function properly if a cable is connected to the GPIB-PCII/IIA.

After you complete this checklist, run IBTEST again. If IBTEST still fails, complete the *GPIB-PCII/IIA Hardware and Software Configuration Form* in Appendix E, *Customer Communication*, and contact National Instruments for technical support.

If no errors occur, the NI-488.2 handler for MS-DOS is installed correctly and you are ready to start using your GPIB-PCII/IIA with your graphics application program.

If your graphics application program instructs you to change the default settings of the software handler, refer to Appendix B, *Changing Board and Device Characteristics*, for more information on how to run IBCONF and on the configurable software parameters and their default values.

Installing the NI-488.2 Software for Windows

Complete the following steps to install the NI-488.2 software for Windows.

Note: *You must have approximately 300 kilobytes of free disk space to install the NI-488.2 software files.*

Step 1. Run INSTALL

The quick version of the INSTALL program assumes that Windows is installed in the default directory (C:\WINDOWS). It copies the NI-488.2 files for Windows to C:\WINDOWS and the GPIB destination directory, GPIB-PCW.

Note: ***If you want to change the default file names and installation settings of the*** `INSTALL` ***program, refer to Appendix C,*** *Interactive Software Installation*, ***for information on running the interactive version of*** `INSTALL`***.***

Complete the following steps to run the quick version of `INSTALL`.

1. Insert the NI-488.2 distribution diskette into an unused drive.

2. Install the software by entering the following command:

    x: `install/qw`

    where *x* is the letter of the drive containing the distribution diskette (this letter is usually `A` or `B`).

    `INSTALL` copies the NI-488.2 software files to the directory `C:\GPIB-PCW` and automatically runs the GPIB-PCII/IIA hardware diagnostic program, `IBDIAG`. `IBDIAG` confirms that the hardware is functioning properly, and verifies that the software configuration settings are set correctly.

    If `IBDIAG` returns an error message, check the GPIB-PCII/IIA to ensure that it is not connected to a GPIB cable. `IBDIAG` may not function properly if a cable is connected to the GPIB-PCII/IIA.

    If `IBDIAG` still returns an error message, you may need to check the hardware configuration switch and jumper settings. Refer to *Verifying the Hardware Configuration Settings* in Appendix C, *Hardware and Software Configuration*, for information on the GPIB-PCII/IIA hardware configuration settings.

3. Restart your computer.

Step 2. Set Up the Windows Applications

To set up the NI-488.2 Windows applications, complete the following steps:

1. Run **Windows Setup** in the **Main** window.

2. Select **Set Up Applications** from the **Options** pull-down menu.

3.   Add `WIBIC` and `WIBTEST` to the **Windows Applications** window.

If necessary, refer to the *Microsoft Windows User's Manual* for a more detailed description of the **Windows Setup** procedure.

Step 3. Test the Software Installation

The file `WIBTEST.EXE` is a Windows application that tests the installation of the software.

Run `WIBTEST` by selecting the `WIBTEST` icon in the Windows Applications window. `WIBTEST` requires no interaction with the user and takes about 10 seconds to complete.

If `WIBTEST` returns an error message, check the following:

*   If you changed any of the hardware configuration settings on the GPIB-PCII/IIA interface board, check the current software configurations of the GPIB-PCII/IIA board in `WIBCONF` to make sure that they match the hardware settings. If you make changes in `WIBCONF`, be sure to save them. Refer to *Step 3. Configure the Software* in Appendix C, *Hardware and Software Configuration*, for information on changing the software configuration.

*   Check the GPIB-PCII/IIA interface board to ensure that it is not connected to a GPIB cable. `WIBTEST` may not function properly if a cable is connected to the GPIB-PCII/IIA.

After you complete this checklist, run `WIBTEST` again. If `WIBTEST` still fails, complete the *GPIB-PCII/IIA Hardware and Software Configuration Form* in Appendix E, *Customer Communication*, and contact National Instruments for technical support.

If no errors occur, the NI-488.2 handler for Windows is installed correctly and you are ready to start using your GPIB-PCII/IIA with your graphics application program.

If your graphics application program instructs you to change the default settings of the software handler, refer to Appendix B, *Changing Board and Device Characteristics*, for more information on how to run the configuration program and on the configurable software parameters and their default values.

Appendix A
Hardware Specifications

This appendix describes the electrical, environmental, and physical characteristics of the GPIB-PCII/IIA and the recommended operating conditions.

Table A-1. Electrical Characteristics

Characteristic	Specification
Maximum GPIB Transfer Rates	
GPIB Reads GPIB Writes	400 kbytes/s* 400 kytes/s*
Power Requirement (from PC/XT/AT I/O) channel)	+5 VDC 250 mA Typical 490 mA Maximum
* Actual rates are dependent on instrument capabilities and system configuration.	

Table A-2. Environmental Characteristics

Characteristic	Specification
Operating Environment	
Component Temperature Relative Humidity	0° to 40° C 10% to 90%, noncondensing
Storage Environment	
Temperature Relative Humidity	-20° to 70° C 5% to 90%, noncondensing
EMI	FCC Class B Certified

Table A-3. Physical Characteristics

Characteristic	Specification
Dimensions	10.67 cm by 11.05 cm (4.2 in. by 4.35 in.)
I/O Connector	IEEE 488 Standard 24-pin

Appendix B
Changing Board and Device Characteristics

_____

This appendix contains instructions for changing the default board and device characteristics of the NI-488.2 handler for MS-DOS/Windows.

Note: *Most graphics application software is written to use the default configuration of the NI-488.2 handler. Do not change the default parameters of the NI-488.2 handler unless your graphics application manual instructs you to do so.*

Board and Device Characteristics

Two groups of features can be changed in the handler file or configuration file. The first group consists of the characteristics of the devices attached to your GPIB-PCII/IIA. The second group consists of the characteristics of each GPIB-PCII/IIA installed in the computer. The following sections describe the characteristics of each group.

Characteristics of the Graphics Devices

Each device used with the GPIB-PCII/IIA has the following characteristics:

- A symbolic name of each device on the GPIB (such as DEV5 or SCANNER).

- A primary and, if used, a secondary address for each device.

- A time limit imposed when executing certain functions. This time limit ensures that transfers do not hang up the GPIB indefinitely.

- A way to terminate I/O transmissions to and from the device. Some devices require or append an end of string (EOS) character, such as the ASCII line feed character, to data strings. Others use the GPIB END message, which is sent or received via the EOI signal line. Still others use both. Some terminate I/O only when a predetermined number of bytes are sent or received.

Characteristics of Each GPIB-PCII/IIA

Each GPIB-PCII/IIA board has the following characteristics:

- A symbolic name (either GPIB0 or GPIB1).

- A GPIB primary or secondary address.

- A computer I/O address.

- A GPIB-PC mode (either PCII or PCIIA).

- The capability to be designated as the System Controller of the devices on its bus.

- A time limit imposed when executing certain functions.

- A way to terminate I/O transmissions to and from the board when executing board calls—for example, by an EOS character, an END message, and/or a byte count.

- An interrupt line that the board uses, if any.

- A DMA channel that the board uses, if any.

- High-speed, highest-speed, or normal timing when transmitting data to a device. With normal timing, there is a delay of at least 2 μs after the data is placed on the GPIB before the Data Valid (DAV) line is asserted. With high-speed timing, this delay is decreased to about 500 ns, and with highest-speed timing, it is decreased to about 350 ns. The default setting of 2 μs is recommended, as some devices cannot communicate at higher speeds.

Default Configurations

The default configurations of the software were set at the factory. For example, the default device names of the 32 GPIB devices are DEV1 through DEV32, but your application manual may instruct you to assign a more descriptive name to a particular device, such as SCANNER.

Note: *Do not give a GPIB device the same name as a directory or file on your disk drive.*

You can also use the configuration programs, `IBCONF` or `WIBCONF`, to examine the current default settings in the handler file.

If you do not make changes to the configuration, the default characteristics of the software remain in effect.

