GETTING STARTED GUIDE

NI PXI-4110

Triple-Output Programmable DC Power Supply

Note Before you begin, install and configure your chassis and controller.

This document explains how to install, configure, and test the NI PXI-4110 (NI 4110). The NI 4110 is a triple-output programmable DC power supply.

To access NI 4110 documentation, navigate to **Start**»**All Programs**»**National Instruments**»**NI-DCPower**»**Documentation**.

Contents

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with

radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

⚠ **Caution** To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

⚠ **Caution** To ensure the specified EMC performance, the length of all attached cables must be no longer than 30 m (100 ft). In addition, the cable or cables connected to the Output port must be provided with an overall shield that is terminated to pin 2 (⏚).

Verifying the System Requirements

To use the NI-DCPower instrument driver, your system must meet certain requirements.

For more information about minimum system requirements, recommended system, and supported application development environments (ADEs), refer to the product readme, which is available on the driver software media or online at *ni.com/updates*.

Safety

⚠ **Caution** Always refer to the specifications document included with the NI 4110 device before connecting signals. Failure to observe the specified maximum signal ratings can cause shock, a fire hazard, or damage to the devices connected to the NI 4110. NI is not liable for any damage or injuries resulting from incorrect signal connections.

Related Information

For information about connecting signals for specific devices, refer to the NI DC Power Supplies and SMUs Help.

Unpacking the Kit

⚠ **Caution** To prevent electrostatic discharge (ESD) from damaging the device, ground yourself using a grounding strap or by holding a grounded object, such as your computer chassis.

1. Touch the antistatic package to a metal part of the computer chassis.
2. Remove the device from the package and inspect the device for loose components or any other sign of damage.

⚠ **Caution** Never touch the exposed pins of connectors.

Notify NI if the device appears damaged in any way. Do not install a damaged device.

3. Unpack any other items and documentation from the kit.

Store the device in the antistatic package when the device is not in use.

Kit Contents

Figure 1. NI 4110 Kit Contents
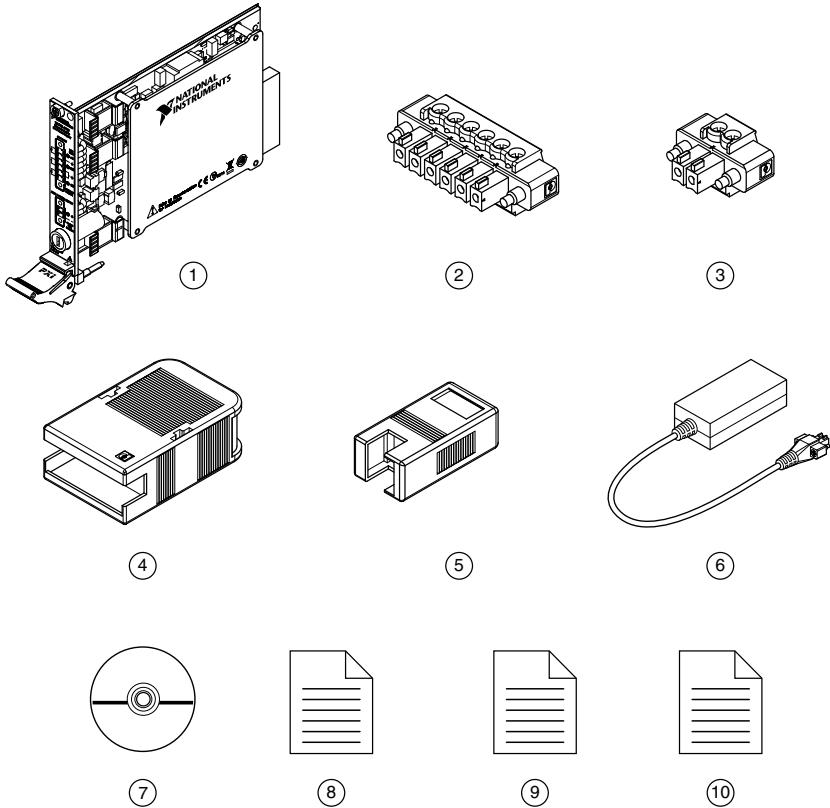
1. NI PXI-4110 Power Supply
2. 6-position MINI-COMBICON Connector
3. 2-position MINI-COMBICON Connector
4. Backshell for 6-position MINI-COMBICON Connector
5. Backshell for 2-position MINI-COMBICON Connector
6. (Optional) Auxiliary 12 V Power Source
7. Driver Software DVD
8. NI PXI-4110 Getting Started Guide (this document)
9. Read Me First: Safety and Electromagnetic Compatibility
10. Maintain Forced-Air Cooling Note to Users

Other Equipment

There are several required items not included in your device kit that you need to operate the NI 4110. Your application may require additional items not included in your kit to install or operate your device.

