Fieldbus

Getting Started with Your PCMCIA-FBUS and the NI-FBUS™ Software for Windows 95

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Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. 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.

Notices 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.***

This device complies with the FCC rules only if used with shielded interface cables of suitable quality and construction. National Instruments used such cables to test this device and provides them for sale to the user. The use of inferior or nonshielded interface cables 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: *Interference to Home Electronic Entertainment Equipment Handbook.* This booklet is available from the U.S. Government Printing Office, Washington, DC 20402.

Canadian Department of Communications

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

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About This Manual

This manual contains instructions on how to install and configure the National Instruments PCMCIA-FBUS interface card and the NI-FBUS software for Windows 95. The PCMCIA-FBUS card is intended for use in laptop computers equipped with a Type II PCMCIA socket. The NI-FBUS software is intended for use with Windows 95. This manual assumes that you are already familiar with Windows 95.

How to Use the Manual Set

Use this getting started manual to install and configure your PCMCIA-FBUS card and the NI-FBUS software.

Use the *NI-FBUS Communications Manager Function Reference Manual* to look up specific information about NI-FBUS functions, such as input and output parameters, syntax, and error messages.

Use the *NI-FBUS Communications Manager User Manual for Windows 95 and Windows NT* to learn how to use the NI-FBUS Communications Manager interface for your application.

If you are using the NI-FBUS Configurator, use the *NI-FBUS Configurator User Manual* to install the NI-FBUS Configurator software for Windows 95.

Organization of This Manual

This manual is organized as follows:

- Chapter 1, *Introduction*, lists what you need to get started and includes a brief description of the PCMCIA-FBUS card and the NI-FBUS software.

- Chapter 2, *Installation and Configuration*, contains instructions for installing and configuring the NI-FBUS software for Windows 95 and the PCMCIA-FBUS.
- Chapter 3, *Begin to Use the NI-FBUS Software*, helps you get started using the NI-FBUS software for Windows 95.
- Appendix A, *Specifications*, describes the electrical, physical, and environmental characteristics of the PCMCIA-FBUS hardware and the recommended operating conditions.
- Appendix B, *Pinout Information*, contains information about the pinout of the fieldbus connectors.
- 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

This manual uses the following conventions:

< >
: Angle brackets enclose the name of a key on the keyboard—for example, <option>.

-
: 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>.

»
: The **»** symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options» Substitute Fonts** directs you to pull down the **File** menu, select the **Page Setup** item, select **Options**, and finally select the **Substitute Fonts** options from the last dialog box.


: This icon to the left of bold italicized text denotes a note, which alerts you to important information.


: This icon to the left of bold italicized text denotes a warning, which advices you of precautions to take to avoid being electrically shocked.

bold	Bold text denotes the names of menus, menu items, parameters, dialog boxes, dialog box buttons or options, icons, windows, Windows 95 tabs, or LEDs.
bold italic	Bold italic text denotes a note, caution, or warning.
italic	Italic text denotes emphasis, a cross reference, or an introduction to a key concept. This font also denotes text for which you supply the appropriate word or value, as in Windows 3.*x*.
`italic monospace`	Italic text in this font denotes that you must supply the appropriate words or values in the place of these items.
`monospace`	Text in this font denotes text or characters that you should literally enter 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, operations, variables, filenames and extensions, and for statements and comments taken from programs.
paths	Paths in this manual are denoted using backslashes (\) to separate drive names, directories, folders, and files.
PCMCIA-FBUS	In this manual, the term *PCMCIA-FBUS* refers to both the single-port PCMCIA-FBUS card and the dual-port PCMCIA-FBUS/2 card, unless otherwise indicated.

Related Documentation

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

- *Fieldbus Foundation System Management Services*
- *Function Block Application Process, Part 1*
- *Function Block Application Process, Part 2*
- *Microsoft Windows 95 Online Help*
- *PC Card Standard, Release 2.1,* Personal Computer Memory Card International Association (PCMCIA)

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 lists what you need to get started and includes a brief description of the PCMCIA-FBUS card and the NI-FBUS software.