Primary Default Characteristics

The following are the primary default characteristics of the handler:

- The GPIB-PC mode is assumed to be the default setting. See Appendix C, *Hardware and Software Configuration*, for more information on the GPIB-PC mode.

- There are 32 active devices with symbolic names `DEV1` through `DEV32`.

- GPIB addresses of these devices are the same as the device number. For example, `DEV1` is at address 1.

- The first 16 devices are assigned to `GPIB0` as their access board, and the second 16 devices are assigned to GPIB1 as their access board. `GPIB0` is the symbolic name of the first GPIB-PCII/IIA board in your system. If you have an additional GPIB-PCII/IIA board in your system, its symbolic name is `GPIB1`.

- Each GPIB-PCII/IIA is System Controller of its independent bus and has a GPIB address of 0.

- The END message is sent with the last byte of each data message to a device. Each data message that is read from a device automatically terminates when END is received. No EOS character is recognized.
- The time limit on I/O and wait function calls is approximately 10 seconds.

- `GPIB0` is a GPIB-PCII board at base I/O address 02B8 hex using DMA channel 1 and no interrupt line, or `GPIB0` is a GPIB-PCIIA board at base I/O address 02E1 hex using DMA channel 1 and no interrupt line.

Repeat Addressing (Device Characteristic Only)

Normally, the GPIB address of a device is issued before each device function pertaining to that device. If you enter `yes` for the Repeat Addressing field, this addressing occurs even if the device is already properly addressed. The default option for this characteristic is `no`.

Changing Board and Device Characteristics

If you are using the NI-488.2 software for Windows, skip to *Changing Characteristics for Windows* later in this appendix. If you are using the NI-488.2 software for MS-DOS, proceed to the following section, *Changing Characteristics for MS-DOS*.

Changing Characteristics for MS-DOS

Use the software configuration program, `IBCONF`, to change the board and device characteristics.

Running IBCONF

Complete the following instructions to change a board or device characteristic using `IBCONF`.

Note: *Never run* `IBCONF` *from the distribution diskette without write-protecting the diskette, as doing so will modify the master copy.*

1. Run `IBCONF` by entering the following commands:

   ```
   cd \gpib-pc
   ibconf
   ```

2. Press any key to display the configuration map.

3. When the configuration map appears, make sure that the board or device is highlighted and press <F8>.

4. Using the arrow keys, move the highlight to the characteristic you want to change.

5. Use the arrow keys to change the value of the characteristic.

6. Press <F9> to stop editing.

7. Press <F9> once again to quit IBCONF.

8. IBCONF displays a prompt asking if you want to save your changes. Enter y for yes.

9. IBCONF displays a prompt asking if you want to update the handler in memory. Enter y for yes. In some cases, IBCONF instructs you to restart your computer.

Changes to other configurable parameters can be made in the same manner.

Changing Characteristics for Windows

Use the software configuration program, WIBCONF, to change the board and device characteristics.

Running WIBCONF

Complete the following instructions to change a board or device characteristic using WIBCONF. WIBCONF edits the file GPIB.INI.

Note: *Never run* WIBCONF *from the distribution diskette without write-protecting the diskette, as doing so will modify the master copy.*

1. Select the WIBCONF icon by double-clicking on it.

2. WIBCONF displays a prompt asking for parameters. If you used the quick version of INSTALL, press <Enter>.

    If you used the interactive version of INSTALL and did not install the software in the default directory, C:\WINDOWS, enter the name of your Windows directory and the path to GPIB.INI—for example, E:\WINDOWS\GPIB.INI.

3. Press any key to display the configuration map.

4. When the configuration map appears, make sure that the board or device is highlighted and press <F8>.

5. Using the arrow keys, move the highlight to the characteristic you want to change.

6. Use the arrow keys to change the value of the characteristic.

7. Press <F9> to stop editing.

8. Press <F9> once again to quit `WIBCONF`.

9. `WIBCONF` displays a prompt asking if you want to save your changes. Enter `y` for yes.

Changes to other configurable parameters can be made in the same manner.

Appendix C
Hardware and Software Configuration

This appendix contains instructions for verifying and changing the configuration settings of your GPIB-PCII/IIA.

Figure C-1 shows the location of the GPIB-PCII/IIA configuration jumpers and switches when the board is in PCIIA mode.

Legend:
1 - Product Name, Assembly Number, and Revision Letter
2 - Serial Number
3 - Base I/O Address
4 - Interrupt Level
5 - DMA Channel
6 - Shield Ground
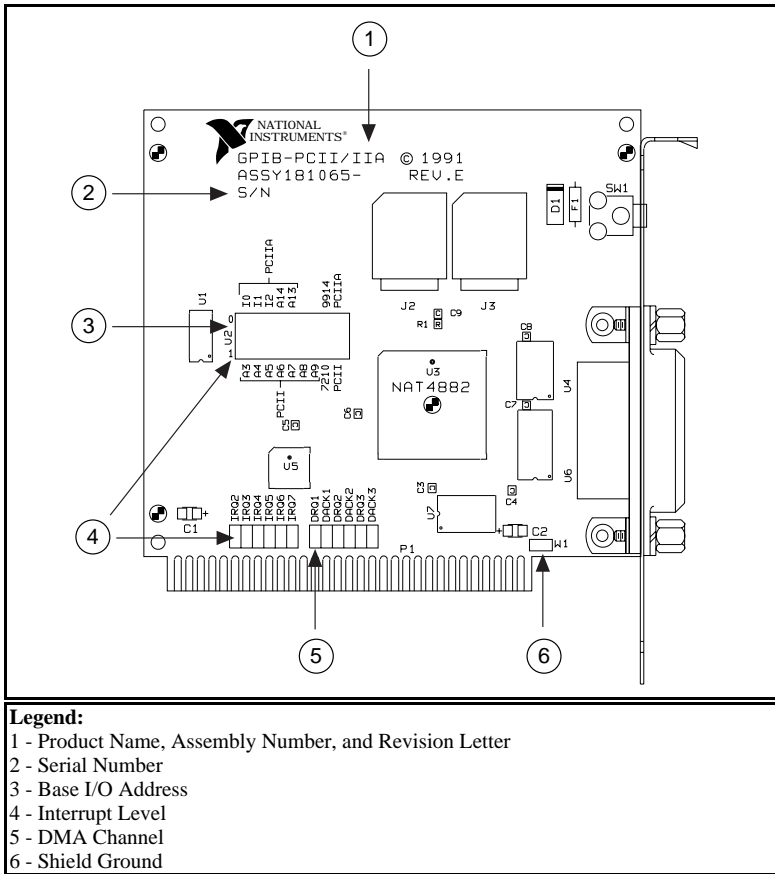
Figure C-1. GPIB-PCII/IIA Parts Locator Diagram

Verifying the GPIB-PC Mode Setting

The GPIB-PC mode of the GPIB-PCII/IIA is set using switch 9 in switch block U2. Check to ensure that this switch is set to the mode indicated on the identifying label on the mounting bracket of the interface board, beside the GPIB connector.

Figure C-2 shows the GPIB-PC mode selection switch set for GPIB-PCII mode and GPIB-PCIIA mode.
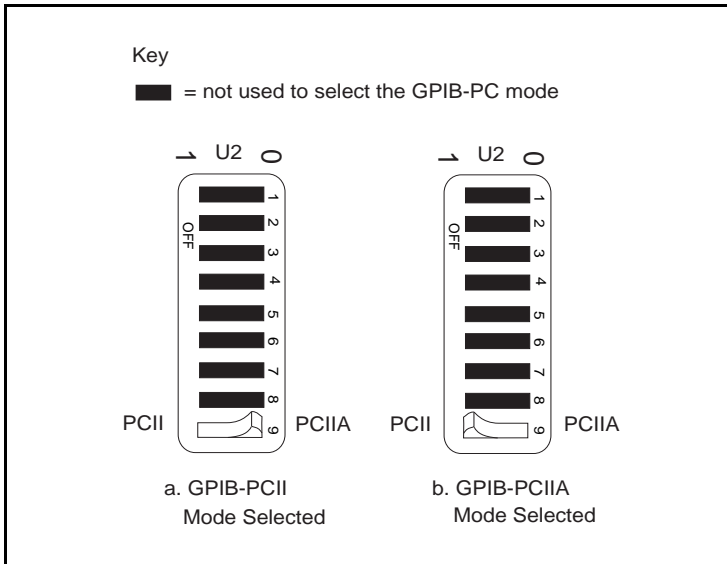
Figure C-2. GPIB-PC Mode Selection Settings

If this switch is not set to the mode indicated on the identifying label, set the switch to the appropriate mode. To select GPIB-PCII mode, push the switch down on the side labeled PCII. To select GPIB-PCIIA mode, push the switch down on the side labeled PCIIA.

