WHERE TO START WITH THE NI 435*X*

This document explains how to begin using the National Instruments 4350/4351 (NI 435*X*) high-precision data acquisition (DAQ) temperature and voltage meters for PCMCIA, USB, PCI, and PXI/CompactPCI buses.

Conventions

The following conventions are used in this document:

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

♦   The ♦ symbol indicates that the following text applies only to a specific product, a specific operating system, or a specific software version.

This icon denotes a note, which alerts you to important information.

This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash. When this symbol is marked on the product, refer to the *Read Me First: Safety and Radio-Frequency Interference* document, shipped with the product, for precautions to take.

bold   Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names.

italic   Italic text denotes variables, emphasis, a cross reference, or an introduction to a key concept. This font also denotes text that is a placeholder for a word or value that you must supply.

monospace   Text in this font denotes text or characters that you should 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,

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programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.

NI 435*X*   Refers to all devices in the National Instruments 4350 and 4351 families.

Unpacking the Kit

Follow the unpacking instructions below that correspond to the NI 435*X* device.

♦   NI PCMCIA-4350

The NI PCMCIA-4350 is shipped in an antistatic vinyl package; when you are not using the NI PCMCIA-4350, store it in the antistatic vinyl package. Because the NI PCMCIA-4350 is enclosed in a fully shielded package, no additional electrostatic discharge (ESD) precautions are necessary. However, for your own safety and to protect the NI PCMCIA-4350, *never* touch the connector pins.

♦   NI PXI-4351 and NI PCI-4351

The NI PXI-4351 and NI PCI-4351 ship in antistatic vinyl packages that prevent electrostatic damage to the device. ESD can damage several components on the device. To avoid such damage when handling the device, take the following precautions:

•   Ground yourself using a grounding strap or by holding a grounded object.

•   Touch the antistatic package to a metal part on the computer chassis before removing the device from the package.

•   Remove the device from the package and inspect the device for loose components or any other sign of damage. Notify NI if the device appears damaged in any way. Do *not* install a damaged device in the computer.

•   *Never* touch the exposed connector pins.

•   Do *not* touch the printed circuit board or any components on the board because this may affect performance of the device.

⚠   **Caution**   The NI PXI-4351 and NI PCI-4351 are ESD/contamination sensitive. Handle the board using the edges or metal bracket.

♦   NI USB-4350

The NI USB-4350 is shipped in an antistatic vinyl package; when you are not using the NI USB-4350, store it in the antistatic vinyl package. Because the NI USB-4350 is enclosed in a fully shielded package, no additional

ESD precautions are necessary. However, for your own safety and to protect the NI USB-4350, *never* touch the connector pins.

What You Need to Get Started

To set up and use the NI 435*X* device, you need the following items:

❑ A computer

❑ One of the following NI 435*X* high-precision DAQ devices:
  – NI PCMCIA-4350
  – NI USB-4350
  – NI PXI-4351
  – NI PCI-4351

❑ NI-DAQ 6.9.3 or higher for PC compatibles

❑ Logger Soft Front Panel 1.0.1 or higher

❑ If you want to program with the device, use one of the following software packages and documentation:
  – LabVIEW 6.1 or later
  – Measurement Studio LabWindows™/CVI™ 4.0 or later
  – Measurement Studio for Visual Basic
  – Third-party compiler

❑ Optional cables and accessories

❑ *Read Me First: Safety and Radio-Frequency Interference*

❑ *VI Logger Soft Front Panel Note to Users*

❑ *Getting Started with VI Logger*

Installing the Software

Install NI-DAQ and the application software before you install the NI 435*X* device. If you are using LabVIEW, Measurement Studio LabWindows/CVI, or Measurement Studio for Visual Basic, refer to their software release notes for installation instructions. If you are using programming languages such as Visual Basic, C, or C++ with NI-DAQ, follow the NI-DAQ release note instructions for installing third-party compilers.

Complete the following steps to install the NI 435*X* software, which includes NI-DAQ 6.9.3, Logger Soft Front Panel 1.0.1, and the NI 435*X* instrument driver:

1. Insert the NI-DAQ 6.9.3 installation CD. Follow the instructions that appear on the screen.

2. Insert the Logger Soft Front Panel 1.0.1 and NI 435*X* instrument driver CD. Follow the instructions that appear on the screen.

3. Click **OK** to restart the computer.

After you install the software, you are ready to install the NI 435*X* hardware. Refer to the *Installing the NI 435X* section for further instructions.

