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Getting Started with Your GPIB-PCIIB and the NI-488® Software for MS-DOS

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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-PCIIB board and the NI-488 software. This package is intended for use on IBM PC AT, PC/XT, and compatible computers. This manual is meant to be used with the *NI-488 MS-DOS Software Reference Manual*.

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Introduction*, lists what you need to get started and lists optional equipment.
- Chapter 2, *Hardware Configuration and Installation*, contains the instructions to configure and install the GPIB-PCIIB interface board.
- Chapter 3, *Software Installation and Configuration*, contains the instructions for installing and configuring the NI-488 software.
- Chapter 4, *Using Your GPIB-PCIIB*, recommends that you read specific chapters of the *NI-488 MS-DOS Software Reference Manual* when using your GPIB-PCIIB board.
- Appendix, *Customer Communication*, contains forms you can use to request help from National Instruments or to comment on our products and manuals.

Conventions Used in This Manual

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

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`	Lowercase 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.
<>	Angle brackets enclose the name of a key on the keyboard–for example, <PageDown>.
-	A hyphen between two or more key names enclosed in angle brackets denotes that you should simultaneously press the named keys–for example, <Control-Alt-Delete>.
<Enter>	Key names are capitalized.

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 the Appendix, *Customer Communication*, at the end of this manual.

Chapter 1
Introduction

This chapter lists what you need to get started and lists optional equipment.

What You Need to Get Started

❑ GPIB-PCIIB interface board

❑ One of the following:
3.5 in. NI-488 Distribution Disk for NI-488 MS-DOS Handler, BASICA, QuickBASIC, C*, and Universal Interfaces

or

5.25 in. NI-488 Distribution Disk for NI-488 MS-DOS Handler, BASICA, QuickBASIC, C*, and Universal Interfaces

* Microsoft C

Optional Equipment

You can call National Instruments to order the following optional equipment.

- Double-shielded GPIB cables*
  GPIB Type X2 cables (1 m, 2 m, or 4 m)

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

Chapter 2
Hardware Configuration and Installation

This chapter contains the instructions to configure and install the GPIB-PCIIB interface board.

Configuration

Figure 2-1 shows the location of the GPIB-PCIIB configuration jumpers and switches.

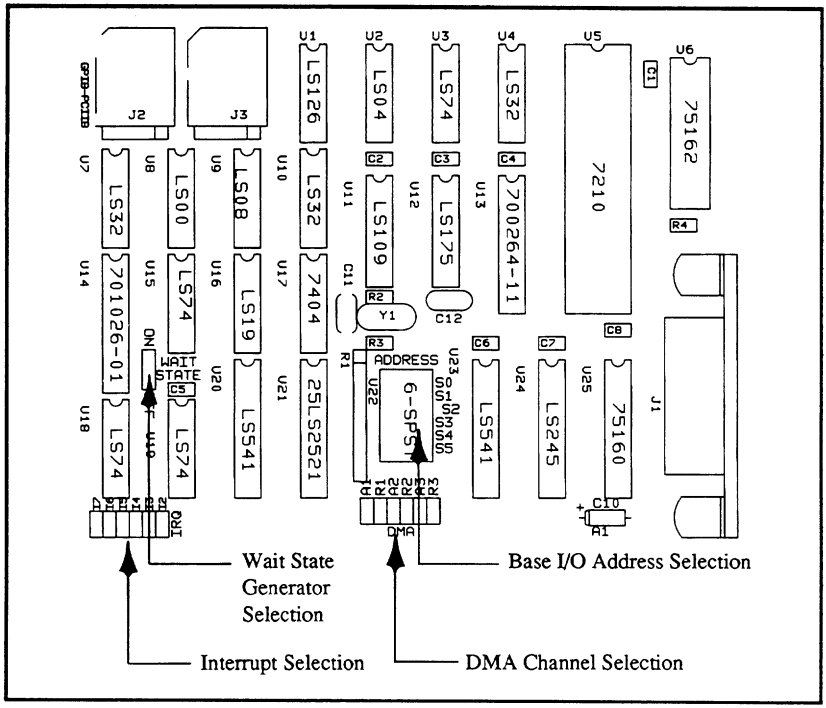


Figure 2-1. GPIB-PCIIB Parts Locator Diagram

The settings of the base I/O address, the interrupt line, and the DMA channel to which the GPIB-PCIIB was configured at the factory are suitable for most computer systems. These default settings must exactly match the software configurations in the NI-488 software.