Required Items

- A PXI or PXI Express hybrid chassis and chassis documentation. For more information about compatible chassis options, refer to *ni.com*.
- A PXI embedded controller or MXI controller system that meets the system requirements specified in this guide and chassis documentation.
- 1/8 in. flathead screwdriver

Optional Item

- If you choose to connect an optional auxiliary 12 V power source to the device, you must either purchase an NI APS-4100 auxiliary power source from NI (part number 779671-01) or use an auxiliary power source from a third-party vendor.

Related Information

Installing the NI 4110 on page 5

Preparing the Environment

Ensure that the environment you are using the NI 4110 in meets the following specifications.

Operating Environment

    Ambient temperature range........................0 °C to 55 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)

    Relative humidity range.............................10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.)

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

Pollution Degree...2

Indoor use only.

> **Note** Refer to the device specifications on *ni.com/manuals* for complete specifications.

Installing the Software

You must be an Administrator to install NI software on your computer.

1. Install an ADE, such as LabVIEW or LabWindows™/CVI™.

2. Insert the driver software media into your computer. The installer should open automatically.

   If the installation window does not appear, navigate to the drive, double-click it, and double-click `autorun.exe`.

3. Follow the instructions in the installation prompts.

   Note Windows users may see access and security messages during installation. Accept the prompts to complete the installation.

4. When the installer completes, select **Restart** in the dialog box that prompts you to restart, shut down, or restart later.

Installing the NI 4110

⚠ **Caution** To prevent damage to the device caused by ESD or contamination, handle the device using the edges or the metal bracket.

1. Ensure the AC power source is connected to the chassis before installing the modules.

   The AC power cord grounds the chassis and protects it from electrical damage while you install the modules.

2. Power off the chassis.

3. Inspect the slot pins on the chassis backplane for any bends or damage prior to installation. Do not install a module if the backplane is damaged.

4. Remove the black plastic connectors from all the captive screws on the module front panel.

5. Identify a supported slot in the chassis. The following figure shows the symbols that indicate the slot types.

Figure 2. Chassis Compatibility Symbols
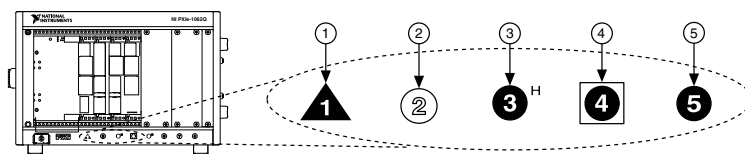
1. PXI Express System Controller Slot
2. PXI Peripheral Slot
3. PXI Express Hybrid Peripheral Slot
4. PXI Express System Timing Slot
5. PXI Express Peripheral Slot

   NI 4110 modules can be placed in PXI peripheral slots or PXI Express Hybrid peripheral slots.

6. Touch any metal part of the chassis to discharge static electricity.

7. Ensure that the ejector handle is in the unlatched (downward) position.

8. Place the module edges into the module guides at the top and bottom of the chassis. Slide the device into the slot until it is fully inserted.

Figure 3. Module Installation
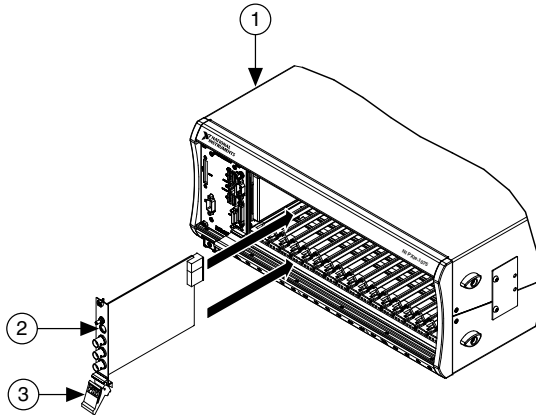
1. Chassis
2. Hardware Module
3. Ejector Handle in Down (Unlatched) Position

9. Latch the module in place by pulling up on the ejector handle.
10. Secure the device front panel to the chassis using the front-panel mounting screws.