Installing the NI 435*X*

⚠ **Caution** Refer to the *Read Me First: Safety and Radio-Frequency Interference* document before removing equipment covers or connecting/disconnecting any signal wires.

Power off the computer and, depending upon the device type, install the NI 435*X* following the instructions in this section.

📝 **Note** You can plug in the NI PCMCIA-4350 and NI USB-4350 at any time after the drivers are installed without powering off the computer.

♦ NI PCMCIA-4350

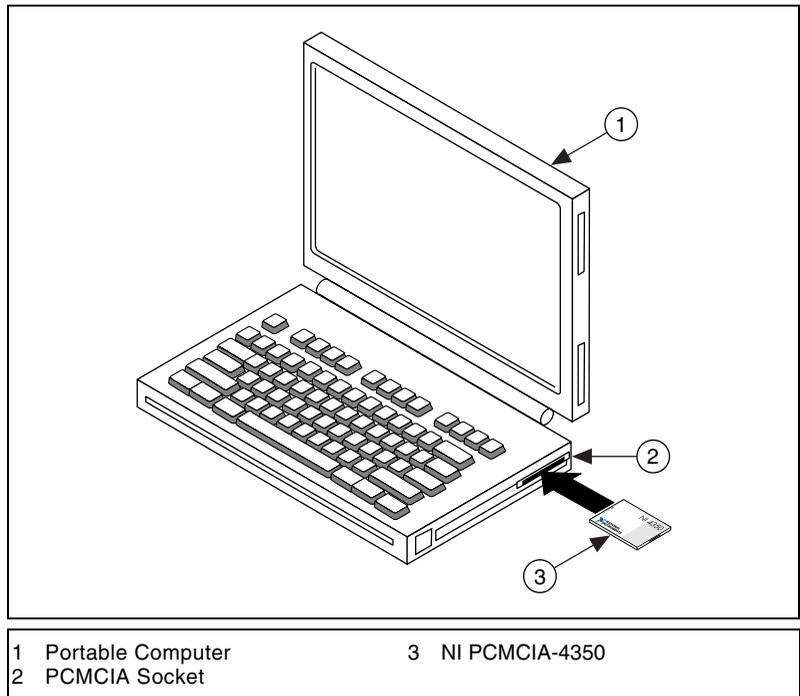|			
1	Portable Computer	3	NI PCMCIA-4350
2	PCMCIA Socket		

Figure 1. NI PCMCIA-4350 System

You can install the NI PCMCIA-4350 in any available Type II PCMCIA slot in the computer.

Windows 98 or later includes the Plug and Play services that the operating system uses. Windows NT 4.0 or higher includes the drivers needed to use PCMCIA cards. The operating system configures the NI PCMCIA-4350 and automatically assigns the base address and the interrupt level. The following are general installation instructions, but consult the PC user manual or technical reference manual for specific instructions and warnings:

1. Write down the NI PCMCIA-4350 serial number for future reference.

2. Power off the computer.

Note If the computer and operating system support hot insertion, you can insert or remove the NI PCMCIA-4350 at any time, even if the computer is powered on.

3. Remove the PCMCIA slot cover on the computer.

4. Insert the 68-pin I/O connector of the NI PCMCIA-4350 into the PCMCIA slot until the connector is firmly seated. The NI PCMCIA-4350 connectors are keyed so the device can only be inserted in one way.

The NI PCMCIA-4350 is now installed. Refer to the *Configuring and Testing the NI 435X* section next.
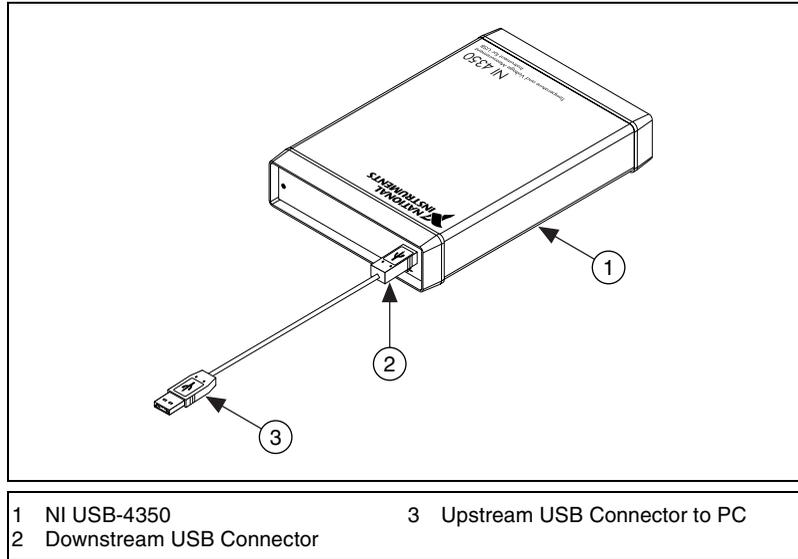
♦ NI USB-4350

