Getting Started with Your GPIB-1284CT and the NI-488.2™ Software for DOS

June 1994 Edition

Part Number 320644-01

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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 A digital device. Operation is subject to the following two conditions:

1. This device may not cause harmful interference in commercial environments.

2. This device must accept any interference received, including interference that may cause undesired operation.

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 A 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 harmful interference from the equipment to radio reception in commercial areas. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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-1284CT parallel-to-GPIB Controller and NI-488.2 software for DOS. This manual assumes that you are already familiar with DOS.

How to Use the Manual Set
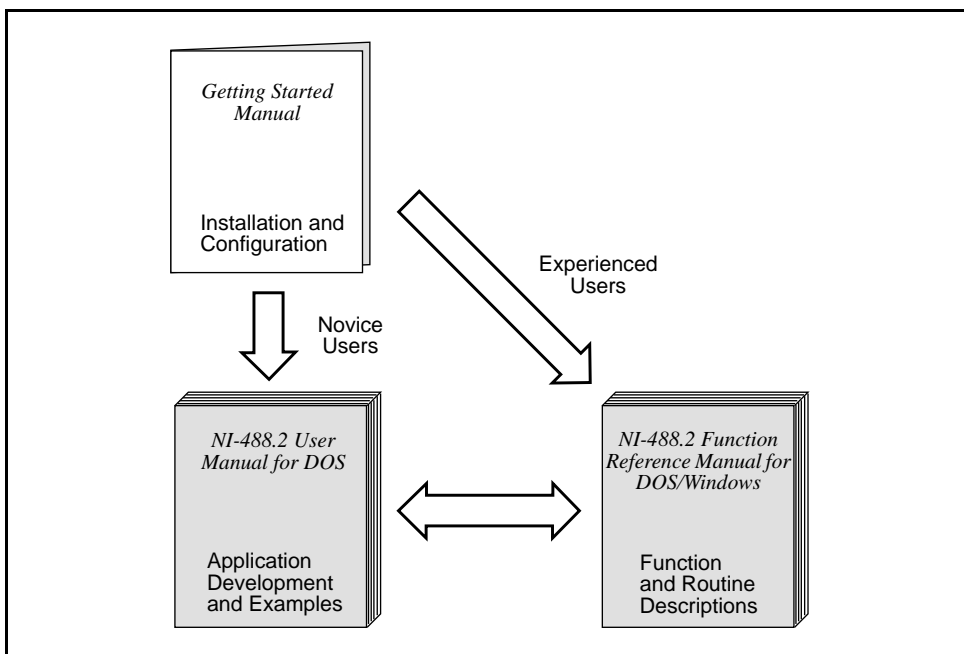
Use this getting started manual to install and configure your GPIB hardware and NI-488.2 software for DOS.

Use the *NI-488.2 User Manual for DOS* to learn the basics of GPIB and how to develop an application program. The user manual also contains debugging information and detailed examples.

Use the *NI-488.2 Function Reference Manual for DOS/Windows* for specific information, such as format, parameters, and possible errors, for each NI-488 function and NI-488.2 routine.

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Introduction*, explains how to use this manual, lists what you need to get started, and gives a brief overview of the GPIB-1284CT hardware and NI-488.2 software.

- Chapter 2, *Hardware Installation*, contains instructions for connecting your GPIB-1284CT to your computer.

- Chapter 3, *Software Installation and Configuration*, contains instructions for installing and configuring your NI-488.2 software.

- Chapter 4, *Installation Verification and Troubleshooting*, explains how to verify the hardware and software installation and troubleshoot problems.

- Chapter 5, *Using Your NI-488.2 Software,* describes the `ibic` utility and lists some programming considerations.

- Appendix A, *Hardware Specifications*, specifies the electrical, environmental, and physical characteristics of the GPIB-1284CT and the recommended operating conditions.

- Appendix B, *The ctupdate Utility*, contains information on the `ctupdate` utility for the GPIB-1284CT.

- Appendix C, *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

The following conventions are used in this manual.

bold	Bold text denotes LEDs.
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, directories, programs, subprograms, subroutines, device names, functions, variables, field names, and filenames.
bold monospace	Bold text in this font denotes the messages and responses that the computer automatically prints to the screen.
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, <PageDown>.
<Enter>	Key names are capitalized.
IEEE 488 and IEEE 488.2	IEEE 488 and IEEE 488.2 refer to the ANSI/IEEE Standard 488.1-1987 and 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*

*   ANSI/IEEE Standard P1284, *Standard Signaling Method for a Bi-directional Parallel Peripheral Interface for Personal Computers*

*   *Microsoft MS-DOS 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 C, *Customer Communication*, at the end of this manual.

Chapter 1
Introduction

This chapter explains how to use this manual, lists what you need to get started, and gives a brief overview of the GPIB-1284CT hardware and NI-488.2 software.