Verifying the Hardware Configuration Settings

If IBDIAG returns an error message and no cables are connected to the GPIB-PCII/IIA, complete the instructions in this section to verify the hardware configuration settings.

Table C-1 shows the factory settings and available configurations for the switches and jumpers on the GPIB-PCII/IIA in GPIB-PCII mode.
Table C-2 shows the factory settings and available configurations for the switches and jumpers in GPIB-PCIIA mode.

Table C-1. Factory Default Settings and Available Configurations for
GPIB-PCII Mode

GPIB-PCII	Default	Available
Base I/O Address (hex)	2B8	100 to 3F8 in increments of 8
DMA Channel	1	1, 2, 3, or Not Used
Interrupt Line (IRQ)	7	2, 3, 4, 5, 6, 7, or Not Used
Shield Ground	Connected	Connected or disconnected

Table C-2. Factory Default Settings and Available Configurations for
GPIB-PCIIA Mode

GPIB-PCII	Default	Available
Base I/O Address (hex)	2E1	2E1, 22E1, 42E1, or 62E1
DMA Channel	1	1, 2, 3, or Not Used
Interrupt Line (IRQ)	7	2, 3, 4, 5, 6, 7, or Not Used
Shield Ground	Connected	Connected or disconnected

Check Tables C-1 and C-2 to make sure that the factory default settings of your GPIB-PCII/IIA board are the same as the values you entered when prompted by the IBDIAG program. If they are not, run IBDIAG again, and enter the default values when prompted. For instructions on running IBDIAG again, refer to Appendix D, *Interactive Software Installation*.

If IBDIAG still returns an error message, one of the switches and jumpers on your GPIB-PCII/IIA board may be configured to the same setting as another board or device in your computer. Check the manuals of any other devices or boards you are using to determine if they conflict with the configuration settings of your GPIB-PCII/IIA board. If the manuals are not available, check Tables C-3, C-4, and C-5 later in this appendix for possible conflicts.

If there is a conflict, you need to change the conflicting setting on either your GPIB-PCII/IIA board or the other board or device and run IBDIAG again. To change a hardware configuration setting on your GPIB-PCII/IIA board, follow the instructions in the following section, *Changing Hardware Configuration Settings*.

If you complete these instructions and IBDIAG still returns an error message, complete the *GPIB-PCII/IIA Hardware and Software Configuration Form* in Appendix E, *Customer Communication*, and contact National Instruments for technical support.

Changing Hardware Configuration Settings

Complete the following steps to change the configuration settings of your GPIB-PCII/IIA interface board.

Step 1. Configure the Hardware

Base I/O Address Selection

GPIB-PCII mode and GPIB-PCIIA mode use different regions of I/O address space. By default, GPIB-PCII mode uses base I/O address 2B8 hex and GPIB-PCIIA mode uses base I/O address 2E1 hex. To select a different base I/O address for your GPIB-PCII/IIA, follow the instructions that pertain to the GPIB-PC mode setting of your board.

GPIB-PCII Mode

Switch block U2 is used to set the address for address lines A3 through A9. The addresses are in a consecutive block of eight beginning on any multiple of 8 between 100 and 3F8 hex. For example, for the default address, 2B8 hex, the GPIB-PCII uses the address space 2B8 through 2BF hex.

Press the side marked 1 to select a binary value of 1 for the corresponding address bit. Press the 0 side of the switch to select a value of 0 for the corresponding address bit.

To change the base I/O address, press each switch to the desired position, then check each switch to make sure it is pressed down all the way.

Figure C-3 shows two possible switch settings. Each of the address selections shows how the base I/O address was calculated from the switch positions.

Key

■ = not used to select the base I/O address

Push this side down (off) for logic 1

Push this side down (on) for logic 0

	Binary	Hex
	0	
	0	
	0	0
A3	0	
A4	0	
A5	0	
A6	0	0
A7	0	
A8	1	
A9	1	3

U2

a. Switch Set to Base I/O Address hex 300

	Binary	Hex
	0	
	0	
	0	8
A3	1	
A4	1	
A5	1	
A6	0	B
A7	1	
A8	0	
A9	1	2

U2

b. Switch Set to Default Setting (Address hex 2B8)
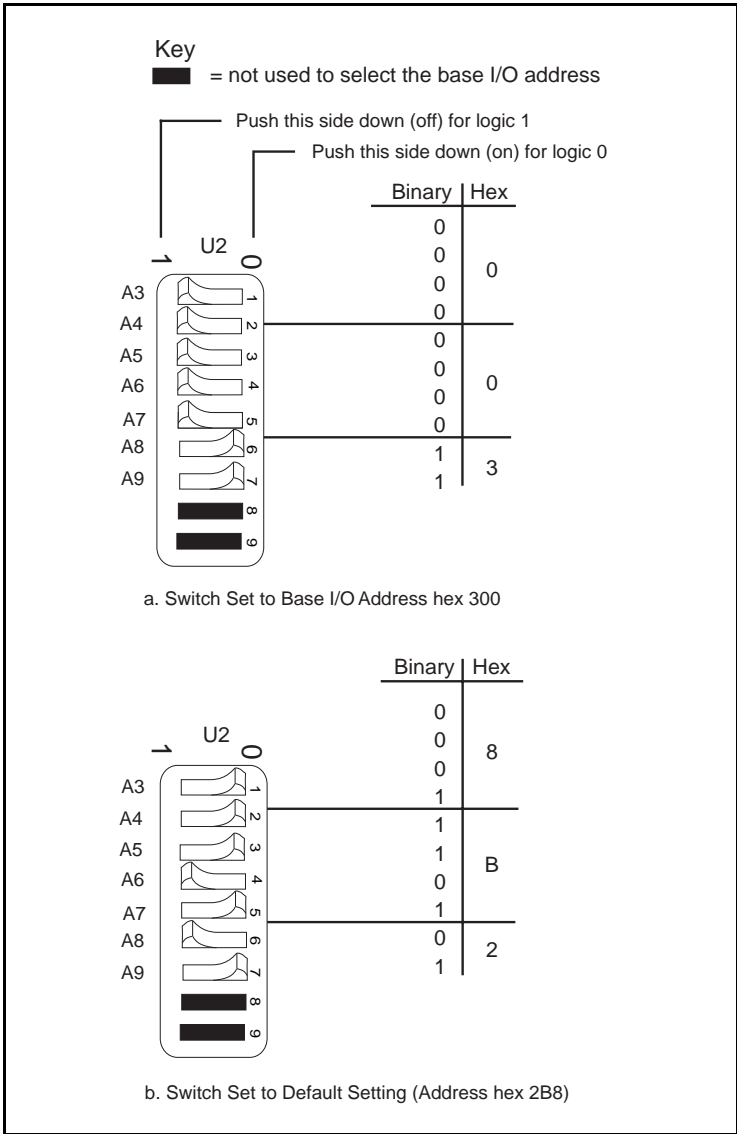
Figure C-3. Base I/O Address Switch Settings for GPIB-PCII Mode

GPIB-PCIIA Mode

The GPIB-PCIIA base I/O address is set using switches 4 and 5 of the switch block at U2. The four possible base I/O addresses are 2E1, 22E1, 42E1, and 62E1 hex.