| 1 | NI USB-4350 | 3 | Upstream USB Connector to PC |
| 2 | Downstream USB Connector | | |

Figure 2. NI USB-4350 with USB Cable

📝 **Note** The NI USB-4350 is only supported in Windows 2000/XP/Me/98.

You can connect the NI USB-4350 to any available USB connector that supports high-power, bus-powered peripheral devices. The following are general installation instructions, but consult the PC user manual or technical reference manual for specific instructions and warnings.

1. Connect the USB cable from the computer port or from any other hub, to the port on the NI USB-4350.

2. The computer should immediately detect the NI USB-4350. When the computer recognizes the NI USB-4350, the LED on the front panel blinks or lights up, depending on the state of the device.

If the LED lights up after the NI USB-4350 is connected to the host, the NI USB-4350 is functioning properly. If the LED remains off or blinks, refer to Table 1.

Table 1. LED Patterns for the NI USB-4350 States

LED	NI USB-4350 State	Description
On	Configured state	The NI USB-4350 is configured.
Off	Off or in the low-power, suspend mode	The NI USB-4350 is powered off or in the low-power, suspend mode.
1 blink	Attached state	The NI USB-4350 is recognized, but not configured.
2 blinks	Addressed state	The host computer detects the NI USB-4350, but cannot configure it because NI-DAQ is improperly installed or system resources are unavailable. Check the software installation.
3 blinks	Power supply failure	The internal power supply shut down. Refer to the *Power Considerations for the NI USB-4350* section in the *NI 435X User Manual* for more information.
4 blinks	General error state	Contact NI. Refer to the *Technical Support Resources* section for contact information.
The LED blinks in one-second intervals during each cycle. The LED then waits three seconds before repeating the cycle.		

The NI USB-4350 is now installed. Refer to the *Configuring and Testing the NI 435X* section next.

♦ NI PXI-4351

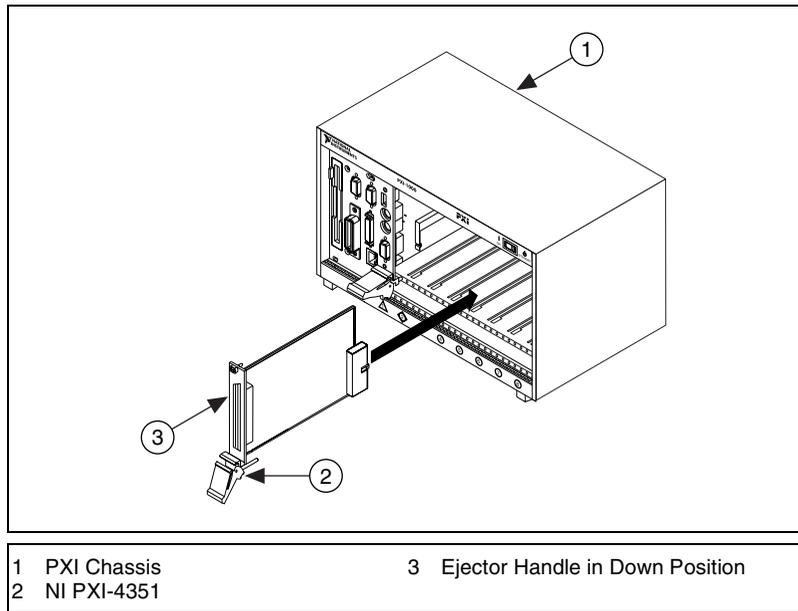| 1 PXI Chassis | 3 Ejector Handle in Down Position |
| 2 NI PXI-4351 | |

Figure 3. NI PXI-4351 with PXI Chassis

You can install the NI PXI-4351 in any available 5 V peripheral slot in the PXI or CompactPCI chassis.