How to Use This Manual

Chapter 1	(Gather What You Need to Get Started)
Chapter 2	Install the Hardware
Chapter 3	Install the Software → Need to Change Software Settings? — Yes → Configure the Software / No ↓
Chapter 4	Verify the Installation → Passes? — No → Troubleshooting / Yes ↓
Chapter 5	Run ibic → Review Programming Considerations
User Manual and Function Reference Manual	(Write Application Program)
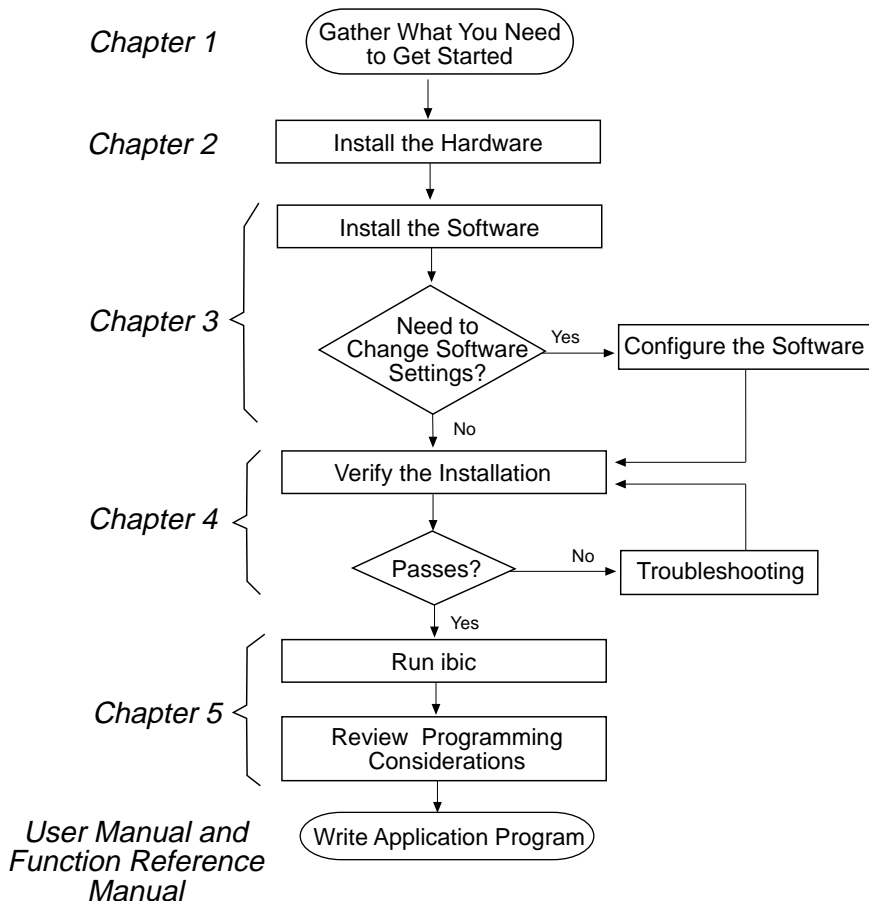
What You Need to Get Started

❏ One of the following boxes:
   GPIB-1284CT AC version, 100 to 120 VAC
   GPIB-1284CT AC version, 220 to 240 VAC
   GPIB-1284CT DC version

❏ *NI-488.2 Software for DOS. Distribution Disk for the GPIB-1284CT.*
   3.5 in.
   or
   5.25 in.

❏ If you have the GPIB-1284CT AC version, you need one of the following power cords:
   U.S.A. standard power cord
   Switzerland power cord
   Australian power cord
   Universal European power cord
   North American power cord
   U.K. power cord

❏ If you have the GPIB-1284CT DC version, you need one of the following:
   9 V wall-mount power supply, 100 to 120 VAC
   9 V wall-mount power supply, 220 to 240 VAC
   External keyboard connector DC power cable

❏ MS-DOS (version 3.3 or higher) or equivalent installed on your computer

❏ Parallel cables
   Refer to the *Optional Equipment* section of this chapter for information on
   National Instruments parallel cables that you can order.

Optional Equipment

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

- Paral lel Cables
      25 pin D-Sub to 25-pin D-Sub (1 m or 2 m)

- GPIB Bus Extenders
      GPIB-130, 100 to 120 VAC
      GPIB-130, 220 to 240 VAC

- Shielded GPIB Cables*
      Type X1 Single-Shielded Cable (1 m, 2 m, or 4 m)
      Type X2 Cable Double-Shielded Cable (1 m, 2 m, or 4 m)

   *   To meet FCC emission limits for a Class A 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 commercial
       areas.

Hardware Description

The GPIB-1284CT is a high-performance parallel-to-GPIB interface. Using a
GPIB-1284CT, any PC AT compatible computer with a parallel port can become a
Controller, Talker, or Listener on the GPIB. The GPIB-1284CT has all the logic required
to implement the physical and electrical specifications of ANSI/IEEE Standard
488.1-1987 and ANSI/IEEE Standard P1284. The GPIB-1284CT conforms to all
versions of the IEEE 488 standard, including ANSI/IEEE Standard 488.2-1987. The
TNT4882C Controller chip implements all IEEE 488 Talker/Listener/Controller
functionality.