Figure C-4 shows the switch settings for the four possible base I/O addresses and the address space used for each setting. Figure C-4a shows how the base I/O address was calculated from the switch positions.
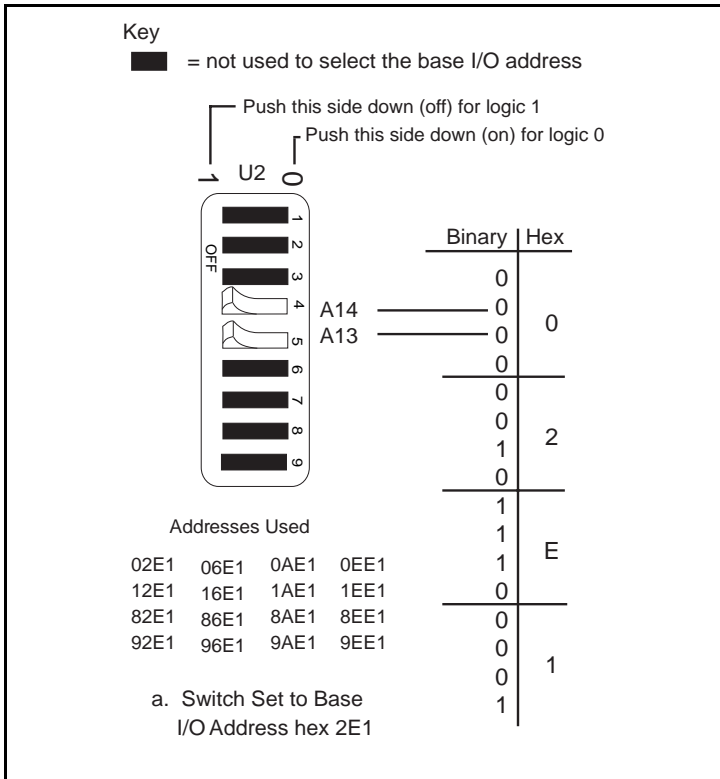
Figure C-4. Base I/O Address Switch Settings for GPIB-PCIIA Mode
(Continues)

U2

Addresses Used

A14
A13

22E1	26E1	2AE1	2EE1
32E1	36E1	3AE1	3EE1
A2E1	A6E1	AAE1	AEE1
B2E1	B6E1	BAE1	BEE1

b. Switches Set to Base I/O Address hex 22E1

U2

Addresses Used

A14
A13

42E1	46E1	4AE1	4EE1
52E1	56E1	5AE1	5EE1
C2E1	C6E1	CAE1	CEE1
D2E1	D6E1	DAE1	DEE1

c. Switches Set to Base I/O Address hex 42E1

U2

Addresses Used

A14
A13

62E1	66E1	6AE1	6EE1
72E1	76E1	7AE1	7EE1
E2E1	E6E1	EAE1	EEE1
F2E1	F6E1	FAE1	FEE1

d. Switches Set to Base I/O Address hex 62E1
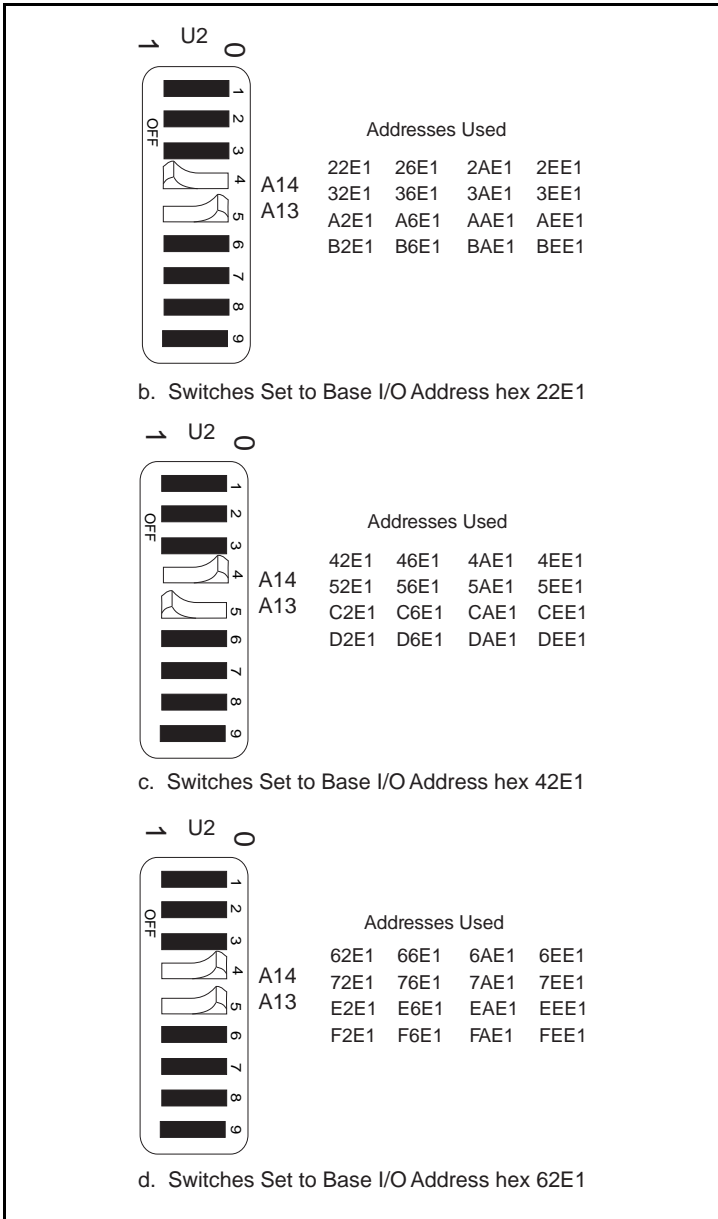
Figure C-4. Base I/O Address Switch Settings (Continued)

To change the base I/O address, locate the switches at U2, press each switch to the desired position, and check each switch to make sure it is pressed down all the way.

If you change the base I/O address setting from the default setting, record the new setting on the *GPIB-PCII/IIA Hardware and Software Configuration Form* in Appendix E, *Customer Communication*. Remember that you must run the IBDIAG diagnostic program and configure the software, as explained later in this appendix, after you change any hardware configuration settings.

Possible Conflicts

Table C-3 lists some of the I/O addresses used by other PC plug-in interface boards and adapters. This is not a complete list, but it may help in determining possible address conflicts. Symptoms of I/O address conflicts vary widely. At one extreme, conflicts can prevent the computer from booting. At the other extreme, they can cause problems that do not surface until a considerable amount of time has elapsed. When conflicts do surface, the problems can exhibit themselves simply as strange behavior.

National Instruments has made every effort to select a default base I/O address that will work. However, because of the numerous different interface boards available for use in the PC, it is not possible to select a base I/O address that is guaranteed to work in all systems.

Note: *In GPIB-PCII mode, eight consecutive addresses are used, while in GPIB-PCIIA mode, sixteen addresses spread throughout the upper address space are used.*

Table C-3. I/O Addresses Used by Other Devices

I/O Address Range (Hex)	Device
100 to 1EF	
1F0 to 1F8	IBM PC Fixed Disk
200 to 20F	PC and PC AT Game Controller, reserved
208	LIM Expanded Memory Card
210 to 217	PC Expansion Unit
210 to 213	AT-DIO-24
218	LIM Expanded Memory Card
219 to 21E	
21F	Reserved
220 to 23F	AT-MIO-16
240 to 25F	AT-DIO-32F
248	LIM Expanded Memory Card
258	LIM Expanded Memory Card
260 to 27F	LabPC (default)
259 to 267	
268	LIM Expanded Memory Card
269 to 277	
278 to 27F	AT Parallel Printer Port 2
280 to 29F	WD EtherCard + (default)
2A0 to 2A7	
2A8	LIM Expanded Memory Card
2A9 to 2AF	
2B0 to 2DF	PC, AT EGA (alternate)
2B8	LIM Expanded Memory Card, GPIB-PCII (base)
2B9 to 2BF	
2C0 to 2DF	AT-GPIB board 0 (default)
2E0 to 2FF	AT-GPIB board 1 (default)
2E1	IBM GPIB Adapter 0, GPIB-PCIIA (base)
2E2 to 2E3	IBM Data Acquisition Adapter 0
2E4 to 2E7	
2E8	LIM Expanded Memory Card
2E9 to 2F7	
2F8 to 2FF	PC, AT Serial Port 2 (COM2)