Switch and Jumper Settings

Table 2-1 shows the factory settings and optional configurations for the switches and jumpers on the GPIB-PCIIB.

Table 2-1. Factory Default Settings and Optional Configurations

GPIB-PCIIB	Default	Optional
Base I/O Address (hex)	hex 2B0	000 - 3F0
DMA Channel	1	2, 3, Not Used
Interrupt Line (IRQ)	7	2, 3, 4, 5, 6, Not Used

If your computer is an IBM PC, PC/XT, or PC AT, the base address must be set higher than hex 200 or the computer will not recognize your GPIB-PCIIB board. Base addresses below hex 200 may work on some compatibles.

Base I/O Address Selection

The GPIB-PCIIB is programmed by the CPU by reading and writing eight consecutive addresses on the I/O channel. The base I/O address for the GPIB-PCIIB is determined by the switches at position U22. The switches are set at the factory for the I/O address 2B0 hex. The GPIB-PCIIB uses the I/O address space 2B0 through 2BF hex with this setting.

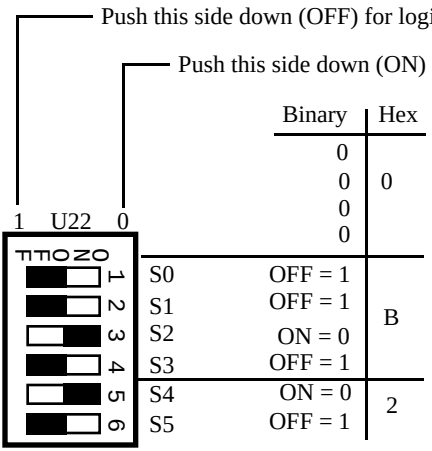
Note: ***Check to determine that this space is not already used by other equipment installed in your computer. If any equipment in your computer uses this I/O address space, change the base I/O address of either the GPIB-PCIIB or the other device. If the GPIB-PCIIB I/O address is changed, make a corresponding change to the GPIB-PCIIB software as described in the*** *Step 3. Configure the Software* ***section of Chapter 3.***

Press the side marked OFF to select a binary value of 1 for the corresponding address bit. Press the ON side of the switch to select a binary value of 0 for the corresponding address bit. Refer to Figure 2-2.

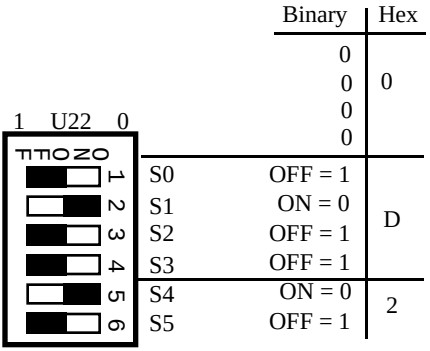
Figure 2-2 shows two possible switch settings. In this figure, the black side of the switch is the side you press down. Each of the address selections shows how the base I/O address was calculated from the switch positions.

Key

Black = side you must press down; Off = 1; On = 0



a. Switch Set to Default Setting (Base I/O Address 2B0)



b. Switch Set to Base Address 2D0

Figure 2-2. Base I/O Address Switch Settings

Interrupt Selection

The GPIB-PCIIB interface board can use one of six interrupt lines of the PC I/O channel. The interrupt line is selected by placing a jumper across the double rows of pins which are located at the lower left side of the GPIB-PCIIB (see Figure 2-1). You must select an interrupt line and place the jumper in the appropriate position to enable that line. The interrupt lines that the GPIB-PCIIB can use are I7, I6, I5, I4, I3, and I2.

Once you have selected an interrupt line, place the jumper on the appropriate pins to select the interrupt line. Figure 2-3 shows four of the allowable jumper configurations.

