

USER GUIDE AND SPECIFICATIONS

NI USB-6501

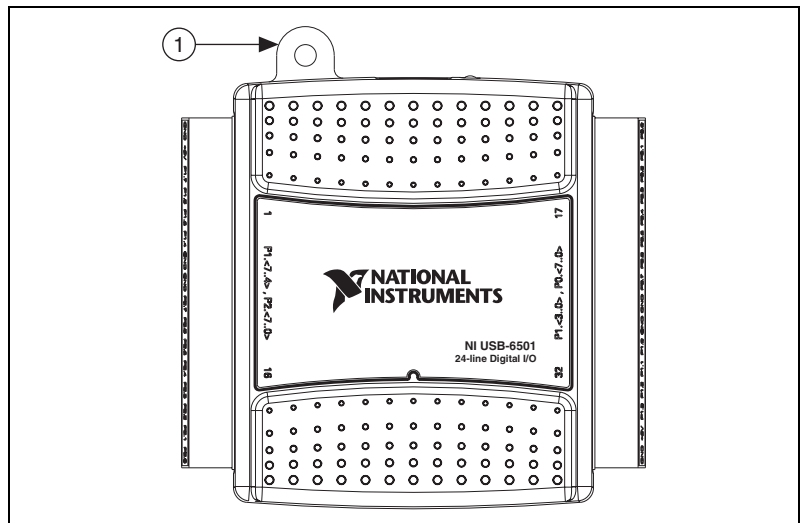
24-Channel, 32-Bit Counter Digital I/O Device

このドキュメントの日本語版については、ni.com/manualsを参照してください。(For a Japanese language version, go to ni.com/manuals.)

This user guide describes how to use the National Instruments USB-6501 data acquisition (DAQ) device and lists the device specifications.

Introduction

The NI USB-6501 is a Full-Speed USB 2.0 device that provides 24 DIO channels and a 32-bit counter.



1 USB Cable Strain Relief

Figure 1. NI USB-6501 Top View

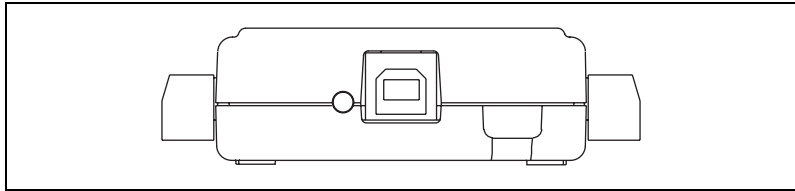


Figure 2. NI USB-6501 Back View

Dimensions

Figure 3 illustrates the dimensions of the USB-6501 device.

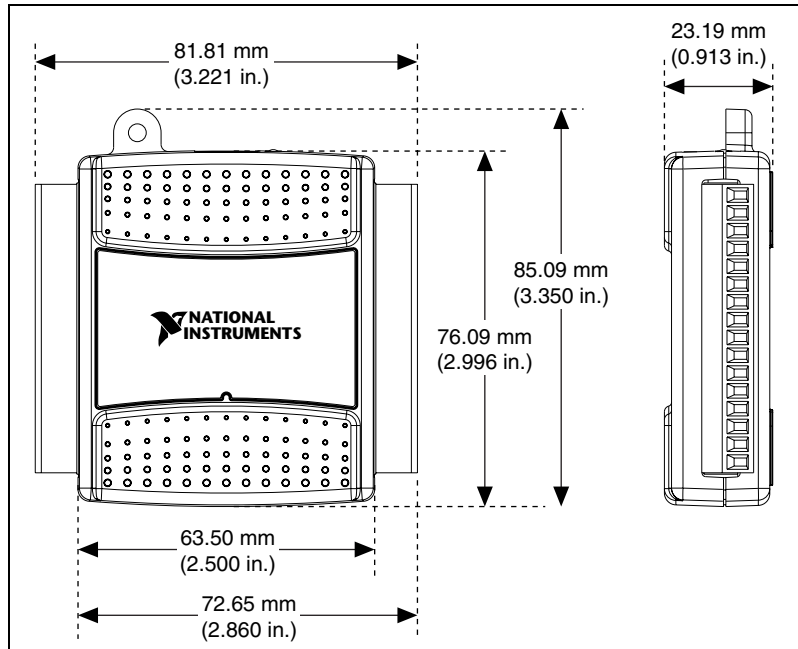


Figure 3. NI USB-6501 Device In Millimeters (Inches)

Safety Guidelines



Caution Operate the NI USB-6501 only as described in these operating instructions.