(continues)

Table C-3. I/O Addresses Used by Other Devices (Continued)

I/O Address Range (Hex)	Device
300 to 31F	PC, AT Prototype card
300 to 30F	3Com EtherLink (default)
320 to 32F	IBM PC/XT Fixed Disk Controller
330 to 347	
348 to 357	DCA 3278
358 to 35F	
360 to 363	PC Network (low address)
364 to 367	Reserved
368 to 36B	PC Network (high address)
36C to 36F	Reserved
370 to 377	
378 to 37F	PC, AT Parallel Printer Port 1
380 to 38C	SDLC Communications
380 to 389	Bisynchronous (BSC) Communications (alternate)
390 to 393	Cluster Adapter 0
394 to 39F	
3A0 to 3A9	Bisynchronous (BSC) Communications (primary)
3AA to 3AF	
3B0 to 3BF	Monochrome Display/Parallel Printer Adapter 0
3C0 to 3CF	Enhanced Graphics Adapter, VGA
3D0 to 3DF	Color/Graphics Monitor Adapter, VGA
3E0 to 3EF	
3F0 to 3F7	Diskette Controller
3F8 to 3FF	Serial Port 1 (COM1)

Interrupt Selection

The GPIB-PCII/IIA interface board can use any of six interrupt lines available on the PC, or no interrupts at all.   The interrupt line is selected using the jumper sets labeled IRQ2 through IRQ7 (see Figure C-1). The GPIB-PCII/IIA is set at the factory to use line 7. To select another interrupt line, place the supplied jumper across the two pins adjacent to the label designating that interrupt line. Figure C-5 shows the selection of interrupt line 7.
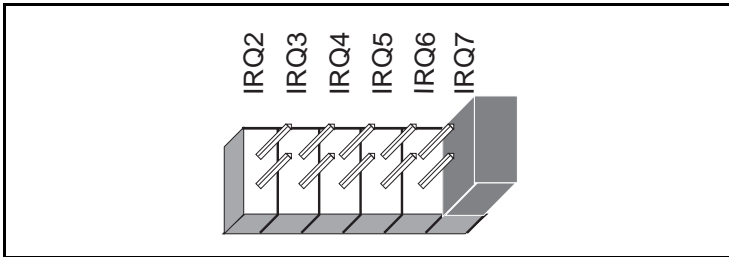
Figure C-5. Default Interrupt Jumper Setting for GPIB-PCII Mode

If you do not want to use interrupts, you must logically disconnect the GPIB-PCII/IIA from the IRQ lines by selecting NONE for the interrupt line when you run the software configuration program, as explained in *Step 3. Configure the Software*, later in this appendix. The board can remain in the backplane and no jumpers have to be moved or changed.

Shared Interrupts in GPIB-PCIIA Mode

Multiple GPIB-PCII/IIA boards can share the same interrupt level if they are all configured for GPIB-PCIIA mode.

If you use the GPIB-PCII/IIA in GPIB-PCIIA mode and you want to change the interrupt line, you must set switches I0, I1, and I2 in switch block U2 to the line setting in addition to setting the interrupt jumpers.

Figure C-6 shows the switch and jumper settings for the default interrupt setting, IRQ7, and shows how the interrupt setting was calculated from the switch positions. Figure C-7 shows the switch and jumper settings for the five remaining interrupt lines.
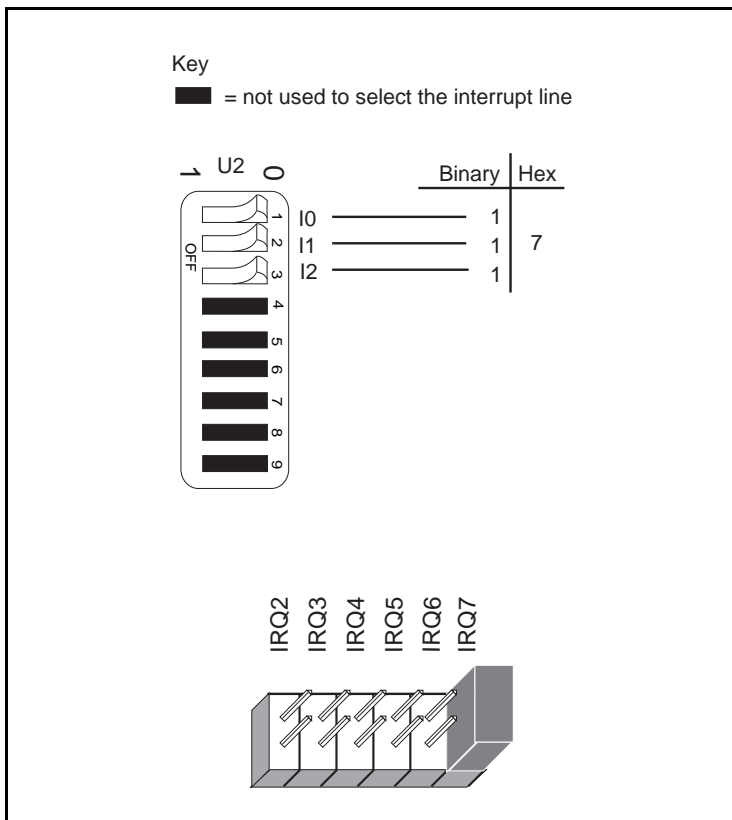

Figure C-6. Default Interrupt Jumper Setting for GPIB-PCIIA Mode
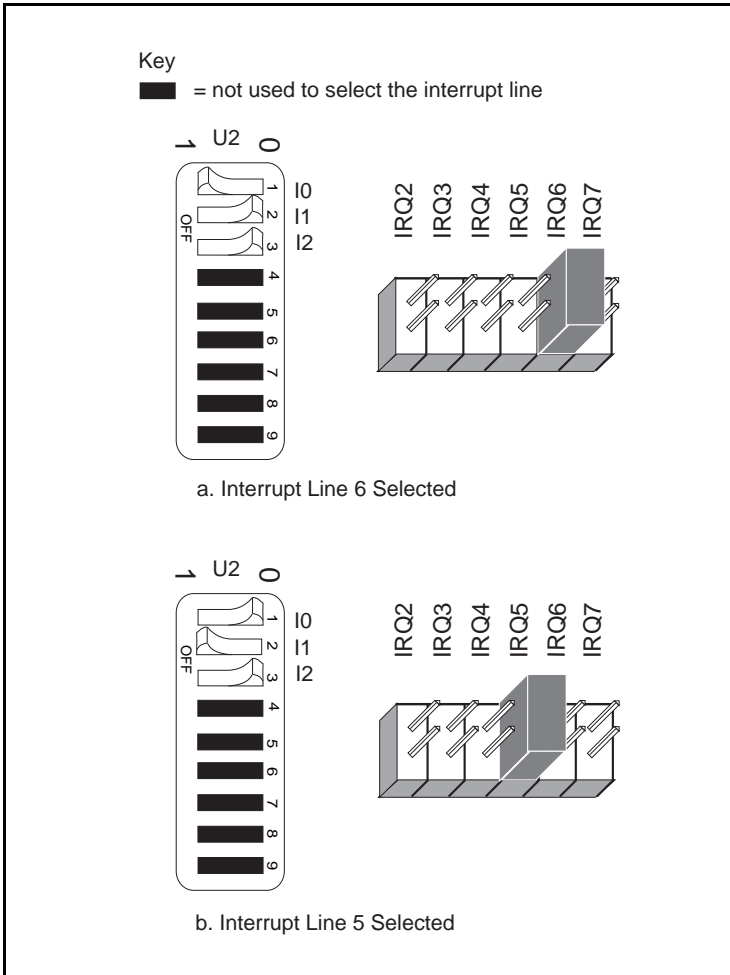
Figure C-7. Interrupt Jumper Settings for GPIB-PCIIA Mode (Continues)