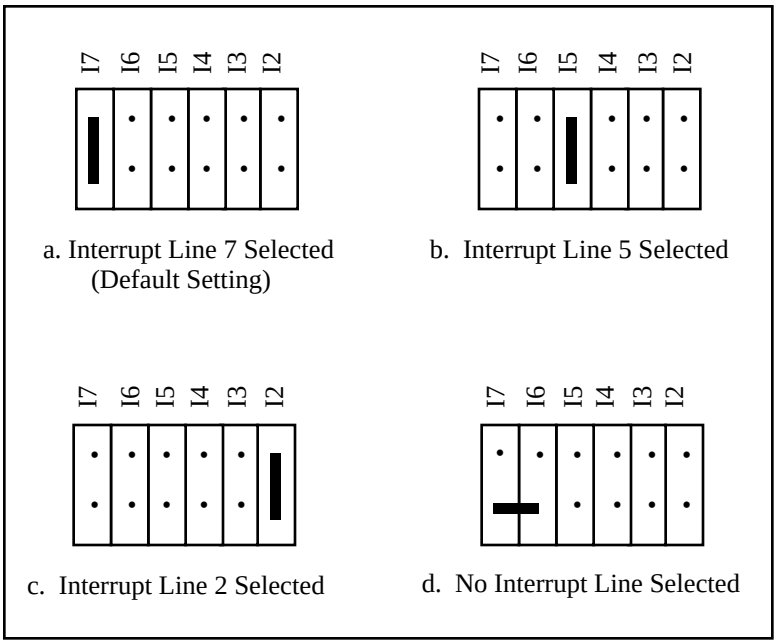


Figure 2-3. Interrupt Jumper Setting Options

DMA Channel Selection

The DMA channel used by the GPIB-PCIIB is selected by jumpers located at the lower center of the interface board (see Figure 2-1). The GPIB-PCIIB is set at the factory to use DMA channel 1. Verify that this DMA channel is not also used by equipment already installed in your computer. If any device uses DMA channel 1, change the DMA channel used by either the GPIB-PCIIB or the other device. The GPIB-PCIIB hardware can use DMA channels 1, 2, or 3, or no channel at all. Each DMA channel consists of two signal lines as shown in Table 2-2.

Table 2-2. DMA Channels for the GPIB-PCIIB

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

Two jumpers must be positioned to select a DMA channel. The DMA Acknowledge and DMA Request lines selected must have the same numeric suffix for proper operation. Figure 2-4 displays the jumper position options.

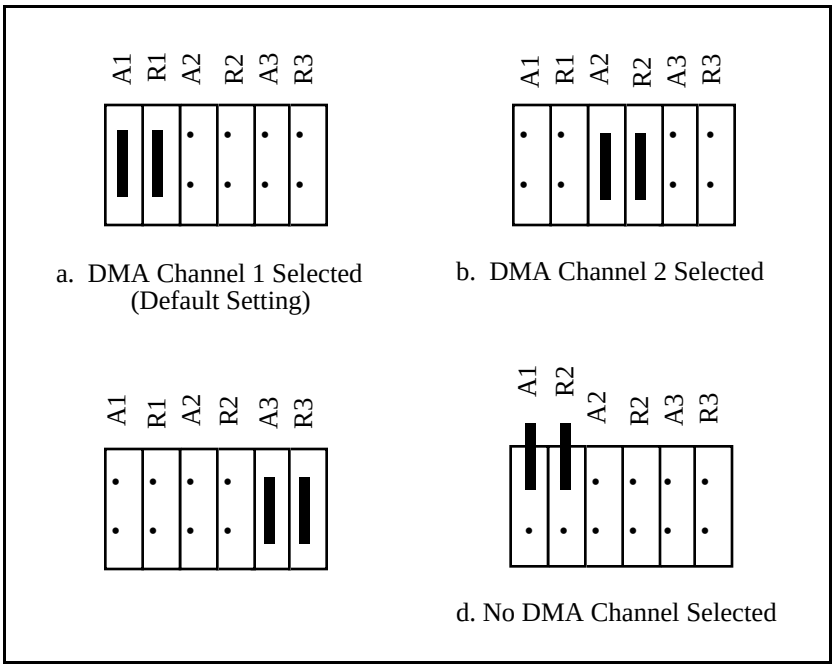
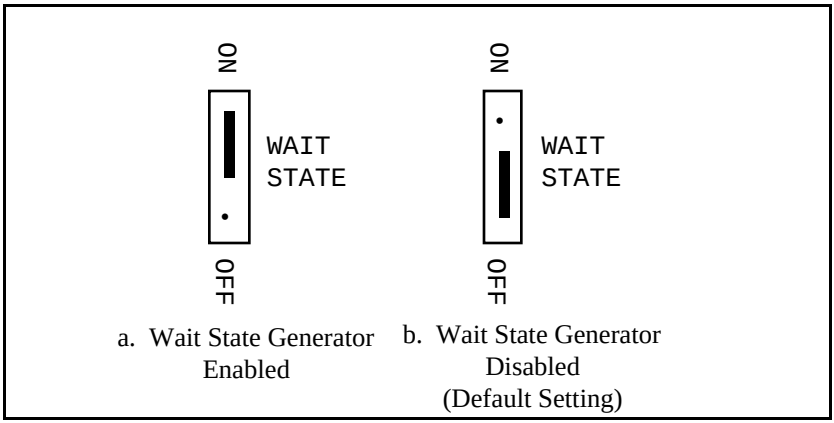