What You Need to Get Started

To install your NI-FBUS software, you need:

- ❑ PCMCIA-FBUS card
- ❑ PCMCIA-FBUS cable
- ❑ Installation disks
- ❑ Windows 95 installed on your computer

Hardware Description

The PCMCIA-FBUS is a Type II PC card that handles communication between a PCMCIA-compatible computer and a network configurable device that complies with the Fieldbus Foundation H1 specification. The PCMCIA-FBUS uses the Intel 386EX embedded processor, shared memory, and an interrupt to communicate with its driver. The PCMCIA-FBUS supports the fieldbus transfer rate of 31.25 kb/s.

The single-port PCMCIA fieldbus interface is called the *PCMCIA-FBUS* and the dual-port PCMCIA fieldbus interface is called the *PCMCIA-FBUS/2*. In this manual, the term *PCMCIA-FBUS* refers to both the single-port PCMCIA-FBUS card and the dual-port PCMCIA-FBUS/2 card, unless otherwise indicated.

Software Description

Your kit includes either the NI-FBUS Communications Manager software or NI-FBUS Configurator software. The NI-FBUS Communications Manager software for Windows 95 implements a high-level API you can use to interface with the National Instruments FOUNDATION Fieldbus (FF) communication stack and hardware. The NI-FBUS Communications Manager hides the low-level protocol details of interface boards, Virtual Communication Relationships (VCRs), connections, addresses, and Object Dictionary (OD) indices. The NI-FBUS Communications Manager interfaces to the Fieldbus Messaging Specification (FMS) for you so you can use fieldbus communication protocols with only a general knowledge of the fieldbus architecture.

For a description of the NI-FBUS Configurator software, refer to the next section, *Optional Fieldbus Network Tools.*

The NI-FBUS Communications Manager software and NI-FBUS Configurator software include the following components:

- NI-FBUS Communications Manager process executable file
- Binary image of the Fieldbus Foundation communication stack
- NI-FBUS Interface Configuration utility
- Windows 95 device driver

The NI-FBUS Communications Manager software also includes the following components not included with the NI-FBUS Configurator software:

- Windows Dynamic Link Libraries (DLLs) for linking with the NI-FBUS Communications Manager process
- Static library for linking with the NI-FBUS Communications Manager process
- NI-FBUS Dialog utility
- C language include files

☞ **Note:** ***Because of some bug fixes and specification changes, the communication stack that the NI-FBUS Communications Manager uses is not compatible with the communication stack in a Round Card using a National Instruments Device Developer Kit Release previous to Version 2.0. If you are using National Instruments Round Card software previous to Version 2.0, you need to upgrade your software to Version 2.0. Contact National Instruments for ordering information.***

Optional Fieldbus Network Tools

Your kit includes either the NI-FBUS Communications Manager software or NI-FBUS Configurator software for Windows 95. In addition, you can order the NI-FBUS Monitor, BridgeVIEW, and/or Lookout from National Instruments. If you have not already done so, you can also order the NI-FBUS Configurator.

The NI-FBUS Monitor helps you monitor and debug fieldbus data traffic. It symbolically decodes data packets from the fieldbus, monitors the live list, and performs statistical analysis of packets. You can use the NI-FBUS Monitor to debug device and host applications.

The NI-FBUS Configurator helps you configure a fieldbus network. It also provides a graphical environment for you to configure function block linkages and to set data values and tags. It can automatically generate the schedule for the network, and can configure field devices and hosts to transmit and receive alarms and trends.

BridgeVIEW helps you perform data acquisition and analysis, create a man-machine interface (MMI), or develop an advanced supervisory control application in a graphical development environment. BridgeVIEW includes real-time process monitoring, historical trending, alarm and event reporting, online configuration, and PLC connectivity.

Lookout helps you create graphical representations on a computer screen of real-world devices such as switches, dial gauges, chart recorders, pushbuttons, knobs, sliders, and meters. After linking these images to your field instruments, you can configure Lookout to generate alarms, log data to disk, animate custom graphics, print reports, automatically adjust setpoints, historically trend information, warn operators of malfunctions, and so on.