The GPIB-1284CT has two parallel ports: one for connecting to the host computer and
another for transparent pass-through connection to other parallel port devices.
Communication from the computer through the pass-through port of the GPIB-1284CT
to another parallel port device can be unidirectional only. When the GPIB-1284CT is
initially powered on, it is in pass-through mode; all parallel port activity from the host
computer is routed to the pass-through parallel port. The NI-488.2 driver switches the
GPIB-1284CT into GPIB mode when a device or board is put online. If another
application initiates a print through the parallel port to which the GPIB-1284CT is
connected, the driver transparently switches the GPIB-1284CT to pass-through mode for
the duration of the print.

The parallel-to-GPIB conversion circuitry is implemented in a field-programmable gate
array, which you can reconfigure with the `ctupdate` utility. Refer to Appendix B, *The
ctupdate Utility*, for more information. As parallel port standards evolve, National
Instruments will provide updates to keep your hardware and software up-to-date.

The GPIB-1284CT Top Panel

Figure 1-1 shows the top panel of the GPIB-1284CT.
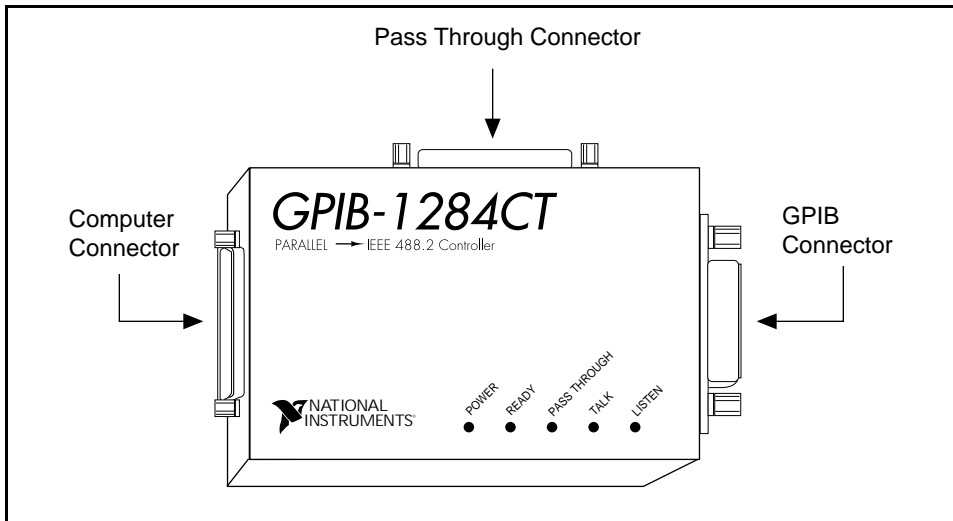
Figure 1-1. GPIB-1284CT Top Panel

Table 1-1 describes the LEDs (light-emitting diodes) on the GPIB-1284CT top panel.

Table 1-1. GPIB-1284CT Top Panel LEDs

LED	Description
POWER	Indicates that power is supplied.
READY	Indicates that the NI-488.2 software has found the GPIB-1284CT and is ready to communicate with it.
PASS THROUGH	Indicates that the GPIB-1284CT is in pass-through mode. All parallel port activity is transferred to the pass-through parallel port connector. The GPIB-1284CT powers up in this mode.
TALK	Indicates that the GPIB-1284CT is configured as a GPIB Talker.
LISTEN	Indicates that the GPIB-1284CT is configured as a GPIB Listener.

I/O Connectors

Connect the parallel port labeled COMPUTER on the GPIB-1284CT to a parallel port on
your computer using a shielded parallel (printer) cable that is two meters or less in length.
You can connect the GPIB-1284CT to a standard AT-style unidirectional parallel port, a
PS/2 style bidirectional parallel port, or an Enhanced Parallel Port (EPP). Refer to the
documentation that came with your computer to determine if you can configure the
parallel port on your computer for different parallel port types. If you need parallel
cables, you can order them from National Instruments.

Connect the GPIB connector to your GPIB instruments. If you need single-shielded or
double-shielded GPIB cables, you can order them from National Instruments. You can
connect the GPIB-1284CT to as many as 14 GPIB instruments. If you need to connect
more than 14 instruments, you can order a GPIB extender or expander from National
Instruments.

If you have an additional unidirectional parallel port device (for example, a printer) that
is accessed by standard printing services, connect it to the parallel port labeled PASS
THROUGH on the GPIB-1284CT. The NI-488.2 software handles the multiplexing
between the PASS THROUGH port and the GPIB port.

Software Description

The NI-488.2 software for DOS consists of a DOS device driver and utilities that enable a
PC AT compatible computer to act as a GPIB Controller with complete communications
and bus management support.

The NI-488.2 driver is a memory-resident program that DOS loads whenever you start
your system. The NI-488.2 driver supports up to three GPIB-1284CT boxes connected to
three separate parallel ports, and requires approximately 50 KB of memory.

Chapter 2
Hardware Installation

This chapter contains instructions for connecting your GPIB-1284CT to your computer.