Figure 2-4. DMA Channel Jumper Setting Options

Wait State Generator

Note: ***The wait state generator is not located on revisions of the GPIB-PCIIB interface board earlier than Revision B.***

To configure the GPIB-PCIIB to generate wait states, you must move the wait state generator jumper (see Figure 2-1) to the enabled position. Enabling the wait state generator guarantees that the timing requirements of the GPIB-PCIIB are met on computers with very fast I/O cycles (less than 180 nsec). The default configuration setting for the wait state generator is at the disabled position as almost all personal computers already have sufficiently long I/O cycles. Figure 2-5 shows the two possible settings for the wait state generator.



a. Wait State Generator Enabled

b. Wait State Generator Disabled (Default Setting)

Figure 2-5. Wait State Generator Settings

In the space provided here, record the new settings of the base I/O address, the DMA channel, the interrupt line, and the wait state generator so that you will have them handy when you install the software.

GPIB-PCIIB	**New Setting**
Base I/O Address:	_____
DMA Channel:	_____
Interrupt Line:	_____
Wait State Generator:	_____

Installation

The GPIB-PCIIB can be installed in any unused expansion slot in your computer. After you change (if needed), verify, and record the switches and jumper settings, you are ready to install the GPIB-PCIIB.

The following steps are general installation instructions. Consult the user manual or technical reference manual of your personal computer for specific instructions and warnings.

1. Turn off your computer.
2. Remove the top cover or access port to the I/O channel.
3. Remove the expansion slot cover on the back panel of the computer.
4. Insert the GPIB-PCIIB in an unused slot with the IEEE-488 receptacle sticking out the opening of the back panel. It may be a tight fit, but do not force the board in place.
5. Screw the mounting bracket of the GPIB-PCIIB to the back panel rail of the computer.
6. Check the installation.
7. Replace the top cover or access port to the computer.
8. Connect the GPIB cable to the GPIB-PCIIB.

The GPIB-PCIIB interface board is now installed and ready for verification testing.

Chapter 3
Software Installation and Configuration

This chapter contains the instructions to install and configure the NI-488 software.

The NI-488 Software Package

Before installing the software, you should review the files on your NI-488 distribution diskette to gain an understanding of what they are.