> **Note** Tightening the top and bottom mounting screws increases mechanical stability and also electrically connects the front panel to the chassis, which can improve the signal quality and electromagnetic performance.

11. Cover all empty slots using filler panels or slot blockers to maximize cooling air flow.
12. (Optional) To gain full output power of the isolated channels on the NI 4110, connect an auxiliary 12 V power source to the auxiliary power input connector of the device. Tighten the screws to hold the auxiliary 12 V power source in place.

> **Note** The NI 4110 automatically uses the optional auxiliary 12 V power source, if it is available, when the session is opened. To override this feature, use the Power Source property or the NIDCPOWER_ATTR_POWER_SOURCE attribute.

Figure 4. Connecting an Optional Auxiliary 12 V Power Source
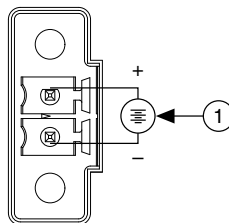
1. Optional Auxiliary Power Source

Note The auxiliary power source provided by NI uses sufficient wire gauge to maintain voltage requirements for the device. If you use a third-party auxiliary power source, you must use the appropriate wire gauge to ensure that it can provide the required device current without dropping below the minimum voltage at the auxiliary power input connector.

13. Power on the chassis.

Related Information

For information about wire gauge, refer to the NI DC Power Supplies and SMUs Help.

For internal and auxiliary power ratings, refer to the specifications for your device.

For more information about using an optional auxiliary 12 V power source with your device, refer to the Internal and Auxiliary Power topic in the NI DC Power Supplies and SMUs Help.

Configuring the NI 4110 in MAX

Use Measurement & Automation Explorer (MAX) to configure your National Instruments hardware. MAX informs other programs about which devices reside in the system and how they are configured. MAX is automatically installed with NI-DCPower.

1. Launch MAX.

2. In the configuration tree, double-click **Devices and Interfaces** to see the list of installed devices.

   Installed devices appear under the name of their associated chassis.

3. Expand your **Chassis** tree item.

   MAX lists all devices installed in the chassis. Your default device names may vary.

   Note If you do not see your device listed, press <F5> to refresh the list of installed devices. If the device is still not listed, power off the system, ensure the device is correctly installed, and restart.

4. Record the device identifier MAX assigns to the hardware. Use this identifier when programming the NI 4110.

5. Self-test the device by selecting the device in the configuration tree and clicking **Self-Test** in the MAX toolbar.

   The MAX self-test performs a basic verification of hardware resources.

Programming the NI 4110

You can generate signals interactively using the NI-DCPower Soft Front Panel (SFP) or you can use the NI-DCPower instrument driver to program your device in the supported ADE of your choice.

Table 1. NI 4110 Programming Options

Application Programming Interface (API)	Location	Description
NI-DCPower SFP	Available from the start menu at **Start**»**All Programs**»**National Instruments**»**NI-DCPower**»**NI-DCPower Soft Front Panel**.	The NI-DCPower SFP acquires, controls, and presents data. The NI-DCPower SFP operates on the PC, to provide additional display capabilities.
NI-DCPower Instrument Driver	LabVIEW—Available on the LabVIEW Functions palette at **Measurement I/O**»**NI-DCPower**.	NI-DCPower configures and operates the device hardware and performs basic acquisition and measurement options using LabVIEW VIs or LabWindows/CVI functions.
	C or LabWindows/CVI—Available at **Program Files**»**IVI Foundation**»**IVI**»**Drivers**»**NI-DCPower**.	
	Microsoft Visual C/C++—NI-DCPower does not ship with installed C/C++ examples.	Refer to the *Creating an Application with Microsoft Visual C and C++* topic of the *NI DC Power Supplies and SMUs Help* to manually add all required include and library files to your project.

Troubleshooting

If an issue persists after you complete a troubleshooting procedure, contact NI technical support or visit *ni.com/support*.

What Should I Do if the NI 4110 Doesn't Appear in MAX?