The following section contains important safety information that you must follow when installing and using the NI USB-6501.

Do not operate the NI USB-6501 in a manner not specified in this document. Misuse of the device can result in a hazard. You can compromise the safety protection built into the device if the device is damaged in any way. If the device is damaged, contact National Instruments for repair.

Do not substitute parts or modify the device except as described in this document. Use the device only with the chassis, modules, accessories, and cables specified in the installation instructions. You must have all covers and filler panels installed during operation of the device.

Do not operate the device in an explosive atmosphere or where there may be flammable gases or fumes. If you must operate the device in such an environment, it must be in a suitably rated enclosure.

If you need to clean the device, use a dry cloth. Make sure that the device is completely dry and free from contaminants before returning it to service.

Operate the device only at or below Pollution Degree 2. Pollution is foreign matter in a solid, liquid, or gaseous state that can reduce dielectric strength or surface resistivity. The following is a description of pollution degrees:

- Pollution Degree 1 means no pollution or only dry, nonconductive pollution occurs. The pollution has no influence.
- Pollution Degree 2 means that only nonconductive pollution occurs in most cases. Occasionally, however, a temporary conductivity caused by condensation must be expected.
- Pollution Degree 3 means that conductive pollution occurs, or dry, nonconductive pollution occurs that becomes conductive due to condensation.

You must insulate signal connections for the maximum voltage for which the device is rated. Do not exceed the maximum ratings for the device. Do not install wiring while the device is live with electrical signals. Do not remove or add connector blocks when power is connected to the system. Avoid contact between your body and the connector block signal when hot swapping modules. Remove power from signal lines before connecting them to or disconnecting them from the device.

Operate the device at or below the Measurement Category I¹. Measurement circuits are subjected to working voltages² and transient stresses (overvoltage) from the circuit to which they are connected during measurement or test. Measurement categories establish standard impulse withstand voltage levels that commonly occur in electrical distribution systems. The following is a description of measurement categories:

- Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS³ voltage. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.
- Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet (for example, 115 V for U.S. or 230 V for Europe). Examples of Measurement Category II are measurements performed on household appliances, portable tools, and similar E Series devices.
- Measurement Category III is for measurements performed in the building installation at the distribution level. This category refers to measurements on hard-wired equipment such as equipment in fixed installations, distribution boards, and circuit breakers. Other examples are wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, and stationary motors with permanent connections to fixed installations.
- Measurement Category IV is for measurements performed at the primary electrical supply installation (<1,000 V). Examples include electricity meters and measurements on primary overcurrent protection devices and on ripple control units.

¹ Measurement Category as defined in electrical safety standard IEC 61010-1. Measurement Category is also referred to as Installation Category.

² Working Voltage is the highest rms value of an AC or DC voltage that can occur across any particular insulation.

³ MAINS is defined as a hazardous live electrical supply system that powers equipment. Suitably rated measuring circuits may be connected to the MAINS for measuring purposes.

Related Documentation

Each application software package and driver includes information about writing applications for taking measurements and controlling measurement devices. The following references to documents assume you have NI-DAQmx 8.7 or later, NI-DAQmx Base 3.x, and where applicable, version 7.1 or later of the NI application software.

NI-DAQmx for Windows

The *DAQ Getting Started Guide* describes how to install your NI-DAQmx for Windows software, how to install your NI-DAQmx-supported DAQ device, and how to confirm that your device is operating properly. Select **Start»All Programs»National Instruments»NI-DAQ»DAQ Getting Started Guide**.

The *NI-DAQ Readme* lists which devices are supported by this version of NI-DAQmx. Select **Start»All Programs»National Instruments»NI-DAQ»NI-DAQ Readme**.

The *NI-DAQmx Help* contains general information about measurement concepts, key NI-DAQmx concepts, and common applications that are applicable to all programming environments. Select **Start»All Programs»National Instruments»NI-DAQ»NI-DAQmx Help**.