Main Programs and Files

The following programs and files are required to program the GPIB-PCIIB from BASICA, QuickBASIC, Microsoft C, or Universal interface using the NI-488 software handler:

- `GPIB.COM` is the NI-488 software handler file that is loaded at system startup by the Disk Operating System. *Handler* is a term used by National Instruments to refer to a loadable device driver.
- `ULI.COM` is the Universal Language Interface software driver file needed to use the Universal Language Interface Using HP-Style Calls option of the NI-488 software package.
- `BIB.M` is a binary language interface file that gives an application program written in BASICA access to the NI-488 handler.
- `QBIB*.OBJ` is a binary language interface file that gives an application program written in QuickBASIC access to the NI-488 handler. (`*` represents the version number corresponding to the QuickBASIC version that it interfaces with.)
- `MCIB*.OBJ` is a binary language interface file that gives an application program written in Microsoft C access to the NI-488 handler. (`*` represents the memory model that the Microsoft C application will use.)

- DECL.BAS is a declaration file that contains code to be placed at the beginning of BASICA application programs.

- QBDECL.BAS is a declaration file that contains code to be placed at the beginning of the QuickBASIC application programs.

- DECL.H is a declaration file that contains code to be included at the beginning of Microsoft C application programs.

Additional Programs and Files

The following programs and files are used to install the NI-488 software, diagnose hardware and software problems, and provide examples for programming from BASICA, QuickBASIC, Microsoft C, and Universal interfaces:

- IBDIAG.EXE is a program that you can use to test the hardware installation. It is called by IBSTART.BAT after the handler is installed, or can be accessed directly at the DOS command line.

- IBSTART.BAT is a batch file that you can use to install the NI-488 software. It is a multipurpose program that performs the software installation. It copies files, modifies CONFIG.SYS (the MS-DOS system configuration file) using MKCFG.EXE, and tests the hardware using IBDIAG.EXE.

- IBTEST.EXE is a program that you can use to test the installation of the NI-488 software.

- IBCONF.EXE is a software configuration program that you can use to change the configuration parameters of the NI-488 software handler.

- IBIC.EXE is an interactive control program that executes functions you enter from the keyboard. It helps you to learn the functions, to program your instrument or other GPIB device, and to develop your application program.

- APPMON.COM is the applications monitor program. It is a resident program that is useful in debugging your application. The applications monitor can halt program execution (trap) on return from GPIB driver calls, so that you can inspect function arguments, buffers, return values,

GPIB global variables, and other pertinent data. The applications monitor performs automatic error detection.

- `IBTRAP.EXE` is a program that configures the applications monitor.

- `BTEST.BAS`, `CTEST.C`, and `PTEST.PAS` are example programs to use with the Universal Language Interface.

Readme files are included on the distribution diskette. `README.DOC` discusses the GPIB-PCIIB software handler. The remaining Readme files discuss programming considerations for different versions of QuickBASIC and Microsoft C.

Example programs are also included on the distribution diskette. Refer to the `README.DOC` file for a complete list of these example programs.

Installing the Software

The NI-488 distribution diskette has a batch file named `IBSTART.BAT` that installs the NI-488 software for you. The term *startup disk* refers to the hard disk or diskette that contains MS-DOS. The startup disk is read by your computer when you power-on or restart your computer.

Step 1. Preparation

Your first step depends on whether you start from a diskette or a hard disk. Perform the step that applies to your system.

- **Starting from a Diskette**

  If you start MS-DOS from a diskette, your startup diskette must have enough free space to hold a copy of the NI-488 software that is located on the distribution diskette.

  Insert the startup diskette into the primary drive (usually named `A:`) and the distribution diskette into the secondary drive (usually named `B:`). Start your system if you have not already done so.

- **Starting from a Hard Disk**

  If you start MS-DOS from a hard disk, the hard disk must have enough free space to hold a copy of the NI-488 software that is located on the distribution diskette.

  Start your system. Then insert the NI-488 distribution diskette into a diskette drive.

Step 2. Run IBSTART

Accessing IBSTART

After starting the computer, run `IBSTART` from the NI-488 distribution diskette by first entering the following command:

```
y:
```

where you replace `y` with the letter of the distribution diskette drive, and then entering the following command:

```
ibstart x:
```

where you replace `x` with the letter of the startup drive.