Chapter 2

Installation and Configuration

This chapter contains instructions for installing and configuring the NI-FBUS software for Windows 95 and the PCMCIA-FBUS.

Install the Software

Complete the following steps to run the software installation program:

1. Insert installation disk 1 into an unused drive.
2. Select **Start»Run**.
3. In the **Run...** dialog box, type the following:

   x:\setup

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

   The interactive setup program takes you through the necessary steps to install the software.

   By default, the installation program installs the software into the nifbus directory. You can change this directory if you want to install the software into a different directory.

   The installation program copies nifb.dll and drvintf.dll into your Windows directory, and it copies the nifb.vxd device driver into the System directory. The installation program also adds information to the Windows 95 Registry.

Continue to the next section to install the hardware.

Install the Hardware

Warning: ***Before you remove the card from the package, touch the antistatic plastic package to a metal part of your system chassis to discharge electrostatic energy, which can damage several components on your PCMCIA-FBUS.***

To install the PCMCIA-FBUS card, complete the following steps:

1. Shut down your operating system and power off your system.
2. Insert the card into a free PC Card (PCMCIA) socket. The card has no jumpers or switches to set. Figure 2-1 shows how to insert the PCMCIA-FBUS and how to connect the PCMCIA-FBUS cable and connector to the PCMCIA-FBUS card.

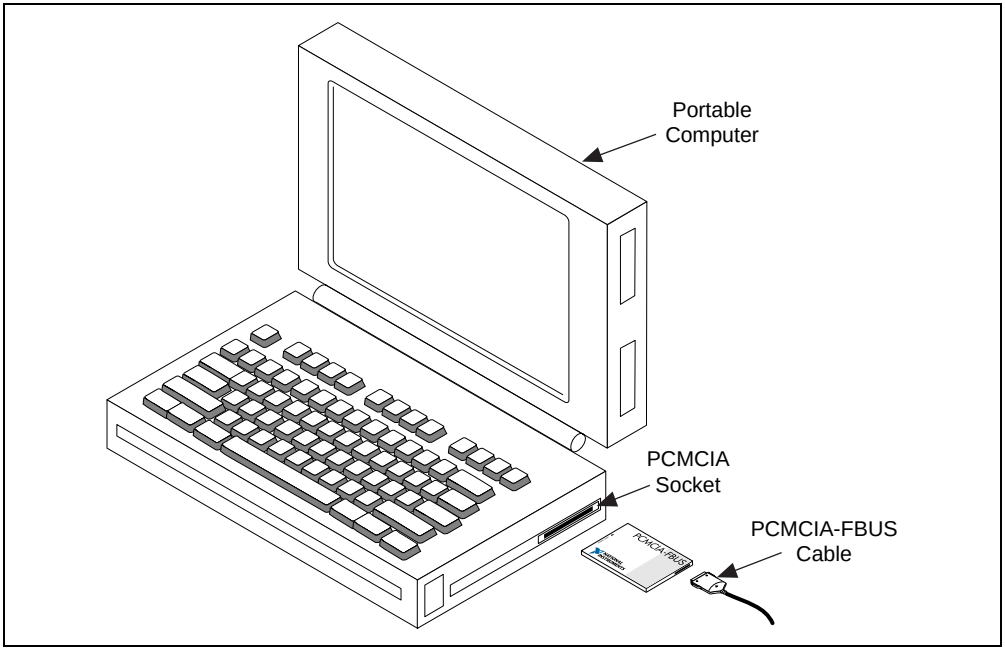


Figure 2-1. Inserting the PCMCIA-FBUS

3. Connect the PCMCIA-FBUS to the fieldbus network.

Your kit contains one PCMCIA-FBUS cable. Refer to Appendix B, *Pinout Information*, if you need to make a longer cable than the PCMCIA-FBUS cable provided.

4. Power on your computer.

Configure the NI-FBUS Communications Manager

Configure the Communication Parameters and Interface Name

Use the NI-FBUS Interface Configuration utility to configure the Fieldbus communication parameters and interface name.