Note For information about non-Windows operating system support, refer to ni.com/info and enter BaseGSGML.

LabVIEW

If you are a new user, use the *Getting Started with LabVIEW* manual to familiarize yourself with the LabVIEW graphical programming environment and the basic LabVIEW features you use to build data acquisition and instrument control applications. Open the *Getting Started with LabVIEW* manual by selecting **Start»All Programs»National Instruments»LabVIEW»LabVIEW Manuals** or by navigating to the `labview\manuals` directory and opening `LV_Getting_Started.pdf`.

Use the *LabVIEW Help*, available by selecting **Help»Search the LabVIEW Help** in LabVIEW, to access information about LabVIEW programming concepts, step-by-step instructions for using LabVIEW, and reference information about LabVIEW VIs, functions, palettes, menus, and tools. Refer to the following locations on the **Contents** tab of the *LabVIEW Help* for information about NI-DAQmx:

- **Getting Started»Getting Started with DAQ**—Includes overview information and a tutorial to learn how to take an NI-DAQmx measurement in LabVIEW using the DAQ Assistant.
- **VI and Function Reference»Measurement I/O VIs and Functions**—Describes the LabVIEW NI-DAQmx VIs and properties.
- **Taking Measurements**—Contains the conceptual and how-to information you need to acquire and analyze measurement data in LabVIEW, including common measurements, measurement fundamentals, NI-DAQmx key concepts, and device considerations.

LabWindows/CVI

The **Data Acquisition** book of the *LabWindows/CVI Help* contains measurement concepts for NI-DAQmx. This book also contains *Taking an NI-DAQmx Measurement in LabWindows/CVI*, which includes step-by-step instructions about creating a measurement task using the DAQ Assistant. In LabWindows™/CVI™, select **Help»Contents**, then select **Using LabWindows/CVI»Data Acquisition**.

The **NI-DAQmx Library** book of the *LabWindows/CVI Help* contains API overviews and function reference for NI-DAQmx. Select **Library Reference»NI-DAQmx Library** in the *LabWindows/CVI Help*.

Measurement Studio

If you program your NI-DAQmx-supported device in Measurement Studio using Visual C++, Visual C#, or Visual Basic .NET, you can interactively create channels and tasks by launching the DAQ Assistant from MAX or from within Visual Studio .NET. You can generate the configuration code based on your task or channel in Measurement Studio. Refer to the *DAQ Assistant Help* for additional information about generating code. You also can create channels and tasks, and write your own applications in your ADE using the NI-DAQmx API.

For help with NI-DAQmx methods and properties, refer to the NI-DAQmx .NET Class Library or the NI-DAQmx Visual C++ Class Library included in the *NI Measurement Studio Help*. For general help with programming in Measurement Studio, refer to the *NI Measurement Studio Help*, which is fully integrated with the Microsoft Visual Studio .NET help. To view this help file in Visual Studio .NET, select **Measurement Studio»NI Measurement Studio Help**.

To create an application in Visual C++, Visual C#, or Visual Basic .NET, follow these general steps:

1. In Visual Studio .NET, select **File»New»Project** to launch the New Project dialog box.
2. Find the Measurement Studio folder for the language you want to create a program in.
3. Choose a project type. You add DAQ tasks as a part of this step.

ANSI C without NI Application Software

The *NI-DAQmx Help* contains API overviews and general information about measurement concepts. Select **Start»All Programs»National Instruments»NI-DAQ»NI-DAQmx Help**.

The *NI-DAQmx C Reference Help* describes the NI-DAQmx Library functions, which you can use with National Instruments data acquisition devices to develop instrumentation, acquisition, and control applications. Select **Start»All Programs»National Instruments»NI-DAQ»NI-DAQmx C Reference Help**.

.NET Languages without NI Application Software

With the Microsoft .NET Framework version 1.1 or later, you can use NI-DAQmx to create applications using Visual C# and Visual Basic .NET without Measurement Studio. You need Microsoft Visual Studio .NET 2003 or Microsoft Visual Studio 2005 for the API documentation to be installed.