For example, if the NI-488 distribution diskette is in drive `B` and you have started up from drive `C`, enter the following command to switch to drive `B`:

```
b:
```

Next, enter the following command to run the `IBSTART.BAT` batch file:

```
ibstart c:
```

Running IBSTART

`IBSTART` first creates a directory named `GPIB-PC` on the startup disk, then copies the NI-488 software to that directory, except for the files `GPIB.COM` and `IBCONF.EXE`, which are copied to the root directory.

If the `insufficient disk space` message appears, abort the `IBSTART` program by pressing <Ctrl-C>.

Note: ***You may press <Ctrl-C> at any time to abort the `IBSTART` program.***

Increase the free space on your startup drive and run `IBSTART` again. You can increase the free space on your startup drive by deleting some files from the startup drive. If you wish to keep the files, you can save them on a diskette that you did not start from.

Next, `IBSTART` creates or modifies the DOS system configuration file `CONFIG.SYS` to contain the line

```
DEVICE = GPIB.COM
```

`GPIB.COM` is the name of the software handler file. By reading this `CONFIG.SYS` file at startup time, DOS installs device drivers and handlers.

Next, `IBSTART` leads you through a hardware diagnostics check for the GPIB-PCIIB interface board using the program `IBDIAG.EXE`.

- Simply press <Enter> in response to each of the prompts. For each hardware setting that you changed, type in the correct value and then press <Enter> to enter the value and cause the next prompt to display. (Refer to the settings you recorded in Chapter 2.)

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

- Check the hardware configuration (switch and jumper settings) to ensure that:
  - the hardware configuration settings are the same as the values you entered when prompted by the `IBDIAG` program.
  - the hardware configuration settings are not configured to the same setting as another board or device in your computer. Try reconfiguring the hardware and run `IBDIAG` again.
- Check the GPIB-PCIIB to ensure that it is not connected to a GPIB device. `IBDIAG` requires that the GPIB-PCIIB interface board *not* be connected to a GPIB device.

If you have performed these steps and `IBSTART` still fails, complete the *GPIB-PCIIB Hardware and Software Configuration Form* in the Appendix and then call National Instruments for technical support.

If the diagnostics passed, you can proceed through the remainder of this chapter.

Finally, `IBSTART` advises you to do the following:

- Run `IBCONF` if you must reconfigure the software.
- Restart your system to load the handler into DOS.
- Run `IBTEST.EXE` to test the software configuration.

Step 3. Configure the Software (Optional)

Note: ***If you are not using default configuration settings, you must complete this step. This step is not required if you are using default configuration settings.***

The file `IBCONF.EXE`, located on your NI-488 distribution diskette, can be used to change or examine the configuration parameters of the NI-488 software handler `GPIB.COM`.

1. If you have to change default configurations, run `IBCONF` by entering the following commands:

   ```
   cd\
   ibconf
   ```

2. Press any key to remove the startup screen.
3. Once the configuration map appears, make sure that `GPIB0` is highlighted and then press <F8> to edit the board configurations.
4. Use the Up and Down arrow keys to move the highlight among the configurable board parameters.

5. The configurable parameters can be changed by one of two methods, as described in the prompt field.

   ```
   ENTER (directly from keyboard)
   ```

   or

   ```
   SELECT (use right/left arrow keys)
   ```

6. Press <F9> to end edit.

7. Press <F9> once again to quit.

8. `IBCONF` will then display a prompt asking if you want to save your changes. Enter *y* for yes.

All board and device configurable parameters can be altered in this manner. See Section Two of the *NI-488 MS-DOS Software Reference Manual* for more information on how to run `IBCONF` and on the configurable software parameters and their default values. There is also some additional information on `IBCONF` later in this chapter.

Step 4. Restart (Optional)

You *must* restart your computer if you have made any changes using `IBCONF` as explained in *Step 3*.

Restart your computer from the startup drive you specified when you ran `IBSTART` by pressing <Ctrl-Alt-Del> so that DOS will load the modified handler `GPIB.COM`.