1. Start the NI-FBUS Interface Configuration utility by selecting **Start»Programs»NI-FBUS»Interface Config**.
2. In the **Interface Config** window, select the port you want to configure and click on the **Edit** button.
3. Enter an interface name for the port.
4. Make sure that **NI-FBUS** is selected for **Usage**.
5. Click on the **OK** button.
6. Assign a unique address to each of your fieldbus interfaces. Your interface must be at a fixed address or a visitor address for you to start using the NI-FBUS Communications Manager.

   If you want to assign a fixed address to your fieldbus interface, choose **Fixed Address** and enter a value in the range 0x10 to 0xF7. If you want your interface to be a temporary device that you do not intend to connect to the fieldbus for an extended time, choose **Visitor Address**. If you want a fieldbus network configuration utility to assign an address to your interface over the fieldbus, choose **Default Address**.
7. Assign a unique physical device tag to each of your fieldbus interfaces. Enter a unique tag at the **Device Tag** prompt. You may leave this empty if you have set the address to **Default Address** and you want a fieldbus network configuration utility to assign a tag over the fieldbus.
8. The NI-FBUS Communications Manager assigns default values for other communication parameters. Click on the **Advanced** button to view or change these parameters.

Configuring the Link Active Schedule File

If you are using the NI-FBUS Configurator or if you do not want to do scheduling or use publishers and subscribers, continue to Chapter 3, *Begin to Use the NI-FBUS Communicatons Manager*. If you want to do scheduling and use publishers and subscribers, you must configure the Link Active Schedule file. Refer to Appendix A, *Configuring the Link Active Schedule File*, in the *NI-FBUS Communications Manager User Manual for Windows 95 and Windows NT*, and then test the NI-FBUS Communications Manager software installation, as described in the next section.

Using the NI-FBUS Interface Configuration Utility after Installation

You should use the NI-FBUS Interface Configuration utility, `fbconf.exe`, after installation in the following cases:

- To change the resource settings to avoid hardware conflicts
- To view or change your communication or software configuration settings

To run the utility, select **Start»Programs»NI-FBUS»Interface Config**.

The NI-FBUS Interface Configuration utility helps you to configure the following information:

- Logical name for each fieldbus interface (port); you can access the port using the logical name
- Device Description (DD) information
  - Base directory for DDs
  - Location of the standard text dictionary

  You need to change this DD information only if you use the NI-FBUS Communications Manager to communicate with devices that have manufacturer-specific blocks or parameters, meaning that you have device-manufacturer-supplied DDs.
- Fieldbus communication parameters for each fieldbus interface

Using the NI-FBUS Interface Configuration utility, you can view (but not change) the following:

- Number of interfaces
- Base address of each interface
- IRQ of each interface

To change the base address or IRQ settings, which are known as *resources* in Windows 95, you must use the Windows 95 Device Manager, as described in the *Changing the Resources to Eliminate Conflicts* section, later in this chapter. However, you should not normally need to modify the resources that Windows 95 assigns to your PCMCIA-FBUS.

Test the Installation

To make sure that your NI-FBUS Communications Manager software is installed correctly and is working properly, start the NI-FBUS Communications Manager process by selecting **Start»Programs»NI-FBUS»Nifb**.

On successful startup, the NI-FBUS Communications Manager displays a message saying that the process started up successfully, and the title bar of the **nifb** window changes to **NIFB (running)**.

If `nifbus` does not start up successfully, the base address, the IRQ line, or your network address is incorrect. Start the NI-FBUS Interface Configuration utility by selecting **Start»Programs»NI-FBUS»Interface Config**, and make sure that your network address is unique. You can also check the Windows 95 Device Manager to see if Windows 95 has detected any problems or conflicts in the resources assigned to your PCMCIA-FBUS. The Device Manager displays an exclamation mark (!) on the icon of any PCMCIA-FBUS that has resource conflicts.