Step 1. Verify the Voltage Requirement

The GPIB-1284CT is shipped from the factory with a 100 to 120 V or 220 to 240 V, built-in or wall-mount power supply. Verify that the voltage marked on the GPIB-1284CT or on the power supply matches the voltage that is supplied in your area.

Caution: *Operating the GPIB-1284CT at any voltage other than the one specified might damage the unit. Replacement fuses for the AC version must be of the proper type and size. Refer to Appendix A,* Hardware Specifications*, for fuse specifications.*

Step 2. Connect the Cables

Complete the following steps to connect the cables.

1. Connect the parallel cable to the GPIB-1284CT 25-pin D-Sub connector labeled COMPUTER, and securely fasten the holding screws. Connect the other end of the cable to the parallel port on your computer. Be sure to use only shielded parallel cables that are two meters or less in length.

2. Connect the GPIB cable to the GPIB-1284CT 24-pin Champ connector labeled GPIB and tighten the thumb screws on the connector. Connect the other end to your GPIB device(s). Be sure to follow all IEEE 488 cabling restrictions, and use only shielded GPIB cables.

3. If you want to connect an additional unidirectional parallel device, such as a printer, to the GPIB-1284CT, connect the parallel port cable to the 25-pin D-sub connector labeled PASS THROUGH. Securely fasten the holding screws. Connect the other end of the cable to your parallel device. Be sure to use only shielded parallel cables.

4. If you have an AC version, connect the power cord to the power receptacle on the GPIB-1284CT. Then plug the supply into an AC outlet of the correct voltage.

    If you have a DC version, you can obtain power from the wall-mount power supply or from an external keyboard connector, which is available on most laptop computers. To use the wall-mount power supply, connect the power jack to the GPIB-1284CT, then plug the supply into an AC outlet of the correct voltage. To use the external keyboard connector, connect the power jack end of the keyboard

connector DC power cable to the GPIB-1284CT, then plug the other end into the external keyboard connector on your computer.

Step 3. Switch on the GPIB-1284CT

If you have an AC version, use the rocker switch to power on your GPIB-1284CT. If you have a DC version, use the slide switch to power on your GPIB-1284CT.

The **POWER** LED should come on immediately. The **PASS THROUGH** indicator should also come on, indicating that the GPIB-1284CT is in pass-through mode. The **READY** LED does not come on until the NI-488.2 driver successfully finds the GPIB-1284CT.

Chapter 3
Software Installation and Configuration

This chapter contains instructions for installing and configuring your NI-488.2 software.

NI-488.2 Software Components

The NI-488.2 software includes the following components:

- Device driver

- Hardware and software diagnostic tests

- Configuration utility

- Interactive control program

- Utilities for software development

- Language interface libraries for BASICA, Microsoft QuickBASIC, Microsoft Professional BASIC/Microsoft Visual Basic for DOS, and Microsoft C

- Sample programs that use NI-488 functions and NI-488.2 routines

For a detailed list of files, refer to the *NI-488.2 User Manual for DOS*.

Install the Software

After you have installed the hardware, you are ready to install the NI-488.2 software. Complete the following steps to run the software installation program.

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

2. Begin the software installation by entering the following command:

   `x:\install`

   where *x* is the letter of the drive containing the distribution disk (usually `a` or `b`).

The software installation begins with the screen shown in Figure 3-1.

```
┌──────────────────────────────────────────────────────────┐
│  ┌──────────────────────────────┐                        │
│  ║                              ║                        │
│  ║   National Instruments Corp. ║                        │
│  ║                              ║                        │
│  └──────────────────────────────┘                        │
│                                                            │
│        ┌──────────────────────────────────┐              │
│        │    GPIB-1284CT DOS Installation   │              │
│        │                                   │              │
│        │  √ • Full GPIB Installation       │              │
│        │                                   │              │
│        │    • Custom GPIB Installation     │              │
│        │                                   │              │
│        │    • Hardware Diagnostics         │              │
│        │                                   │              │
│        │    • Exit Install                 │              │
│        └──────────────────────────────────┘              │
│                                                            │
│        Use the arrow keys to move the check mark          │
│          Press ENTER to continue, ESC to exit             │
└──────────────────────────────────────────────────────────┘
```
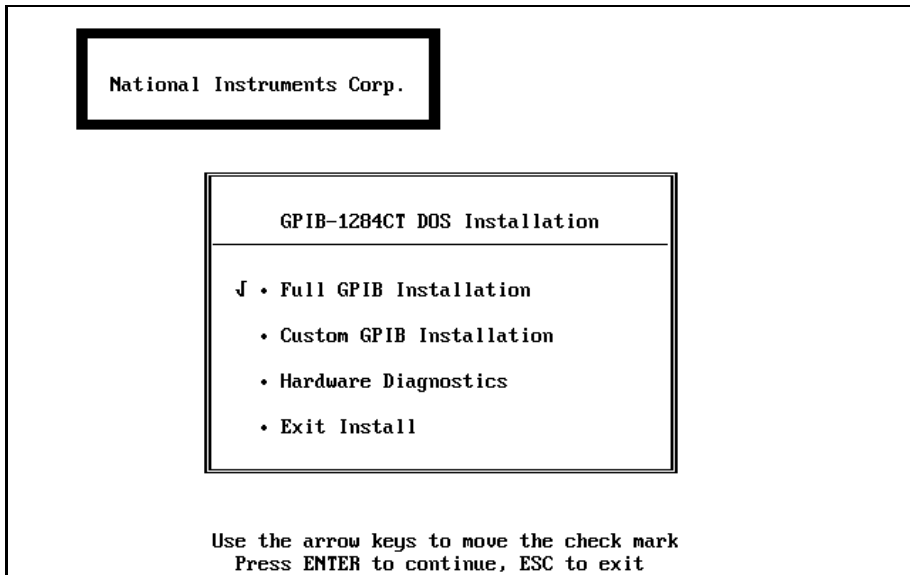
Figure 3-1. Software Installation Screen