The installed documentation contains the NI-DAQmx API overview, measurement tasks and concepts, and function reference. This help is fully integrated into the Visual Studio .NET documentation. To view the NI-DAQmx .NET documentation, go to **Start»Programs»National Instruments»NI-DAQ»NI-DAQmx .NET Reference Help**. Expand **NI Measurement Studio Help»NI Measurement Studio .NET Class Library»Reference** to view the function reference. Expand **NI Measurement Studio Help»NI Measurement Studio .NET Class Library»Using the Measurement Studio .NET Class Libraries** to view conceptual topics for using NI-DAQmx with Visual C# and Visual Basic .NET.

To get to the same help topics from within Visual Studio, go to **Help»Contents**. Select **Measurement Studio** from the **Filtered By** drop-down list and follow the previous instructions.

Device Documentation and Specifications

NI-DAQmx includes the Device Document Browser, which contains online documentation for supported DAQ and SCXI devices, such as documents describing device pinouts, features, and operation. You can find, view, and/or print the documents for each device using the Device Document Browser at any time by inserting the CD. After installing the Device Document Browser, device documents are accessible from **Start»All Programs»National Instruments»NI-DAQ»Browse Device Documentation**.



Note You can also download these documents at ni.com/manuals.

NI-DAQmx Base (Linux/Mac OS X/LabVIEW PDA 8.x)

The *NI-DAQmx Base Getting Started Guide* describes how to install your NI-DAQmx Base software, your NI-DAQmx Base-supported DAQ device, and how to confirm that your device is operating properly. In Windows, select **Start»All Programs»National Instruments»NI-DAQmx Base»Documentation»Getting Started Guide**.

Getting Started with NI-DAQmx Base for Linux and Mac Users describes how to install your NI-DAQmx Base software, your NI-DAQmx Base-supported DAQ device, and how to confirm that your device is operating properly on your Mac/Linux machine.

The *NI-DAQmx Base Readme* lists which devices are supported by this version of NI-DAQmx Base. In Windows, select **Start»All Programs»National Instruments»NI-DAQmx Base»DAQmx Base Readme**.

The *NI-DAQmx Base VI Reference Help* contains VI reference and general information about measurement concepts. In LabVIEW, select **Help»NI-DAQmx Base VI Reference Help**.

The *NI-DAQmx Base C Reference Help* contains C reference and general information about measurement concepts. In Windows, select **Start»All Programs»National Instruments»NI-DAQmx Base»Documentation»C Function Reference Help**.



Note All NI-DAQmx Base documentation for Linux is installed at `/usr/local/natinst/nidaqmxbase/documentation`.



Note All NI-DAQmx Base documentation for Mac OS X is installed at `/Applications/National Instruments/NI-DAQmx Base/documentation`.

Training Courses

If you need more help getting started developing an application with NI products, NI offers training courses. To enroll in a course or obtain a detailed course outline, refer to ni.com/training.

Technical Support on the Web

For additional support, refer to ni.com/support or zone.ni.com.

Installing the Software

Software support for the NI USB-6501 for Windows Vista/XP/2000 is provided by NI-DAQmx or NI-DAQmx Base depending on the software you are using. The *DAQ Getting Started Guide*, which you can download at ni.com/manuals, offers NI-DAQmx users step-by-step instructions for installing software and hardware, configuring channels and tasks, and getting started developing an application.



Note For information about non-Windows operating system support, refer to ni.com/info and enter BaseGSGML.

Installing Other Software

If you are using other software, refer to the installation instructions that accompany your software.

Example Programs

The NI-DAQmx CD contains example programs that you can use to get started programming with the NI USB-6501. Refer to the *NI-DAQmx for USB Devices Getting Started Guide* that shipped with your device, and is also accessible from **Start»All Programs»National Instruments»NI-DAQ**, for more information.

The NI-DAQmx Base software ships with example programs you can use to get started programming with the NI USB-6501. Refer to the *NI-DAQmx Base Getting Started Guide* that shipped with your device, and is also accessible from **Start»All Programs»National Instruments»NI-DAQmx Base»Documentation**, for more information.

Installing the NI USB-6501 Device

Before installing the device, you must install the software you plan to use with the device. Refer to the [Installing the Software](#) section of this guide and the documentation included with the software for more information.