1. In the MAX configuration tree, click **Devices and Interfaces**.
2. Expand the **Chassis** tree to see the list of installed devices, and press <F5> to refresh the list.

3. If the module is still not listed, power off the system, ensure that all hardware is correctly installed, and restart the system.
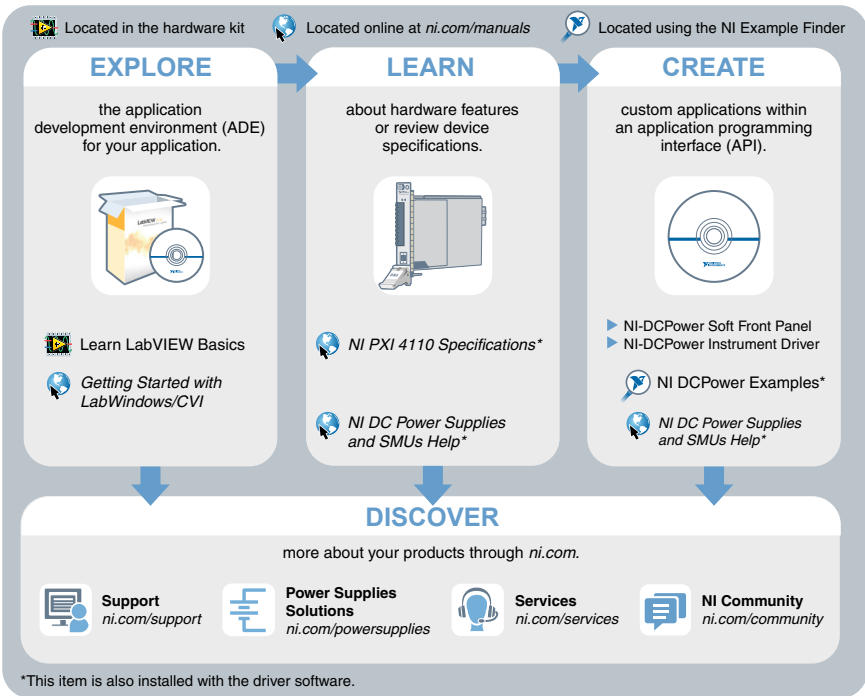
4. Navigate to the Device Manager.

Operating System	Description
Windows 8	Right-click the Start screen, and select **All apps**»**Control Panel**»**Hardware and Sound**»**Device Manager**.
Windows 7	Select **Start**»**Control Panel**»**Device Manager**.
Windows Vista	Select **Start**»**Control Panel**»**System and Maintenance**»**Device Manager**.
Windows XP	Select **Start**»**Control Panel**»**System**»**Hardware**»**Device Manager**.

5. If you are using a PXI controller, verify that a **National Instruments** entry appears in the system device list. Reinstall NI-DCPower and the device if error conditions appear in the list. If you are using an MXI controller, right-click **PCI-to-PCI Bridge**, and select **Properties** from the shortcut menu to verify that the bridge is enabled.

What Should I Do if the Module Fails the Self-Test?

1. Restart the system.
2. Launch MAX, and perform the self-test again.
3. Power off the chassis.
4. Reinstall the failed module in a different slot.
5. Power on the chassis.
6. Perform the self-test again.

Where To Go Next

Located in the hardware kit	Located online at *ni.com/manuals*	Located using the NI Example Finder
EXPLORE	**LEARN**	**CREATE**
the application development environment (ADE) for your application.	about hardware features or review device specifications.	custom applications within an application programming interface (API).
Learn LabVIEW Basics *Getting Started with LabWindows/CVI*	*NI PXI 4110 Specifications** *NI DC Power Supplies and SMUs Help**	▶ NI-DCPower Soft Front Panel ▶ NI-DCPower Instrument Driver NI DCPower Examples* *NI DC Power Supplies and SMUs Help**

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*This item is also installed with the driver software.

Worldwide Support and Services

The National Instruments website 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.

Visit *ni.com/services* for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit *ni.com/register* to register your National Instruments product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You

can obtain the DoC for your product by visiting *ni.com/certification*. If your product supports calibration, you can obtain the calibration certificate for your product at *ni.com/calibration*.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world. For telephone support in the United States, create your service request at *ni.com/support* or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the *Worldwide Offices* section of *ni.com/niglobal* to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.