3. Select the type of installation you want.

  • Selecting `Full GPIB Installation` installs all NI-488.2 software files on your hard drive.

  • Selecting `Custom GPIB Installation` lets you select the parts of the NI-488.2 software to install on your hard drive.

  • Selecting `Hardware Diagnostics` executes the hardware diagnostic program `ibdiag`. If the hardware diagnostics fail, refer to Chapter 4, *Installation Verification and Troubleshooting*, for information on `ibdiag`.

  • Selecting `Exit Install` or pressing the <Esc> key at any time causes you to exit the installation program and returns you to the DOS prompt.

4. After the installation is complete, restart your computer.

  To load the NI-488.2 driver for DOS, you must restart your computer. If the installation is successful, the driver displays a banner message on your screen when DOS loads the driver.

After you have installed your software, you might want to run `ibconf` to view or
modify the driver configuration. If you installed more than one GPIB-1284CT, or if your
single GPIB-1284CT is not connected to `lpt1`, you must reconfigure the software with
`ibconf`. Refer to the section *Configure the Software with ibconf*, later in this chapter,
for instructions on running `ibconf`. If you do not need to run `ibconf`, refer to
Chapter 4, *Installation Verification and Troubleshooting*, for instructions on verifying the
hardware and software installation.

Pass-Through Printing in DOS

When the GPIB-1284CT is powered on, it is in pass-through mode, as indicated by the
PASS THROUGH LED. All data sent to the parallel port to which you have connected
the GPIB-1284CT passes from the parallel port labeled COMPUTER to the parallel port
labeled PASS THROUGH.

When the NI-488.2 software places the GPIB-1284CT online, the GPIB-1284CT is taken
out of pass-through mode. If another application tries to print, the NI-488.2 software
handles the multiplexing between the GPIB application and the print job. When the
GPIB-1284CT is taken offline, it is placed back into pass-through mode.

Configure the Software with ibconf

`ibconf` is an interactive utility you can use to examine or modify the configuration of
the driver. You must run `ibconf` if you installed more than one GPIB-1284CT, or if
your single GPIB-1284CT is not connected to `lpt1`.

Follow these steps to run `ibconf`:

1. Go to the directory where the NI-488.2 software is installed, and enter the following
    command:

    `ibconf`

2. Use the cursor keys to select different fields and view corresponding help
    information.

3. Make any necessary changes.

    Notice that the `Type of parallel port` field in `ibconf` is set to `AUTO` by
    default. When the field is set to `AUTO`, the NI-488.2 software attempts to determine
    the type of the corresponding parallel port automatically. If you know the type of
    your parallel port, set the `Type of parallel port` field to the correct type
    (`UNIDIR`, `BIDIR`, or `EPP`). All parallel port types support the unidirectional
    protocol, so it is always safe to select `UNIDIR`, the unidirectional protocol.

> **Notes:** ***All PS/2 computers have bidirectional parallel ports. If you have a PS/2 computer, set the*** `Type of parallel port` ***field in*** `ibconf` ***to*** `BIDIR`***.***
>
> ***The NI-488.2 software is unable to safely detect an EPP parallel port at I/O address 0x3BC. For this reason, if the parallel port is at I/O address 0x3BC and the*** `Type of parallel port` ***field is set to*** `AUTO`***, the driver treats the port as a unidirectional port.***

4. Exit `ibconf` by pressing <Esc> or the function key <F9>, and save your changes.

5. Restart your computer.

For more information about `ibconf`, refer to the *NI-488.2 User Manual for DOS*.

After you have installed and configured the software, refer to Chapter 4, *Installation Verification and Troubleshooting*, to verify the installation.

Chapter 4
Installation Verification and Troubleshooting

This chapter explains how to verify the hardware and software installation and troubleshoot problems.

Run the Hardware Diagnostic Program

To verify and test the hardware installation, run the `ibdiag` hardware diagnostic program that came with your NI-488.2 software. `ibdiag` verifies that your hardware is connected and functioning properly.

Follow these steps to run `ibdiag`:

1. If a parallel cable is connected to the pass-through parallel port, disconnect it.

2. Go to the directory where the software is installed (for example, `c:\1284ct`).

3. Enter the following command:

   ```
   ibdiag
   ```

If `ibdiag` completes with no errors, your hardware is functioning properly. If `ibdiag` returns an error message, refer to the next section for troubleshooting instructions.