Step 5. Test the Software Installation

The file IBTEST.EXE on your NI-488 distribution diskette is a program that tests the installation of the software. Run IBTEST from the GPIB-PC directory created by IBSTART by entering the following commands:

```
cd \GPIB-PC
ibtest
```

If errors occur, then check the following:

- Is the handler configured for your model GPIB?
- Did you change any of the hardware configurations on the GPIB interface board? If so, check the current configurations of the GPIB board in IBCONF. Make sure that the hardware settings match the software configurations in IBCONF. If you make changes in IBCONF, make sure you save them and restart your computer (refer to *Step 3* and *Step 4*).
- Are the GPIB.COM and CONFIG.SYS files installed in the root directory of your startup drive? If not, put them in your root directory and restart the computer. The following line must appear in your CONFIG.SYS file:

  ```
  DEVICE = GPIB.COM
  ```

- Did you restart your system before you ran IBTEST? If not, do so now (refer to *Step 4*).

If you have completed this checklist and IBTEST still fails, complete the *GPIB-PCIIB Hardware and Software Configuration Form* in the Appendix and then call National Instruments for technical support.

If no errors occur, you can proceed to learn how to use the software and to develop your application program.

Step 6. Developing Your Application Program

The easiest way to learn how to communicate with your instrument is by controlling it interactively. Located in your GPIB-PC directory is an interactive control program entitled `IBIC.EXE`. This program allows you to write to and read from your instrument while it updates the status of these GPIB transfers and displays any errors that occur.

To use this program, connect your instrument to the bus and enter the following commands:

```
cd \GPIB-PC
IBIC
```

Then begin entering NI-488 commands as described in Section Five of the *NI-488 MS-DOS Software Reference Manual*.

More About IBCONF

You use `IBCONF` to edit the description in the handler file of characteristics of the devices and boards in the system. Running `IBCONF` to place this information directly in the handler file eliminates having to restate it inside each application program.

`IBCONF` passes two groups of features to the handler. The first group consists of the characteristics of the instruments or devices attached to your GPIB-PCIIB board. The second group consists of the characteristics of each GPIB-PCIIB board installed in the computer.

Characteristics of the Instruments

Each instrument used with the GPIB-PCIIB board has the following characteristics:

- A symbolic name of each device on the GPIB (such as `DEV5` or `PS5010`).
- A GPIB-PCIIB access board for each device (for example, `GPIB0`). The access board is discussed in *Characteristics of Each GPIB-PCIIB*.
- 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 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 messages only when a predetermined number of bytes are sent or received.

Characteristics of Each GPIB-PCIIB Board

Each GPIB-PCIIB board has the following characteristics:

- A symbolic name (such as `GPIB0` or `GPIB1`).

- A GPIB primary and, possibly, a secondary address.

- A computer I/O address.

- 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 or normal timing when transmitting data to a device. With normal timing, there is a delay of at least 2 µsec 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 nsec. High-speed timing is strongly recommended.

- The ability to disable device unaddressing.

Default Configurations

The software has factory default configurations. For example, the default device names of the 16 GPIB devices are `DEV1` through `DEV16`, but you can choose to assign more descriptive names to each device, such as `METER` for a digital multimeter. Do not, however, give a GPIB device the same name as a directory or file on your diskette drive.

You can also use `IBCONF` to look at the current default settings in the handler file.

Note: ***If you do not make changes using `IBCONF`, default characteristics of the software remain in effect.***

Primary Default Characteristics

The following are the primary default characteristics of the handler:

- There are 16 active devices with symbolic names `DEV1` through `DEV16`.
- GPIB addresses of these devices are the same as the device number–for example, `DEV1` is at address 1.
- The 16 devices are assigned to `GPIB0` as their access board. `GPIB0` is the symbolic name of the first GPIB-PCIIB board in your system. If you have an additional GPIB-PCIIB board in your system, its symbolic name is `GPIB1`.
- Each GPIB-PCIIB board 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 sec.
- `GPIB0` is a GPIB-PCIIB board at base I/O address 02B0 hex, using DMA channel 1 and no interrupt line.

Specific Board Characteristics of IBCONF for the GPIB-PCIIB

In addition to the board and device characteristics of `IBCONF` listed in Section Two of the *NI-488 MS-DOS Software Reference Manual*, the GPIB-PCIIB handler has the following option.