Figure 4 shows key functional components of the NI USB-6501.

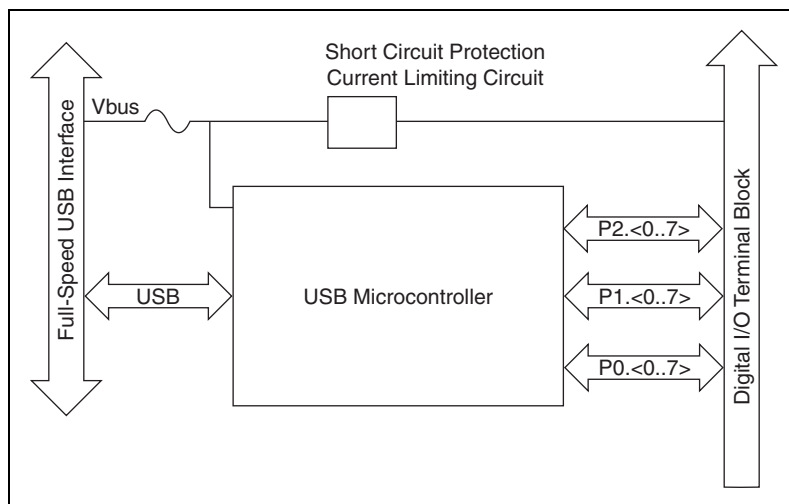


Figure 4. Device Block Diagram

Refer to the [Safety Guidelines](#) section of this document for important safety information.

Setting Up the NI USB-6501 Device

Complete the following steps to set up the NI USB-6501:

1. Install combicon screw terminal blocks by inserting them into the combicon jacks.



Note The NI USB-6501 kit ships with signal name labels. You can apply the signal name labels to the screw terminal blocks for easy signal identification.

2. Refer to Table 2 and Figure 5 for label orientation and affix provided signal labels to the screw terminal blocks. Until the signal name labels are applied, you can insert the screw terminal blocks into either of the combicon jacks. Refer to Figure 5 for more information about signal name label orientation.

Table 1. LED State/Device Status

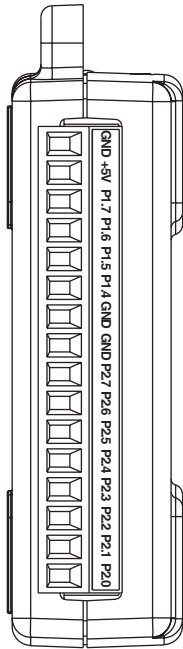
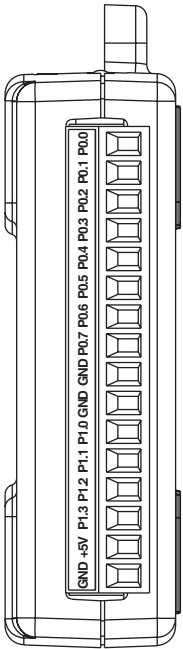
LED State	Device Status
Not lit	Device not connected or in suspend.
On, not blinking	Device connected.
Single-blink	Operating normally.

I/O Connector

The NI USB-6501 ships with two detachable terminal blocks for digital signals. The individual terminals accept 16 AWG to 28 AWG wire.

Table 2 lists the digital terminal assignments.

Table 2. Digital Terminal Assignments

Module	Terminal	Signal	Module	Terminal	Signal
	1	GND		17	P0.0
	2	+5 V		18	P0.1
	3	P1.7		19	P0.2
	4	P1.6		20	P0.3
	5	P1.5		21	P0.4
	6	P1.4		22	P0.5
	7	GND		23	P0.6
	8	GND		24	P0.7
	9	P2.7/PFI 0		25	GND
	10	P2.6		26	GND
	11	P2.5		27	P1.0
	12	P2.4		28	P1.1
	13	P2.3		29	P1.2
	14	P2.2		30	P1.3
	15	P2.1		31	+5 V
	16	P2.0		32	GND

Signal Descriptions

Table 3 describes the signals available on the I/O connectors.