Changing the Resources to Eliminate Conflicts

☞ **Note:** ***You should not normally need to modify the resources that Windows 95 assigns to your PCMCIA-FBUS. If you do not suspect you have resource conflicts, proceed to Chapter 3,*** *Begin to Use the NI-FBUS Communications Manager****.***

If you discovered resource conflicts when testing the installation, you need to change your base address or IRQ settings, which are known as resources in Windows 95. To change these settings, use the Windows 95 Device Manager as follows:

1. Double-click on the **System** icon under **Start»Settings»Control Panel**.

2. Click on the **Device Manager** tab.
3. Locate your board under the heading **Fieldbus Adapters**.
4. Click on the name of the board, then click on the **Properties** button.
5. Use the **Resources** tab to view or edit the resources assigned to the board.

Chapter 3

Begin to Use the NI-FBUS Communications Manager

This chapter helps you get started using the NI-FBUS Communications Manager software for Windows 95.

Starting the NI-FBUS Communications Manager

The `nifb` process must be running in order to run an application that uses the NI-FBUS Communications Manager. Start the `nifb` process by selecting **Start»Programs»NI-FBUS»Nifb**.

If the NI-FBUS Communications Manager does not start up, and displays the message **`Unable to download stack to board X`**, you might have a memory base address conflict. Refer to the *Changing the Resources to Eliminate Conflicts* section in Chapter 2, *Installation and Configuration*, for instructions on how to reconfigure your board to use a different memory base address.

If the process and the driver start up successfully, you can add the **NIFB** shortcut to the **StartUp** folder so that the NI-FBUS Communications Manager starts automatically when you boot or restart your computer. Consult your Microsoft Windows 95 online help for information on adding programs to the **StartUp** folder.

If you are using the NI-FBUS Configurator, refer to the *NI-FBUS Configurator User Manual* for information on using your software.

Writing and Compiling Your Application

☞ **Note:** ***If you are using the NI-FBUS Configurator and you are not developing an the NI-FBUS Communications Manager application, this section does not apply to you.***

When you compile your the NI-FBUS Communications Manager application, consider the following points:

- You must include the `nifbus.h` header file in your program.
- You must specify the include directory under the NI-FBUS install directory in your project settings.
- You must link your program with either the `nifb.lib` or `nifb_bor.lib` import library. National Instruments created `nifb.lib` using Microsoft Visual C/C++ version 4.0, and `nifb_bor.lib` using Borland C 4.51. Borland C users should link with `nifb_bor.lib`.
- You can create a console application using the `nifbtest.c` sample program included in your kit. Create a console application project in your compiler and add `nifbtest.c` and `nifb.lib` to the project. Build the project and execute the resulting application.

Using the NI-FBUS Dialog Utility

☞ **Note:** ***The NI-FBUS Dialog utility is not included with the NI-FBUS Configurator.***

Use the NI-FBUS Dialog utility to interact with your devices over the fieldbus by opening descriptors, making single NI-FBUS calls, and viewing the results. You might want to use the NI-FBUS Dialog utility to verify installation and device operation, or to learn the NI-FBUS Communications Manager API.

You can run the NI-FBUS Dialog utility by selecting **Start»Programs»NI-FBUS»NIFBus Dialog**. When you open the NI-FBUS Dialog utility, a window appears containing a single item called **Open Descriptors**. This is the root of a tree that shows an icon for each of the NI-FBUS descriptors you open using the utility. The area

below the icon remains empty until you make an NI-FBUS call to open a descriptor.

The NI-FBUS Dialog utility displays an icon for each descriptor you open: session, link, physical device, Virtual Field Device (VFD), and block. Click the right mouse button on an icon to view a list of valid NI-FBUS functions for that descriptor. When you choose a function from that list, a dialog box for that function appears and prompts you for input parameters.

Refer to the *NI-FBUS Communications Manager User Manual for Windows 95 and Windows NT* for examples of how to use the NI-FBUS Dialog utility.

Appendix

A

Specifications

This appendix describes the electrical, physical, and environmental characteristics of the PCMCIA-FBUS hardware and the recommended operating conditions.