Troubleshooting ibdiag Error Messages

Warning: *The GPIB-1284CT contains circuitry that operates with hazardous voltages. Refer service requirements to qualified personnel*.

If `ibdiag` returns an error message, do the following:

- Verify that the GPIB-1284CT is connected to the parallel port you have selected in `ibdiag`.

- Verify that a parallel cable is not connected to the pass-through parallel port.

- Verify that the correct LEDs are lit. The GPIB-1284CT should power on with the **POWER** and **PASS THROUGH** LEDs lit.

  If the **POWER** LED is not lit, check the following items:

  - Check that the power switch is in the ON position.

- Check that the power cable is securely plugged into the power outlet.

- If you have an AC version, check the power cord connection and the fuse.

  Warning: ***For continued protection against fire, replace the fuse only with the same type and rating of fuse. See Appendix A,*** *Hardware Specifications****, for fuse specifications***.

- If you have a DC version, check the connection to the power supply.

  If the **PASS THROUGH** LED does not come on when the GPIB-1284CT is powered on, contact National Instruments.

- Make sure that when you run `ibdiag`, you enter the correct parallel port information for the parallel port to which the GPIB-1284CT is connected. You must enter the name of the parallel port (for example, `lpt1`), its type (unidirectional, bidirectional, or EPP), and its interrupt level. Refer to the documentation that came with your computer to determine what type of parallel port you have and how it can be configured.

  If you do not know what type of parallel port you have, choose unidirectional to run `ibdiag`. Unidirectional communication works properly on all types of parallel ports. You can use `ibdiag` to determine whether your parallel port is capable of either bidirectional or EPP communication.

  If you do not know the interrupt level of your parallel port, choose `No Interrupt` when you run `ibdiag`. Typically, interrupt level 7 is associated with `lpt1` and interrupt level 5 is associated with `lpt2`. You can use `ibdiag` to determine whether you can use interrupts with your parallel port.

- Check the parallel port cable connection. The cable should be no longer than 2 m, and should be a shielded parallel cable. If you suspect cable problems, you can order a parallel cable from National Instruments. See the *Optional Equipment* section of Chapter 1, *Introduction*, for specific information on parallel cables you can order.

Run the Software Diagnostic Program

To verify and test the software installation, run the `ibtest` software diagnostic program that came with your NI-488.2 software. The `ibtest` program is an NI-488.2 application that makes calls to the driver just as your application does.

Follow these steps to run `ibtest`:

1. Disconnect any GPIB cables.

2.   Go to the directory where the software is installed (for example, `c:\1284ct`).

3.   Enter the following command:

      `ibtest`

If `ibtest` completes with no errors, you have installed the NI-488.2 software correctly. If `ibtest` returns an error message, refer to the next section for troubleshooting instructions.

Troubleshooting ibtest Error Messages

If an error occurs when you run `ibtest`, check the following:

*   The GPIB-1284CT should *not* be connected to a GPIB device.

*   The GPIB-1284CT must be powered on.

*   The **READY** LED should be on. If it is not, the NI-488.2 software has not accessed the GPIB-1284CT. Either the software is not installed or configured properly, or the cable connection between the computer and the GPIB-1284CT is not secure.

*   The `config.sys` file on your startup disk should contain the following line:

      `device=`*`drive`*`:\`*`path`*`\gpib.com`

    where *`drive`* is the disk drive where the NI-488.2 software is installed (usually `c`) and *`path`* is the path of the directory in which you have installed the NI-488.2 software (for example, `1284ct`).

*   You should have restarted your computer after installing and configuring the NI-488.2 software.

*   Verify that the GPIB-1284CT passes `ibdiag` successfully.

*   Verify that the NI-488.2 software is configured correctly by running `ibconf`. Specifically, verify that the `Use this GPIB interface`, `Parallel port number`, `Type of parallel port`, and `Interrupt Level` fields are all set properly.

*   Verify that the `Type of parallel port` field in `ibconf` is set correctly. Leave this field set to `AUTO` only if you do not know the type of parallel port you have; otherwise, select the correct type. The documentation that came with your computer should specify the type of your parallel port.

*   Check the parallel port cable connection. The cable should be no longer than 2 m, and should be a shielded parallel cable. If you suspect cable problems, you can order a parallel cable from National Instruments. See the *Optional Equipment* section of Chapter 1, *Introduction*, for specific information on parallel cables you can order.

If you have performed these steps and `ibtest` still fails, refer to the following sections to check the hardware and software.

Note: *In the following paragraphs,* `gpibx` *refers to* `gpib0`, `gpib1`, `gpib2`, *or* `gpib3` *as appropriate.*

Presence Test of Driver

The `ibtest` program tests for the presence of the NI-488.2 driver and displays the following message if it detects a problem:

`<<<  No driver present for GPIBx.  >>>`

If this message appears, make sure that the GPIB driver is installed. Check that the following line is in your `config.sys` file:

`device=`*`drive`*`:\`*`path`*`\gpib.com`

where *`drive`* is the disk drive where the NI-488.2 software is installed (usually `c`) and *`path`* is the path of the directory in which you have installed the NI-488.2 software (for example, `1284ct`).