Table 3. Signal Descriptions

Signal Name	Direction	Description
P0.<0..7> P1.<0..7> P2.<0..6>	Input or Output	Digital I/O Signals —You can individually configure each signal as an input or output.
P2.7/PFI 0	Input or Output	This pin is configurable as either a digital line or an event counter. Digital I/O Signal —As a digital line, this signal can be used as an input or output. CTR —As a counter, this signal can be used as an event counter input source.
+5 V	Output	+5 V —The voltage source provided by the USB host. The voltage is nominally 5 V, but varies from system to system.
GND	—	Ground —The reference for the digital signals and the +5 VDC supply.

Digital I/O

The NI USB-6501 has 24 single-ended digital lines, P0.<0..7>, P1.<0..7>, and P2.<0..7>, which comprise the three DIO ports. P2.7/PFI 0 can also function as a 32-bit counter. Refer to the [Event Counter](#) section for more information about the counter.

Static DIO

Each of the NI USB-6501 DIO lines can be individually programmed as a static DI or DO line. You can use static DIO lines to monitor or control digital signals. All samples of static DI lines and updates of DO lines are software-timed.

Digital Output Information



Note This manual revision updates naming conventions to reflect the conventions used in NI-DAQmx. Table 4 notes the correlation between the hardware functionality and the NI-DAQmx terminology.

Table 4. Digital Output Driver Type Naming Conventions

Hardware Functionality	NI-DAQmx Terminology
Open-drain	Open collector
Push-pull	Active drive

The default configuration of the NI USB-6501 DIO ports is open collector, allowing 5 V operation, with an onboard 4.7 k Ω pull-up resistor. An external, user-provided pull-up resistor can be added to increase the source current drive up to a 8.5 mA limit per line, as shown in Figure 6.

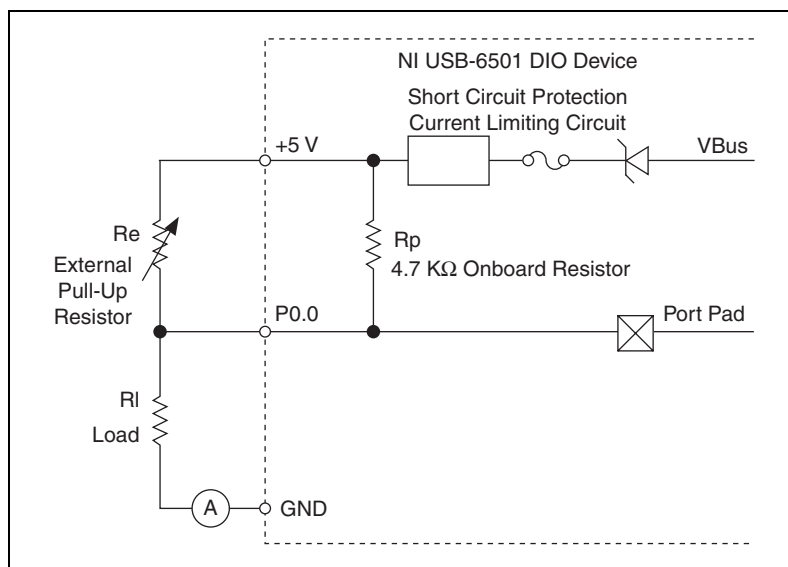


Figure 6. Example of Connecting External User-Provided Resistor

Complete the following steps to determine the value of the user-provided pull-up resistor:

1. Place an ammeter in series with the load.
2. Place a variable resistor between the digital output line and the +5 V.
3. Adjust the variable resistor until the ammeter current reads as the intended current. The intended current must be less than 8.5 mA.

4. Remove the ammeter and variable resistor from your circuit.
5. Measure the resistance of the variable resistor. The measured resistance is the ideal value of the pull-up resistor.
6. Select a static resistor value for your pull-up resistor that is greater than or equal to the ideal resistance.
7. Re-connect the load circuit and the pull-up resistor.

Additionally, you can configure the NI USB-6501 DIO ports as active drive. When configured as active drive, the total current sourced by all DO lines simultaneously should not exceed 65 mA.

Digital I/O Circuitry

Figure 7 shows P0.<0..7> connected to example signals configured as digital inputs and digital outputs. You can configure P1.<0..7> and P2.<0..7> similarly. Refer to Figure 7 for some common examples of connections of DIO lines with standard circuits.