Table A-1. Electrical Characteristics for the PCMCIA-FBUS

Characteristic	Specification
Power Requirement (from PCMCIA socket)	500 mA Typical

Table A-2. Physical Characteristics for the PCMCIA-FBUS

Characteristic	Specification
Dimensions	85.6 by 54.0 by 5.0 mm (3.4 by 2.1 by 0.4 in.)
I/O Connector	Cable with DB-9 DSUB and 5-Position Pluggable Screw Terminal

Table A-3. Environmental Characteristics for the PCMCIA-FBUS

Characteristic	Specification
Operating Environment: Component Temperature Relative Humidity	 0° to 70° C 10% to 90% Noncondensing
Storage Environment: Temperature Relative Humidity	 –40° to 125° C 5% to 90% Noncondensing
EMI	FCC Class A Verified

Appendix

B

Pinout Information

This appendix contains information about the pinout of the fieldbus connectors.

One PCMCIA-FBUS cable is included in your kit. The following figures show the pinout of the fieldbus connectors so you can make your own cable if you need a longer cable than the PCMCIA-FBUS cable in your kit.

Figure B-1 shows the PCMCIA-FBUS cable. An arrow on the cable points to pin 1 of the screw terminal block.

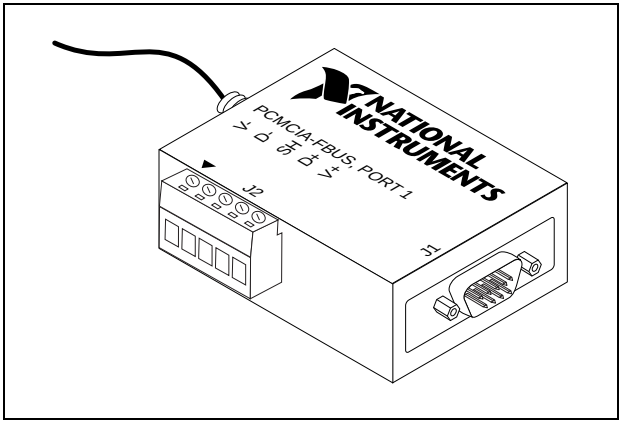


Figure B-1. PCMCIA-FBUS Cable

The PCMCIA-FBUS/2 cable has two fieldbus connectors that are similar to the one shown in Figure B-1. The connector labeled "PCMCIA-FBUS, PORT 1" is the connector for fieldbus port 1, and the connector labeled "PCMCIA-FBUS, PORT 2" is the connector for fieldbus port 2. Refer to Figures B-2 and B-3 for the pinouts of both connectors.

Figure B-2 shows J1, the fieldbus connector pinout.

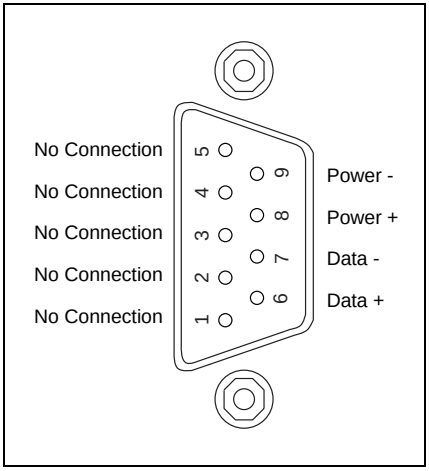


Figure B-2. Fieldbus Connector Pinout

Figure B-3 shows J2, the screw terminal block pinout.

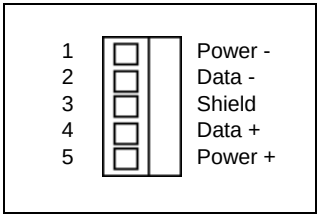


Figure B-3. Screw Terminal Block Pinout

The pinout of the PCMCIA-FBUS uses pins 6 and 7 of the J1 connector for the fieldbus signals, as specified in the *Fieldbus Standard for Use in Industrial Control Systems, Part 2, ISA-550.02.1992*. Pins 2 and 4 of the J2 screw terminal block provide an alternate connection to the fieldbus.

☞ **Note:** ***The screw terminal block is not a second, independent link.***

All of the signals on the screw terminal block provide a direct connection to the 9-pin DSUB. National Instruments provides the Power+ and Power- connections as passive connections from the DSUB to the screw terminal. The PCMCIA-FBUS itself does not supply power to or draw power from these pins.