c. Interrupt Line 4 Selected

d. Interrupt Line 3 Selected

e. Interrupt Line 2 Selected
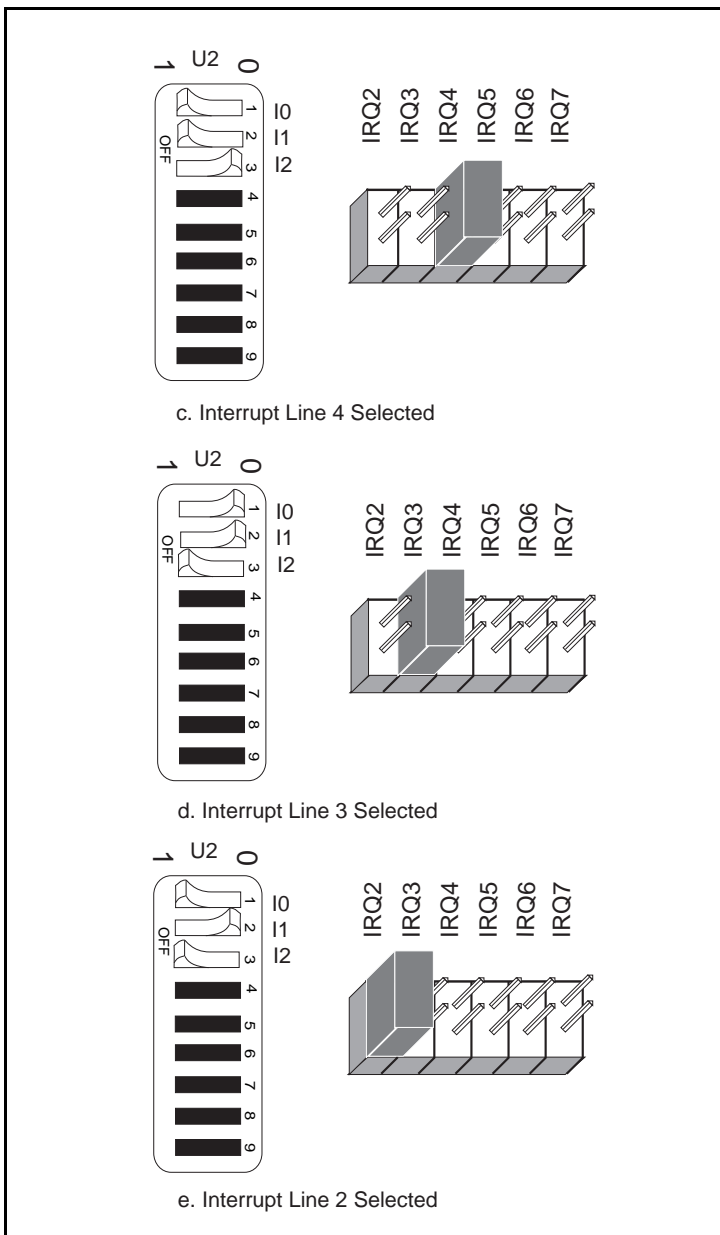
Figure C-7. Interrupt Jumper Settings for GPIB-PCIIA Mode (Continued)

If you change the interrupt jumper setting from the default setting, record the new setting on the *GPIB-PCII/IIA Hardware and Software Configuration Form* in Appendix E, *Customer Communication*. Remember that you must run the IBDIAG diagnostic program and configure the software, as explained later in this appendix, after you change any hardware configuration settings.

Possible Conflicts

Table C-4 lists some of the interrupt lines used by other PC plug-in interface boards and adapters. This is by no means a complete list, but it may help in determining possible interrupt conflicts. Symptoms of interrupt conflicts vary widely. Conflicts can prevent the computer from booting. They may also cause repeated time outs on GPIB function calls. When conflicts do surface, the problems can exhibit themselves simply as strange behavior.

National Instruments has made every effort to select a default interrupt line that will work. However, because of the numerous different interface boards available for use in the PC, it is not possible to select an interrupt line that is guaranteed to work in all systems. Therefore, be certain of your system's interrupt assignments before proceeding with installation.

Table C-4. Interrupt Lines Used by Other Devices

IRQ	Device
7	Parallel Port 1 Data Acquisition and Control (default) GPIB-PCII/IIA
6	Diskette Controller Fixed Disk and Diskette Drive
5	Parallel Port 2 PC-DIO-24 (default) LabPC (default)

(continues)

Table C-4. Interrupt Lines Used by Other Devices (Continued)

IRQ	Device
4	Serial Port 1 BSC BSC Alt. SDLC
3	Serial Port 2 BSC BSC Alt. Cluster (Primary) PC Network (default) PC Network Alt. (default) SDLC WD EtherCard + (default) 3Com EtherLink (default)
2	IRQ Chain for PC AT
1	Keyboard Controller Output Buffer Full
0	Timer Channel 0 Output

DMA Channel Selection

The GPIB-PCII/IIA can use DMA channels 1, 2, or 3, or no DMA at all. The DMA channel is selected by the jumper sets labeled DRQ1 through DACK 3 (see Figure C-1).

Each DMA channel consists of two signal lines, as shown in Table C-5.

Table C-5. DMA Channels for the GPIB-PCII/IIA

DMA Channel	Signal Lines	
	DMA Acknowledge	DMA Request
1	DACK1	DRQ1
2	DACK2	DRQ2
3	DACK3	DRQ3

You must position two jumpers to select a DMA channel. One jumper selects the DMA Request line, and the other selects the DMA Acknowledge line. You must move these two jumpers as a pair, and the DMA Acknowledge and DMA Request lines that you select must have the same numeric suffix for proper operation.

Figure C-8 shows the jumper position for the default DMA channel setting, DMA channel 1.
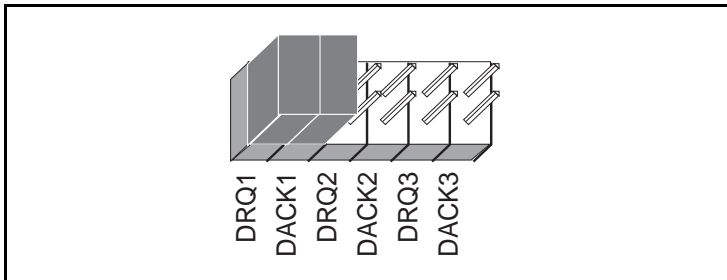
Figure C-8. DMA Channel Jumper Setting for DMA Channel 1

If you do not want to use DMA for GPIB transfers (the GPIB-PCII/IIA alternatively can use programmed I/O transfers), you must logically disconnect the GPIB-PCII/IIA from the DMA lines by selecting NONE for the DMA line when you run the software configuration program, as explained in *Step 3. Configure the Software*, later in this appendix. The board can remain in the back panel and no jumpers have to be moved or changed.

Note: *Disabling DMA will decrease performance substantially.*

If you change the DMA jumper setting from the default setting, record the new setting on the *GPIB-PCII/IIA Hardware and Software Configuration Form* in Appendix E, *Customer Communication*. Remember that you must run the IBDIAG diagnostic program and configure the software, as explained later in this appendix, after you change any hardware configuration settings.

Possible Conflicts

There are only three DMA channels that can be used by the GPIB-PCII/IIA interface board. If any device uses DMA channel 1, change the DMA channel used by either the GPIB-PCII/IIA or the other device to DMA channel 2 or 3. If no DMA channel is available, configure the software to run without DMA using the software configuration program.

Shield Ground Configuration

The GPIB-PCII/IIA is set at the factory with the jumper in place to connect the logic ground of the GPIB-PCII/IIA to its shield ground. This configuration minimizes the EMI emissions.