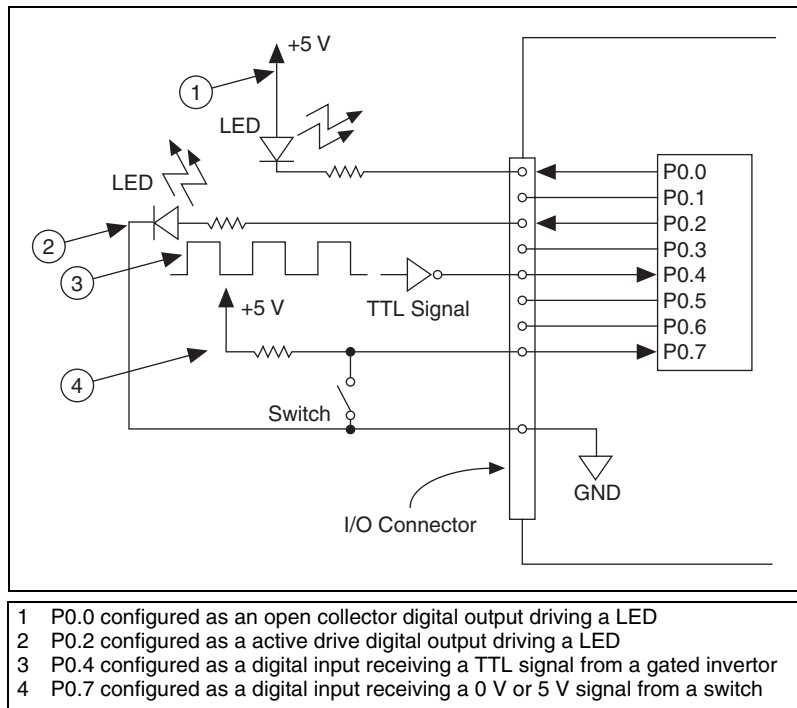


Figure 7. Example of Connecting a Load



Caution Exceeding the maximum input voltage ratings or maximum output ratings, which are listed in the *Specifications* section, can damage the DAQ device and the computer. National Instruments is *not* liable for any damage resulting from such signal connections.

I/O Protection

Each DIO signal is protected against overvoltage, undervoltage, and overcurrent conditions, as well as ESD events. However, you should avoid these fault conditions by using the following guidelines:

- If you configure a DIO line as an output, do not connect it to any external signal source, ground signal, or power supply.
- If you configure a DIO line as an output, understand the current requirements of the load connected to these signals. Do not exceed the specified current output limits of the DAQ device.
- If you configure a DIO line as an input, do not drive the line with voltages outside of its normal operating range.
- Treat the DAQ device as you would treat any static sensitive device. Always properly ground yourself and the equipment when handling the DAQ device or connecting to it.

Power-On States

At system startup and reset, the hardware sets all DIO lines to high-impedance inputs. The DAQ device does not drive the signal high or low. Each line has a weak pull-up resistor connected to it.

Event Counter

You can configure P2.7 as the source for a 32-bit counter. In this mode, the device counts high to low transitions on P2.7. The counter can be armed and disarmed and the count can be read or reset through software. Refer to your software documentation for more information about counter programming techniques.

+5 V Power Source

The NI USB-6501 supplies a nominal 5 V from two pins, one on each screw terminal block. The voltage source is provided by the USB host. The voltage is nominally 5 V, but varies from system to system. Refer to the [Specifications](#) section for more information about USB bus power specifications. This source can be used to power external components.



Note While the device is in USB suspend, the output is disabled.



Caution When using the 5 V source, understand the current requirements of the load connected. Do *not* exceed the specified current output limits of the USB Vbus.

Specifications

The following specifications are typical at 25 °C, unless otherwise noted. All voltages are relative to COM unless otherwise noted.