Note The NI PXI-4351 does not have connections to reserved lines on the CompactPCI J2 connector. Therefore, you can use the NI PXI-4351 in a CompactPCI system that uses J2 connector lines for purposes other than PXI.

1. Write down the NI PXI-4351 serial number for future reference.

2. Plug in, but do not power on, the PXI or CompactPCI chassis.

Caution To protect both yourself and the computer from electrical hazards, do *not* power on the computer until you finish installing the NI PXI-4351.

3. Choose an unused PXI or CompactPCI 5 V peripheral slot.

4. Remove the filler panel for the peripheral slot you selected.

5. Touch a metal part on the chassis to discharge any static electricity that might be on your clothes or body.

Caution The NI PXI-4351 is ESD/contamination sensitive. Handle the device using the metal bracket or edges.

6. Insert the NI PXI-4351 into the selected 5 V slot. Use the injector/ejector handle to fully insert the device.

7. Use the screw on the front panel of the NI PXI-4351 to fasten the device to the front panel mounting rails of the PXI or CompactPCI chassis.

8. Visually verify the installation.

9. Plug in and power on the PXI or CompactPCI chassis.

The NI PXI-4351 is now installed. Refer to the *Configuring and Testing the NI 435X* section next.

♦ NI PCI-4351

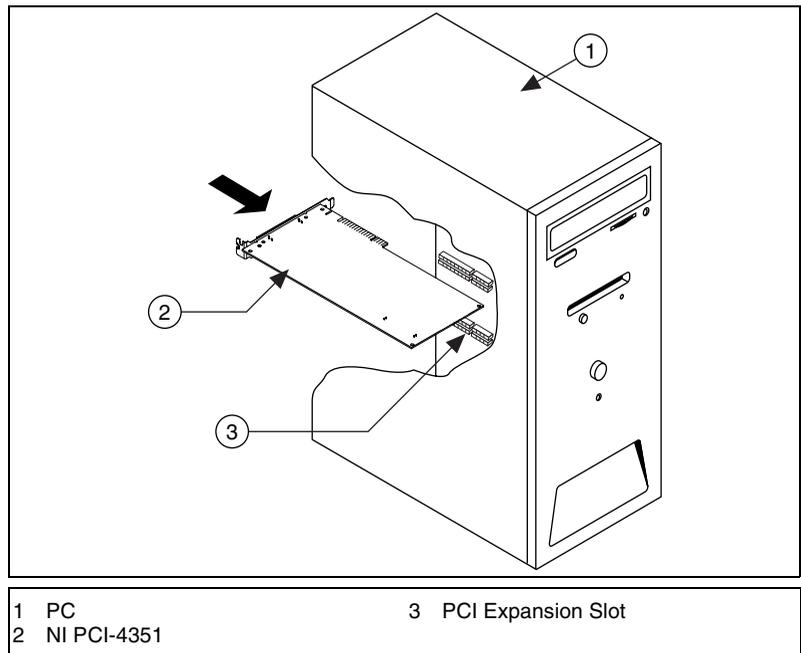| 1 | PC | 3 | PCI Expansion Slot |
| 2 | NI PCI-4351 | | |

Figure 4. NI PCI-4351 with PC

You can install the NI PCI-4351 in any available PCI expansion slot in the computer. However, to achieve the best noise performance, leave as much room as possible between the NI PCI-4351 and other boards and hardware. The following are general instructions, so consult the computer user manual or technical reference manual for specific instructions and warnings.

1. Write down the NI PCI-4351 serial number for future reference.

2. Plug in, but do not power on, the computer before installing the NI PCI-4351 device. The power cord grounds the computer and protects it from electrical damage while you are installing the module.

⚠ **Caution** To protect both yourself and the computer from electrical hazards, do *not* power on the computer until you finish installing the NI PCI-4351.

3. Remove the top cover or access port to the PCI bus.

4. Select any available PCI expansion slot.

5. Locate the metal bracket that covers the cut-out in the back panel of the chassis for the slot you selected. Remove and save the bracket-retaining screw and the bracket cover.

6. Touch the metal part of the power supply case inside the computer to discharge any static electricity that might be on your clothes or body.

⚠ **Caution** The NI PCI-4351 is ESD/contamination sensitive. Handle the device using the metal bracket or edges.

7. Line up the NI PCI-4351 with the 68-pin connector near the cut-out on the back panel. Using slow, evenly distributed pressure, press the NI PCI-4351 straight down until it seats in the expansion slot.