Caution: *The GPIB-PCII/IIA was tested for compliance with FCC standards with the shield ground connected to logic ground. Removing the jumper might cause EMI emissions to exceed any or all of the applicable standards.*

If your application requires that logic ground be disconnected from shield ground, refer to Figure C-1 to locate the shield ground jumper W1 on the GPIB-PCII/IIA. Remove the jumper and place it across only one of the jumper pins, as shown in Figure C-9.
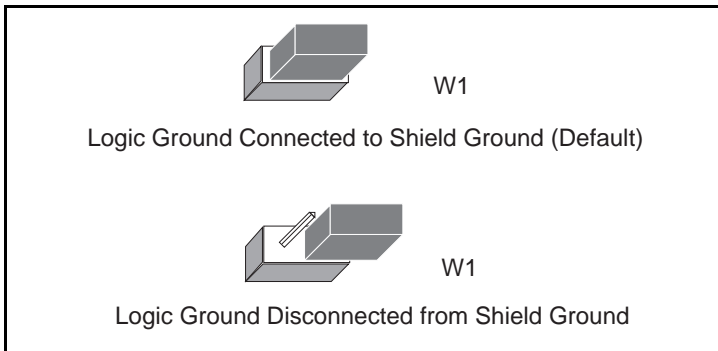
Figure C-9. Ground Configuration Jumper Settings

Be sure to record the jumper setting on the *GPIB-PCII/IIA Hardware and Software Configuration Form* in Appendix E, *Customer Communication*.

Step 2. Run the IBDIAG Diagnostic Program

If you have changed any hardware configuration settings, you *must* run the diagnostic program, IBDIAG, again. For instructions on running IBDIAG, refer to Appendix C, *Interactive Software Installation.*

Step 3. Configure the Software

If you have changed any hardware configuration settings, you *must* make appropriate changes to the NI-488.2 handler. To do so, you must run the configuration program, IBCONF or WIBCONF, and edit the board parameters (such as the base I/O address or interrupt line) that you have changed.

If you are using the NI-488.2 software for Windows, skip to *Configuring the Software for Windows*, later in this appendix. If you are using the NI-488.2 software for MS-DOS, proceed to the next section, *Configuring the Software for MS-DOS*.

Configuring the Software for MS-DOS

Use the software configuration program, IBCONF, to change or examine the configuration parameters of the NI-488.2 software handler file, GPIB.COM.

Perform the following steps to change a software parameter to match changes to the hardware configuration.

1. Run IBCONF by entering the following commands:

    ```
    cd \gpib-pc
    ibconf
    ```

2. Press any key to display the configuration map.

3. When the configuration map appears, make sure that GPIB0 is highlighted and press <F8> to edit the board configurations.

4. Using the arrow keys, move the highlight to the board parameter you want to change.

5. Use the arrow keys to change the value of the parameter to match the hardware configuration.

6. Press <F9> to stop editing.

7. Press <F9> once again to quit IBCONF.

8. IBCONF displays a prompt asking if you want to save your changes. Enter y for yes.

9. IBCONF displays a prompt asking if you want to update the handler in memory. Enter y for yes. In some cases, IBCONF instructs you to restart your computer.

Changes to other configurable parameters can be made in the same manner.

Configuring the Software for Windows

Use the software configuration program, WIBCONF, to change or examine the configuration parameters of the NI-488.2 software handler. WIBCONF is *not* a Windows application. You can run it to configure the software directly from Windows.

WIBCONF operates in much the same way as the NI-488.2 MS-DOS configuration program, IBCONF. However, the following differences exist between IBCONF for MS-DOS and WIBCONF for Windows:

•   Instead of configuring the handler file, GPIB.COM, WIBCONF actually modifies the configuration file, GPIB.INI.

•   Auto-configuration for NI-488.2 GPIB DLLs is not supported.

•   The option of configuring the loaded driver does not apply.

Perform the following steps to change a software parameter to match changes to the hardware configuration.

1.   Select the WIBCONF icon by double-clicking on it.

2.   WIBCONF displays a prompt asking for parameters. If you used the quick version of INSTALL, press <Enter>.

     If you used the interactive version of INSTALL and did not install the software in the default directory, C:\WINDOWS, enter the name of your Windows directory, such as E:\WINDOWS\GPIB.INI, for example.

3.   Press any key to display the configuration map.

4.   When the configuration map appears, make sure that GPIB0 is highlighted and press <F8> to edit the board configurations.

5.   Using the arrow keys, move the highlight to the board parameter you want to change.

6.   Use the arrow keys to change the value of the parameter to match the hardware configuration.

7. Press <F9> to stop editing.

8. Press <F9> once again to quit WIBCONF.

9. WIBCONF displays a prompt asking if you want to save your changes.
   Enter y for yes.

Changes to other configurable parameters can be made in the same manner.

Appendix D
Interactive Software Installation

This appendix contains instructions for running the interactive version of `INSTALL`.

By using he interactive version of `INSTALL`, you can change the default filenames and directories used in installation. Enter the following command to run `INSTALL`:

x:`install`

where *x* is the letter of the drive containing the distribution diskette.

`INSTALL` displays a main menu with three options: `DOS GPIB Installation`, `Windows GPIB Installation`, and `Return to DOS`.

If you are using the NI-488.2 software for Windows, skip to *INSTALL for Windows*, later in this appendix. If you are using the NI-488.2 software for MS-DOS, proceed to the following section, *INSTALL for MS-DOS*.

INSTALL for MS-DOS

Select `DOS GPIB Installation` from the main menu.

`INSTALL` displays a DOS installation menu with three options: `GPIB Installation`, `Diagnostics`, and `Return to DOS`.

If you have already installed the NI-488.2 software files and need to run `IBDIAG` again, skip to *Running IBDIAG for MS-DOS*, later in this section.

Installing the Software for MS-DOS

Select `GPIB Installation` to install the NI-488.2 software files.

`INSTALL` displays a screen asking you to confirm or change the default installation settings, the *destination directory* and the *boot drive*.

- The destination directory setting is the drive and directory name of the location to which `INSTALL` will copy the NI-488.2 software. The default value of this setting is `c:\gpib-pc`. In most cases, the drive name given in this field should be the drive off of which you start your computer.

- The boot drive setting is the drive name of the disk (hard disk or diskette) off of which you start your computer. If you start from a diskette, this field typically contains `A:` or `B:`. If you start from a hard disk, this field typically contains `C:`. The default value of this setting is `C:`.

To change these settings, use the arrow keys to move the highlight to the appropriate field and enter the new value. Press <Enter> to exit the menu.

`INSTALL` then checks the information you entered. If there is a problem accessing any of the specified drives, it displays an error message and prompts you to re-enter the offending setting. If there are no errors, `INSTALL` installs the software files.

Note: *Press <Esc> at any time to abort the installation.*

When the installation is complete, `INSTALL` asks to modify your `CONFIG.SYS` file. If you enter `yes`, `INSTALL` adds the following line to your `CONFIG.SYS` file:

`device=dir\gpib.com`

where `dir` is the destination directory. If you have a previous version of the NI-488 software installed on your computer, `INSTALL` replaces the old version's information in `CONFIG.SYS` with the new information.

If you enter `no` to the above prompt, `INSTALL` displays a message informing you of the correct line that you should add to your `CONFIG.SYS` file.

Running IBDIAG for MS-DOS

Upon completion of the software installation, INSTALL returns to the main menu. Select Diagnostics to run the hardware diagnostic program, IBDIAG. IBDIAG confirms that the hardware is functioning properly, and verifies that the software configuration settings are set correctly.

If IBDIAG returns an error message, check the GPIB-PCII/IIA to ensure that it is not connected to a GPIB cable. IBDIAG may not function properly if a cable is connected to the GPIB-PCII/IIA.

If IBDIAG still returns an error message, you may need to check the hardware configuration switch and jumper settings. Refer to Appendix C, *Hardware and Software Configuration*, for information on checking and changing the GPIB-PCII/IIA hardware configuration settings.

If there are no errors, INSTALL displays the DOS installation menu.

Exiting INSTALL

You have completed the interactive version of INSTALL for MS-DOS.

Select Return to DOS from the DOS installation menu to exit INSTALL. Proceed to *Step 2. Test the Software Installation* in Chapter 3, *Software Installation*, to complete the installation procedure.

INSTALL for Windows

Select Windows GPIB Installation from the main menu.

INSTALL displays a Windows installation menu with three options: Windows Installation, Diagnostics, and Return to Windows.