Presence Test of GPIB-1284CT

The following error message appears if the GPIB-1284CT is not installed or if the software is not configured properly:

`<<<  No board present for GPIBx.  >>>`

If this message appears, you could have one of the following situations:

- The `Use this GPIB interface` field in `ibconf` might be set to `No` for `gpibx`. If you want to use the GPIB-1284CT, you must set this field to `Yes`.

- The GPIB-1284CT might not be properly installed. Refer to Chapter 2, *Hardware Installation*, for detailed instructions.

- The software settings do not match the parallel port hardware settings. You can run `ibconf` to check the current configuration of the software.

GPIB Cables Connected

The following error message appears if a GPIB cable is connected to the GPIB-1284CT when you run `ibtest`:

```
Call(25) 'ibcmd " "' failed, ibsta (0x134) not what was expected
(0x8130)

Call(25) 'ibcmd " "' failed, expected ibsta (0x100) to have the
ERR bit set.
```

Disconnect all GPIB cables before trying the test again.

Common Questions

Which NI-488.2 software (DOS or Windows) do I need to install?

If you want to run a GPIB application under DOS, install the NI-488.2 software for DOS. If you want to run a GPIB application in Windows, you must install the NI-488.2 software for Windows.

Can I have the DOS and Windows drivers for NI-488.2 installed at the same time?

Yes, there is nothing wrong with installing both. However, it is unsafe to access them both at the same time.

How can I determine which type of GPIB controller I have installed?

Run the `GPIBInfo` utility. If you run `GPIBInfo` without specifying any parameters, it returns information about the GPIB controllers currently configured for use in your system. For more information about `GPIBInfo`, refer to the *NI-488.2 User Manual for DOS.*

How can I determine which version of the NI-488.2 software I have installed?

Run the `GPIBInfo` utility. If you run `GPIBInfo` without specifying any parameters, it returns information about the version of the NI-488.2 software currently installed. For more information about `GPIBInfo`, refer to the *NI-488.2 User Manual for DOS*.

What do I do if `ibdiag` or `ibtest` fails with an error?

Refer to the troubleshooting sections of this chapter for specific information about what might cause these tests to fail.

How do I use `ibic`?

You can use `ibic` to practice communication with your instrument, troubleshoot problems, and develop your application program. For instructions, refer to Chapter 5, *ibic–Interface Bus Interactive Control*, in the *NI-488.2 User Manual for DOS*.

How do I use a GPIB language interface?

For information about using the language interfaces, refer to Chapter 3, *Developing Your Application*, in the *NI-488.2 User Manual for DOS*.

What information should I have before I call National Instruments?

When you call National Instruments, you should have the results of the diagnostic tests `ibdiag` and `ibtest` and the output from `GPIBInfo`. Also, make sure you have filled out the configuration form in Appendix C, *Customer Communication*.

Chapter 5
Using Your NI-488.2 Software

This chapter describes the ibic utility and lists some programming considerations.

Introduction to ibic

You can use ibic, the Interface Bus Interactive Control utility, to enter NI-488 functions and NI-488.2 routines interactively and to see the values returned by the function calls. Without writing an application, you can use ibic to do the following:

• Verify GPIB communication with your device quickly and easily.

• Learn the syntax of the functions and routines before writing your application.

• Become familiar with the commands of your device.

• Receive data from your GPIB device.

• Learn new functions and routines before integrating them into your application.

For more information about ibic, refer to the *NI-488.2 User Manual for DOS*.

Programming Considerations

As you begin developing your GPIB application, remember the following points:

• You must include the GPIB header file in your source code.

• You must link the GPIB library with your compiled source code.

Also, notice that the NI-488.2 software includes readme files for most language interfaces, as well as sample programs.

For information about choosing a programming method, developing your application, or compiling and linking, refer to the *NI-488.2 User Manual for DOS*. For detailed information about each NI-488 function and NI-488.2 routine, refer to the *NI-488.2 Function Reference Manual for DOS/Windows*.

Appendix A
Hardware Specifications

The appendix specifies the electrical, environmental, and physical characteristics of the GPIB-1284CT and the recommended operating conditions.

Table A-1. Electrical Characteristics - AC Version

Characteristic	Specification
Power Supply Unit	100 to 120 VAC ± 10%, 50 to 60 Hz or 220 to 240 VAC ± 10%, 50 to 60 Hz
Current	100 to 120 VAC 37 mA or 220 to 240 VAC 39 mA
Fuse Rating and Type	100 to 120 VAC 300 mA, UL/CSA approved or 220 to 240 VAC 500 mA, IEC approved

Table A-2. Electrical Characteristics - DC Version

Characteristic	Specification
DC Input	+5 to +13 VDC Regulated
Current	340 mA maximum

Table A-3. Environmental Characteristics

Characteristic	Specification
Operating Temperature	10° to 40° C
Storage Temperature	0° to 70° C
Relative Humidity	10% to 95% noncondensing conditions
EMI	FCC Class A Verified