Appendix C

Customer Communication

For your convenience, this appendix contains forms to help you gather the information necessary to help us solve technical problems and a form you can use to comment on the product documentation. When you contact us, we need the information on the Technical Support Form and the configuration form, if your manual contains one, about your system configuration to answer your questions as quickly as possible.

National Instruments has technical assistance through electronic, fax, and telephone systems to quickly provide the information you need. Our electronic services include a bulletin board service, an FTP site, a Fax-on-Demand system, and e-mail support. If you have a hardware or software problem, first try the electronic support systems. If the information available on these systems does not answer your questions, we offer fax and telephone support through our technical support centers, which are staffed by application engineers.

Electronic Services

Bulletin Board Support

National Instruments has BBS and FTP sites dedicated for 24-hour support with a collection of files and documents to answer most common customer questions. From these sites, you can also download the latest instrument drivers, updates, and example programs. For recorded instructions on how to use the bulletin board and FTP services and for BBS automated information, call (512) 795-6990. You can access these services at:

United States: (512) 794-5422
Up to 14,400 baud, 8 data bits, 1 stop bit, no parity

United Kingdom: 01635 551422
Up to 9,600 baud, 8 data bits, 1 stop bit, no parity

France: 01 48 65 15 59
Up to 9,600 baud, 8 data bits, 1 stop bit, no parity

FTP Support

To access our FTP site, log on to our Internet host, `ftp.natinst.com`, as `anonymous` and use your Internet address, such as `joesmith@anywhere.com`, as your password. The support files and documents are located in the /`support` directories.

Fax-on-Demand Support

Fax-on-Demand is a 24-hour information retrieval system containing a library of documents on a wide range of technical information. You can access Fax-on-Demand from a touch-tone telephone at (512) 418-1111.

E-Mail Support (currently U.S. only)

You can submit technical support questions to the applications engineering team through e-mail at the Internet address listed below. Remember to include your name, address, and phone number so we can contact you with solutions and suggestions.

`support@natinst.com`

Telephone and Fax Support

National Instruments has branch offices all over the world. Use the list below to find the technical support number for your country. If there is no National Instruments office in your country, contact the source from which you purchased your software to obtain support.

	Telephone	Fax
Australia	03 9879 5166	03 9879 6277
Austria	0662 45 79 90 0	0662 45 79 90 19
Belgium	02 757 00 20	02 757 03 11
Canada (Ontario)	905 785 0085	905 785 0086
Canada (Quebec)	514 694 8521	514 694 4399
Denmark	45 76 26 00	45 76 26 02
Finland	09 725 725 11	09 725 725 55
France	01 48 14 24 24	01 48 14 24 14
Germany	089 741 31 30	089 714 60 35
Hong Kong	2645 3186	2686 8505
Israel	03 5734815	03 5734816
Italy	02 413091	02 41309215
Japan	03 5472 2970	03 5472 2977
Korea	02 596 7456	02 596 7455
Mexico	5 520 2635	5 520 3282
Netherlands	0348 433466	0348 430673
Norway	32 84 84 00	32 84 86 00
Singapore	2265886	2265887
Spain	91 640 0085	91 640 0533
Sweden	08 730 49 70	08 730 43 70
Switzerland	056 200 51 51	056 200 51 55
Taiwan	02 377 1200	02 737 4644
U.K.	01635 523545	01635 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 (include version number) _____

Clock 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 _____

_____

_____

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

Hardware Type (PCMCIA-FBUS or PCMCIA-FBUS/2) and Revision _____

Interrupt Level of Hardware _____

Base I/O Address of Hardware _____

Fieldbus Software and Version _____

Other Products

Computer Make and Model _____

Microprocessor _____

Clock Frequency _____

Type of Video Board Installed _____

Operating System _____

Operating System Version _____

Operating System Mode _____

Programming Language _____

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 PCMCIA-FBUS and the NI-FBUS™ Software for Windows 95*

Edition Date: July 1997

Part Number: 321537A-01

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

_____

_____

_____

_____

_____

_____

_____

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

_____

_____

_____

_____

_____

_____

_____

Thank you for your help.