If you have already installed the NI-488.2 software files and need to run IBDIAG again, refer to *Running IBDIAG for Windows*, later in this section.

Installing the Software for Windows

Select `Windows Installation` to install the NI-488.2 software files.

`INSTALL` displays a screen asking you to confirm or change the default installation settings, the *destination directory* and the *Windows directory*.

- The destination directory setting is the drive and directory name of the location to which `INSTALL` will copy the NI-488.2 software. The default value of this setting is `c:\gpib-pcw`. In most cases, the drive name given in this field should be the drive off of which you start your computer.

- The Windows directory setting is the drive and directory name of the location to which `INSTALL` will copy the Windows GPIB software. The default value of this setting is `c:\windows`.

To change these settings, use the arrow keys to move the highlight to the appropriate field and enter the new value. Press <Enter> to exit the menu.

`INSTALL` then checks the information you entered. If there is a problem accessing any of the specified drives, it displays an error message and prompts you to re-enter the offending setting. If there are no errors, `INSTALL` installs the software files.

Note: *Press <Esc> at any time to abort the installation.*

Running IBDIAG for Windows

Upon completion of the software installation, `INSTALL` returns to the main menu. Select `Diagnostics` to run the hardware diagnostic program, `IBDIAG`. `IBDIAG` confirms that the hardware is functioning properly, and verifies that the software configuration settings are set correctly.

If `IBDIAG` returns an error message, check the GPIB-PCII/IIA to ensure that it is not connected to a GPIB cable. `IBDIAG` may not function properly if a cable is connected to the GPIB-PCII/IIA.

If `IBDIAG` still returns an error message, you may need to check the hardware configuration switch and jumper settings. Refer to Appendix C, *Hardware and Software Configuration*, for information on checking and changing the GPIB-PCII/IIA hardware configuration settings.

If there are no errors, `INSTALL` displays the Windows installation menu.

Exiting INSTALL

You have now completed the interactive version of `INSTALL` for Windows.

Select `Return to DOS` from the Windows installation menu to exit `INSTALL`. Proceed to *Step 2. Set Up the Windows Applications* in Chapter 3, *Software Installation*, to complete the installation procedure.

Appendix E
Customer Communication

For your convenience, this appendix contains forms to help you gather the information necessary to help us solve technical problems you might have as well as a form you can use to comment on the product documentation. Filling out a copy of the *Technical Support Form* before contacting National Instruments helps us help you better and faster.

National Instruments provides comprehensive technical assistance around the world. In the U.S. and Canada, applications engineers are available Monday through Friday from 8:00 a.m. to 6:00 p.m. (central time). In other countries, contact the nearest branch office. You may fax questions to us at any time.

Corporate Headquarters
(512) 795-8248
Technical support fax: (800) 328-2203
                          (512) 794-5678

Branch Offices	Phone Number	Fax Number
Australia	(03) 879 9422	(03) 879 9179
Austria	(0662) 435986	(0662) 437010-19
Belgium	02/757.00.20	02/757.03.11
Denmark	45 76 26 00	45 76 71 11
Finland	(90) 527 2321	(90) 502 2930
France	(1) 48 14 24 00	(1) 48 14 24 14
Germany	089/741 31 30	089/714 60 35
Italy	02/48301892	02/48301915
Japan	(03) 3788-1921	(03) 3788-1923
Mexico	95 800 010 0793	95 800 010 0793
Netherlands	03480-33466	03480-30673
Norway	32-848400	32-848600
Singapore	2265886 2265887	
Spain	(91) 640 0085	(91) 640 0533
Sweden	08-730 49 70	08-730 43 70
Switzerland	056/20 51 51	056/20 51 55
Taiwan	02 377 1200	02 737 4644
U.K.	0635 523545	0635 523154

Technical Support Form

Photocopy this form and update it each time you make changes to your software or hardware, and use the completed copy of this form as a reference for your current configuration. Completing this form accurately before contacting National Instruments for technical support helps our applications engineers answer your questions more efficiently.

If you are using any National Instruments hardware or software products related to this problem, include the configuration forms from their user manuals. Include additional pages if necessary.

Name _____

Company _____

Address _____

_____

Fax   (___)_____   Phone (___)_____

Computer brand _____

Model _____   Processor   _____

Operating system _____

Speed _____MHz   RAM _____MB

Display adapter _____

Mouse _____yes _____no

Other adapters installed _____

Hard disk capacity _____MB   Brand _____

Instruments used _____

National Instruments hardware product model _____

Revision _____

Configuration _____

(continues)

National Instruments software product _____

    Version _____

    Configuration _____

Application Program _____

    Version _____

    Graphics Devices Used _____

The problem is _____

_____

_____

_____

_____

_____

_____

List any error messages _____

_____

_____

_____

_____

_____

_____

The following steps will reproduce the problem _____

_____

_____

_____

_____

_____

_____

GPIB-PCII/IIA Hardware and Software Configuration Form

Record the settings and revisions of your hardware and software on the line located to the right of each item. Complete this form each time you revise your software or hardware configuration, and use this form as a reference for your current configuration. Completing this form accurately before contacting National Instruments for technical support helps our applications engineers answer your questions more efficiently.

National Instruments Products

- GPIB-PCII/IIA Hardware Revision _____

- GPIB-PC Mode of GPIB-PCII/IIA _____

- NI-488.2 Software Version Number on Disk _____

- Shield Ground Connected to Logic Ground (yes or no) _____

- Board Settings

	Base I/O Address	Interrupt Level	DMA Channel
gpib0	_____	_____	_____
gpib1	_____	_____	_____
gpib2	_____	_____	_____
gpib3	_____	_____	_____

- GPIB-PC Handler Type set in IBCONF or WIBCONF _____

- Interrupt Level set in IBCONF or WIBCONF _____

- DMA Channel set in IBCONF or WIBCONF _____

- Base I/O Address set in IBCONF or WIBCONF _____

- Shield Ground set in IBCONF or WIBCONF _____

Other Products

- Computer Make and Model _____

- Microprocessor _____

- Clock Frequency _____

- Type of Monitor Card Installed _____

- DOS or Windows Version _____

- Graphics Devices Used _____

- Application Program _____

    Version _____

- Other Boards in System _____

- Base I/O Addresses of Other Boards _____

- DMA Channels of Other Boards _____

- Interrupt Levels of Other Boards _____

Documentation Comment Form

National Instruments encourages you to comment on the documentation supplied with our products. This information helps us provide quality products to meet your needs.

Title: **Getting Started with Your GPIB-PCII/IIA and the NI-488.2™ Software for MS-DOS/Windows Graphics Applications**

Edition Date: **October 1994**

Part Number: **320269B-01**

Please comment on the completeness, clarity, and organization of the manual.

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(continues)

If you find errors in the manual, please record the page numbers and
describe the errors.

_____

_____

_____

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_____

_____

_____

_____

_____

_____

Thank you for your help.

Name _____

Title _____

Company _____

Address _____

_____

Phone   (_____)   _____

Mail to: Technical Publications
            National Instruments Corporation
            6504 Bridge Point Parkway, MS 53-02
            Austin, TX 78730-5039

Fax to: Technical Publications
            National Instruments Corporation
            MS 53-02
            (512) 794-5678

Glossary

Prefix	Meaning	Value
n-	nano-	10^{-9}
μ-	micro-	10^{-6}
m-	milli-	10^{-3}
c-	centi-	10^{-2}
M-	mega-	10^{6}

°	degrees
%	percent
A	amperes
AC	alternating current
ANSI	American National Standards Institute
ASCII	American Standard Code for Information Interchange
ASIC	application-specific integrated circuit
C	Celsius
DAV	Data Valid
DLL	dynamic link library
DMA	direct memory access
EMI	electromagnetic interference
EOI	end or identify
EOS	end of string
FCC	Federal Communications Commission
GPIB	General Purpose Interface Bus
hex	hexadecimal
Hz	hertz
IEEE	Institute of Electrical and Electronic Engineers
in	inches
I/O	input/output
m	meters
MB	megabytes of memory
PC	personal computer
RAM	random-access memory
s	seconds
VDC	volts direct current