Disable Device Unaddressing (Board Characteristic Only)

Normally, devices are unaddressed upon completion of a device function by sending the Untalk (UNT) and Unlisten (UNL) interface commands. A *yes* response to this field eliminates this unaddressing on device functions. The default option for this characteristic is *no*.

Running IBCONF

When you ran `IBSTART`, a copy of `IBCONF.EXE` was placed on your startup drive.

To run `IBCONF`, go to the root directory of the startup drive and enter the following command:

```
ibconf
```

`IBCONF` scans the handler file, `GPIB.COM`, and reads its data structures into memory. After you press any key, the program then displays the device map for board `GPIB0`.

Modify only the copy of `GPIB.COM` created by `IBSTART` in your root directory—that is, always run `IBCONF` from your root directory. Never modify the master copy by running `IBCONF` from the distribution diskette with the distribution diskette not write-protected.

Exiting IBCONF

Once all changes have been made, exit `IBCONF` by pressing the function key <F9>. The program first asks if it should `Save changes?` before exiting. Typing a *y* response causes the changes to be written to the file on disk. Before exiting, the program checks for situations that may cause problems such as the following:

- GPIB addressing conflict between a device and its access board.
- GPIB boards not present in the host machine at the specified address.
- Timeouts disabled on a device or board.

If any of the these situations is encountered, you are notified and given the option of re-entering or exiting `IBCONF`. To disable automatic checking when starting `IBCONF`, enter the following command:

```
ibconf –e
```

After exiting, the system *must* be restarted for the new values to take effect.

Chapter 4
Using Your GPIB-PCIIB

Now that your software and hardware are installed, read Section Three of the *NI-488 MS-DOS Software Reference Manual* for a description of the NI-488 function groups available for the GPIB-PCIIB. The functions are described in the order you will most likely use them. Pay special attention to the device functions, which are found in Group I, Group II, and Group III. Read Section Four of the *NI-488 MS-DOS Software Reference Manual* for a detailed description of the NI-488 software.

After reading about these functions and their capabilities, practice using them with your programmable instrument or device in an interactive environment using the `IBIC` program described in Section Five of the *NI-488 MS-DOS Software Reference Manual*.

Appendix
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.

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Germany	089/741 31 30	089/714 60 35
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Japan	(03) 3788-1921	(03) 3788-1923
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Norway	32-848400	32-848600
Spain	(91) 640 0085	(91) 640 0533
Sweden	08-730 49 70	08-730 43 70
Switzerland	056/20 51 51	056/27 00 25
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 _____

The problem is _____

_____

_____

_____

_____

_____

_____

_____

List any error messages _____

_____

_____

_____

_____

_____

_____

_____

The following steps will reproduce the problem _____

_____

_____

_____

_____

_____

_____

GPIB-PCIIB Hardware and Software Configuration Form

Record the settings and revisions of your hardware and software on the line to the right of each item. Complete a new copy of 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-PC Model : _____
- NI-488 Software Revision Number on Disk _____
  (Disk Label: *NI-488 Distribution Disk for MS-DOS Handler with BASICA and QuickBASIC Language Interfaces*)
- Application Programming Language (BASICA, QuickBASIC, C, Pascal, and so on) _____
- Programming Language Interface Revision _____
- Interrupt Level of GPIB-PCIIB _____
- DMA Channel of GPIB-PCIIB _____
- Base I/O Address of GPIB-PCIIB _____

Other Products

- Computer Make and Model _____
- Microprocessor: _____

- Clock Frequency _____
- Type of Monitor Card Installed _____
- DOS Version : _____
- Programming Language Version _____
- Other Boards in System _____
- Base I/O Address of Other Boards _____
- DMA Channels of Other Boards _____
- Interrupt Level 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-PCIIB and the NI-488® Software for MS-DOS**

Edition Date: **June 1994**

Part Number: **320226B-01**

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

(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.

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Glossary

Prefix	Meaning	Value
n-	nano-	10^{-9}
μ-	micro-	10^{-6}

hex	hexadecimal
in.	inch
m	meter
sec	second

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