8. Reinstall the bracket-retaining screw to secure the NI PCI-4351 to the back panel rail.

9. Visually verify the installation.

10. Replace the computer cover and power on the computer.

The NI PCI-4351 is now installed. Refer to the *Configuring and Testing the NI 435X* section next.

Configuring and Testing the NI 435*X*

The NI 435*X* is a completely software-configurable, Plug and Play device. The Plug and Play services query the device and allocate the required resources; then, the operating system enables the device for operation.

Complete the following steps to configure and test the NI 435*X*:

1. Launch **Measurement & Automation Explorer** (MAX) from the computer.

📝 **Note** You may want to first refresh <F5> in MAX.

2. Expand **Devices and Interfaces**.

3. Right-click the NI 435*X* device and select **Properties**. In the **System** window, note the Device Number that was assigned. Use this device number when you program the device.

4. From the **System** window, click **Test Resources** to test the NI 435*X* resources. A dialog box appears and indicates whether the resource test was passed.

5. In the **Accessory** window, select the accessory, if any, attached to the NI 435*X* device.

Note Selecting the accessory allows NI-DAQ to make use of accessory features, such as a cold-junction compensation channel.

6. From the **System** window, click **Run Test Panels** to run functional test panels.

7. Connect a signal to an input channel on the attached accessory.

8. Select the **Channel**, **Input Limits**, and **Sensor Type** settings. If the sensor type is a thermocouple, select the correct option in **CJC Info**. The NI 435*X* device immediately starts acquiring data.

9. When you finish testing, click **Close** and then **OK** in the **Configuring Devices** window.

When you finish configuring and testing the NI 435*X*, you can use **Logger Soft Front Panel** from within MAX. Use the Logger Soft Front Panel to control the NI 435*X* without doing any programming. Refer to the *Logger Soft Front Panel Note to Users* for a list of the available features. Refer to the *Getting Started with VI Logger* to learn how to use the available features of the Logger Soft Front Panel.

If you want to program in LabVIEW, refer to the NI-DAQ VI reference within *LabVIEW Help* and the NI 435*X* NI-DAQ examples for programs and examples for the NI 435*X* product. To access *LabVIEW Help* from within LabVIEW select **Help»VI, Function, and How-To Help**. To program with Measurement Studio LabWindows/CVI, Visual Basic, Visual C/C++, or a third-party software, install the NI 435*X* instrument driver available on the CD.

Technical Support Resources

NI Web Support

NI Web support is your first stop for help in solving installation, configuration, and application problems and questions. Online problem-solving and diagnostic resources include frequently asked questions, knowledge bases, product-specific troubleshooting wizards, manuals, drivers, software updates, and more. Web support is available through the Technical Support section of ni.com.

Worldwide Support

NI has offices located around the world to help address your support needs. You can access our branch office Web sites from the Worldwide Offices section of ni.com. Branch office Web sites provide up-to-date contact information, support phone numbers, email addresses, and current events.

If you have searched the technical support resources on our Web site and still cannot find the answers you need, contact your local office or NI corporate. For telephone support in the United States, dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

Australia 03 9879 5166, Austria 0662 45 79 90 0, Belgium 02 757 00 20, Brazil 55 11 3262 3599, Canada (Calgary) 403 274 9391, Canada (Montreal) 514 288 5722, Canada (Ottawa) 613 233 5949, Canada (Québec) 514 694 8521, Canada (Toronto) 905 785 0085, China 86 21 6555 7838, Czech Republic 02 2423 5774, Denmark 45 76 26 00, Finland 09 725 725 11, France 01 48 14 24 24, Germany 089 741 31 30, Greece 01 42 96 427, Hong Kong 2645 3186, India 91 80 4190000, Israel 03 6393737, Italy 02 413091, Japan 03 5472 2970, Korea 02 3451 3400, Malaysia 603 9596711, Mexico 001 800 010 0793, Netherlands 0348 433466, New Zealand 09 914 0488, Norway 32 27 73 00, Poland 22 3390 150, Portugal 210 311 210, Russia 095 238 7139, Singapore 65 6 226 5886, Slovenia 3 425 4200, South Africa 11 805 8197, Spain 91 640 0085, Sweden 08 587 895 00, Switzerland 056 200 51 51, Taiwan 02 2528 7227, United Kingdom 01635 523545