Name _____

Title _____

Company _____

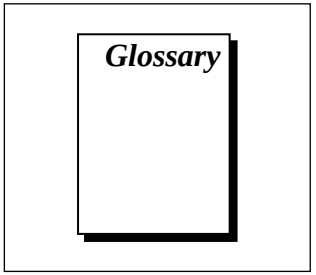
Address _____

_____

Phone (____) _____

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

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



Prefix	Meaning	Value
n-	nano-	10^{-9}
µ-	micro-	10^{-6}
m-	milli-	10^{-3}
k-	kilo-	10^{3}

Symbols

°	Degrees.

A

A	Amperes.
AI	Analog Input. A type of function block.
API	Application Programmer Interface. A message format that an application uses to communicate with another Programmer entity that provides services to it.
asynchronous	Communication that occurs at times that are not predetermined.
AT-compatible	Compatible with the 16-bit Industry Standard Architecture.

B

b	Bits.
block	A logical software unit that makes up one named copy of a block and the associated parameters its block type specifies. The values of the parameters persist from one invocation of the block to the next. It can be a resource block, transducer block, or function block residing within a VFD.

C

C	Celsius.
channel	A pin or wire lead to which you apply or from which you read the analog or digital signal.
communication stack	Performs the services required to interface the user application to the physical layer.

D

Data Link Layer (DLL)	The second-lowest layer in the ISO seven layer model (layer two). The Data Link Layer splits data into frames to send on the physical layer, receives acknowledgment frames, and re-transmits frames if they are not received correctly. It also performs error checking to maintain a sound virtual channel to the next layer.
descriptor	A number returned to the application by the NI-FBUS Communications Manager; used to specify a target for future NI-FBUS calls.
Device Description (DD)	A machine-readable description of all the blocks and block parameters of a device.
device ID	An identifier for a device that the manufacturer assigns. Device IDs must be unique to the device; no two devices can have the same device ID.
DRAM	Dynamic Random Access Memory. Memory that requires electricity and refreshing to hold data.

E

EMI	Electromagnetic interference.

F

fieldbus	An all-digital, two-way communication system that connects control systems to instrumentation.
Fieldbus Foundation	An organization that developed a fieldbus network specifically based upon the work and principles of the ISA/IEC standards committees.
Fieldbus Messaging Specification (FMS)	The layer of the communication stack that defines a model for applications to interact over the fieldbus. The services FMS provides allow you to read and write information about the OD, read and write the data variables described in the OD, and perform other activities such as uploading/downloading data, and invoking programs inside a device.
FOUNDATION Fieldbus (FF)	The communications network that the Fieldbus Foundation created.

I

in.	Inches.
I/O	Input/output.
IRQ	Interrupt request.
ISA	Industry Standard Architecture.

L

link	A group of fieldbus devices connected across a single wire pair with no intervening bridges.
Link Active Schedule	A schedule of times in the macrocycle when devices must publish their output values on the fieldbus.

Link Active Scheduler (LAS)	A device that is responsible for keeping a link operational. The LAS executes the link schedule, circulates tokens, distributes time, and probes for new devices.

M

m	Meters.

O

Object Dictionary (OD)	A structure in a device that describes data that can be communicated on the fieldbus. The OD is a lookup table that gives information such as data type and units about a value that can be read from or written to a device.
octet	A single 8-bit value.

P

parameter	One of a set of network-visible values that makes up a function block.
PC	Personal Computer.
PCMCIA	Personal Computer Memory Card International Association.
physical device	A single device residing at a unique address on the fieldbus.
physical device tag	A user-defined name for a physical device.

S

s	Seconds.
session	A connection between your application and an NI-FBUS entity.
static library	A library of functions/subroutines that you must link to your application as one of the final steps of compilation, as opposed to a Dynamic Link Library, which links to your application at run time.
System Management Configuration	Configuration parameters that set up device identification and network time distribution.

V

VCR	Preconfigured or negotiated connections between virtual field devices on a network.
Virtual Field Device (VFD)	A model for remotely viewing data described in the Object Dictionary.