Table A-4. Physical Characteristics - AC Version

Characteristic	Specification
Case Size	4.65 in. by 3.05 in. by 1.74 in. (11.8 cm by 7.75 cm by 4.42 cm)
Case Material	All metal enclosure
Weight	11.52 oz. (327 g)

Table A-5. Physical Characteristics - DC Version

Characteristic	Specification
Case Size	4.65 in. by 3.05 in. by 1.12 in. (11.8 cm by 7.75 cm by 2.84 cm)
Case Material	All metal enclosure
Weight	7.68 oz. (218 g)

Appendix B
The ctupdate Utility

This appendix contains information on the `ctupdate` utility for the GPIB-1284CT.

The `ctupdate` utility is included with your NI-488.2 software so that you can easily update your firmware, if necessary, in the future. As parallel port standards evolve or as the hardware and/or software is enhanced, National Instruments will provide updates of the software and the firmware (the `.mcs` file).

The parallel-to-GPIB conversion circuitry is implemented in a field-programmable gate array, which is loaded from an EEPROM (electrically erasable programmable read-only memory) when the GPIB-1284CT is powered on. You can use the `ctupdate` utility to upgrade the firmware in the EEPROM. The `.mcs` file is the latest revision of the firmware.

Caution: *Because of the potential loss of EEPROM information, do not attempt to update the firmware when your electrical power is unstable; that is, during a weather storm or similar situation. Once you have started the update process, do not switch off power to your GPIB-1284CT until the* `ctupdate` *program completes.*

Run the `ctupdate` utility as follows:

1. Invoke the `ctupdate` utility with two parameters, an *imagefile*`.mcs` name and the parallel port number, as shown in the following example.

    ```
    ctupdate 702314b.mcs 1
    ```

    `ctupdate` transfers the imagefile into the EEPROM within the GPIB-1284CT. `ctupdate` then reads back the contents of the EEPROM to verify that the transfer was successful.

    Do not power off the GPIB-1284CT until the program reports completion. If the `ctupdate` utility reports an error, do *not* power off the GPIB-1284CT. Confirm that the GPIB-1284CT is connected to the parallel port indicated on the command line, and execute `ctupdate` again. If errors persist, *leave the box powered on*, write down the error message that appears on the screen, and contact National Instruments.

2. Power the GPIB-1284CT off and then back on to load the new EEPROM contents into the field-programmable gate array.

3. Record the *imagefile*`.mcs` filename on the configuration form in Appendix C, *Customer Communication*.

Appendix C
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

Technical support is available at any time by fax. Include the information from your configuration form. Use 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 _____

National Instruments software product _____

    Version _____

    Configuration _____

The problem is _____

_____

_____

_____

_____

_____

_____

_____

List any error messages _____

_____

_____

_____

_____

_____

_____

The following steps will reproduce the problem _____

_____

_____

_____

_____

_____

_____

GPIB-1284CT Hardware and Software Configuration Form

Record the settings and revisions of your hardware and software on the line to the right of each item. Update this form each time you revise your software or hardware configuration, and use this form as a reference for your current configuration.

National Instruments Products

*   GPIB-1284CT Model and Revision _____

*   GPIB-1284CT *imagefile*.mcs filename _____

*   NI-488.2 Software Version Number on Disk _____

Other Products

*   Computer Make and Model _____

*   Computer Parallel Port Type _____

*   Memory Capacity on Computer _____

*   DOS Version _____

*   Number of GPIB Devices on Bus _____

*   Other Hardware Devices in System _____

*   Type of Monitor _____

*   Device Connected to Pass-Through Parallel Port _____

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-1284CT and the NI-488.2**^{TM} **Software for DOS**

Edition Date: **June 1994**

Part Number: **320644-01**

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

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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 _____

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Phone   (_____)   _____

Mail to: Technical Publications
              National Instruments Corporation
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              Austin, TX 78730-5039

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Glossary

Prefix	Meaning	Value
c-	centi-	10^{-2}
m-	milli-	10^{-3}
K-	kilo-	10^{3}
M-	mega-	10^{6}

°	degrees
%	percent
A	amperes
AC	alternating current
ANSI	American National Standards Institute
BIOS	Basic Input/Output System
C	Celsius
CSA	Canadian Standards Association
DC	direct current
DIP	dual inline package
EEPROM	electrically erasable programmable read-only memory
EMI	electromagnetic interference
EPP	Enhanced Parallel Port
FCC	Federal Communications Commission
GPIB	General Purpose Interface Bus
Hz	hertz
ibic	Interface Bus Interactive Control
IEC	International Electrotechnical Commission
IEEE	Institute for Electrical and Electronic Engineers
in.	inches
I/O	Input/Output
KB	kilobytes of memory
LED	light-emitting diode
m	meters
MB	megabytes of memory
oz	ounces
PC	personal computer
PS/2	IBM Personal System/2
RAM	random-access memory
s	seconds
UL	Underwriters Laboratories
V	volts
VAC	volts alternating current
VDC	volts direct current