Digital I/O

Number of lines	
P0.<0..7>.....	8
P1.<0..7>.....	8
P2.<0..7>.....	8
Direction control	Input or output, software-selectable
Output driver type	Active drive (push-pull) or open collector (open-drain), software selectable
Pull-up resistor	4.7 kΩ VBus (nominally 5 V)
Absolute voltage range.....	-0.5 to 5.8 V with respect to GND
Power-on state.....	Input (high impedance)
Digital logic levels	

Level	Min	Max	Units
Input			
Input low voltage	-0.3	0.8	V
Input high voltage	2.0	5.8	V
Input leakage current	—	50.0	μA
Output			
Output low voltage			
Open collector (open-drain) or active drive (push-pull)			
I _{OL} = 2 mA	—	0.4	V
I _{OL} = 8.5 mA	—	0.8	V
Output high voltage			
Active drive (push-pull ¹)			
I _{OH} = -2 mA	2.8	3.6	V
I _{OH} = -8.5 mA	2.0	3.5	V
Open collector (open-drain), I _{OH} = -0.4 mA, nominal	2.0	5.0	V
Open collector (open-drain), I _{OH} = -7.5 mA, with external pull-up resistor	2.0	—	V

¹ The total current sourced by all DO lines simultaneously should not exceed 65 mA.

Counter

Number of counters	1 (P2.7 can be configured as a counter)
Resolution	32 bits
Counter measurements	Falling edge counting
Maximum input frequency	5 MHz
Minimum high pulse width.....	100 ns
Minimum low pulse width.....	100 ns

Bus Interface

USB specification	USB 2.0 Full-Speed (12 Mb/s)
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External Voltage

+5 V output	
Voltage	4.00 V min, 5.25 V max
Current.....	230 mA max

Power Requirements

USB	
Input voltage	4.50 to 5.25 VDC, in configured state
Active current	80 mA typical, 500 mA max
Suspend current	500 μ A max, all DIO lines disconnected

Physical Characteristics

Dimensions	
Without connectors.....	6.35 cm \times 8.51 cm \times 2.31 cm (2.50 in. \times 3.35 in. \times 0.91 in.)
With connectors.....	8.18 cm \times 8.51 cm \times 2.31 cm (3.22 in. \times 3.35 in. \times 0.91 in.)
I/O connectors.....	USB series B receptacle, (2) 16 position (screw terminal) plug headers

Screw-terminal wiring.....	16 to 28 AWG copper conductor wire with 10 mm (0.39 in.) of insulation stripped from the end
Torque for screw terminals	0.22–0.25 N · m (2.0–2.2 lb · in.)
Weight.....	84 g (3 oz)

Safety

If you need to clean the module, wipe it with a dry towel.

Safety Voltages

Overvoltage Protection

Connect only voltages that are within these limits.

Channel-to-COM (one channel)..... ± 30 V max,
Measurement Category I

Channels-to-COM
(one port, all channels)..... ± 8.9 V max,
Measurement Category I

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as *MAINS* voltage. *MAINS* is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.



Caution Do *not* use this module for connection to signals or for measurements within Measurement Categories II, III, or IV.

Safety Standards

The NI USB-6501 is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1



Note For UL and other safety certifications, refer to the product label or visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

Hazardous Locations

The NI USB-6501 is not certified for use in hazardous locations.

Environmental

The NI USB-6501 device is intended for indoor use only.

Operating temperature

(IEC 60068-2-1 and IEC 60068-2-2).....0 to 55 °C

Operating humidity

(IEC 60068-2-56)5 to 95% RH, noncondensing

Maximum altitude.....2,000 m (at 25 °C ambient temperature)

Storage temperature

(IEC 60068-2-1 and IEC 60068-2-2).....-40 to 85 °C

Storage humidity

(IEC 60068-2-56)5 to 90% RH, noncondensing

Pollution Degree (IEC 60664).....2

Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A



Note For EMC compliance, operate this device with double-shielded cables.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)



Note Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit ni.com/certification, search by module number or product line, and click the appropriate link in the Certification column.

Environmental Management

National Instruments is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial not only to the environment but also to NI customers.

For additional environmental information, refer to the *NI and the Environment* Web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit ni.com/environment/weee.htm.

电子信息产品污染控制管理办法（中国 RoHS）



中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息, 请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At ni.com/support you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at ni.com/support and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

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Belgium 32 (0) 2 757 0020, Brazil 55 11 3262 3599,
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