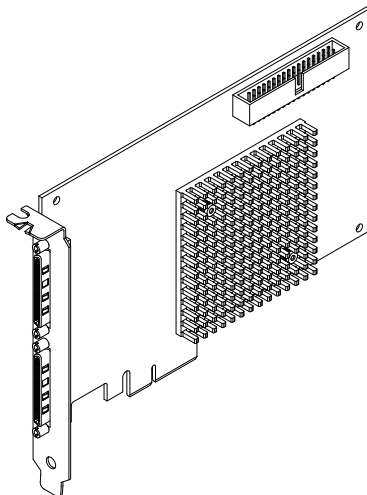# NI PCIe-7857

R Series Digital I/O Module for PCI Express, 8 AI, 8 AO, 48 DIO,
1 MS/s AI, 512 MB DRAM, Kintex-7 160T FPGA

This document describes how to begin using the PCIe-7857.

Safety Guidelines

⚠ **Caution** Observe all instructions and cautions in the user documentation. Using the model in a manner not specified can damage the model and compromise the built-in safety protection. Return damaged models to NI for repair.

EMC 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 NI could void your authority to operate it under your local regulatory rules.

Notice Operate this product only with shielded cables and accessories.

Notice The length of all I/O cables must be no longer than 3 m (10 ft).

Preparing the Environment

Ensure that the environment in which you are using the NI PCIe-7857 meets the following specifications.

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

Storage Environment

Temperature	
Operating[1]	0 °C to 55 °C
Storage	-20 °C to 70 °C
Humidity	
Operating	10% RH to 90% RH, noncondensing
Storage	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m (at 25 °C ambient temperature)

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[1] For PCI Express adapter cards without integrated air movers, NI defines the local operational ambient environment to be 25 mm (1 in.) upstream of the leading edge of the card with system airflow of at least 0.4 m/s (80 LFM) for half length cards and 0.6 m/s (120 LFM) for three-quarter length cards. For more information about the local operational ambient environment definition for PCI Express adapter cards, visit *ni.com/info* and enter the Info Code `pcielocalambient`.

Unpacking the Kit

⊙ **Notice** 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.

⊙ **Notice** Never touch the exposed pins of connectors.

📝 **Note** Do not install a device if it appears damaged in any way.

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

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

Verifying the Kit Contents

Verify that the following items are included in the PCIe-7857 kit.

Figure 1. PCIe-7857 Kit Contents
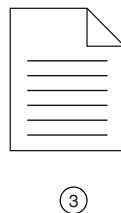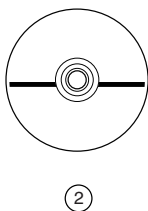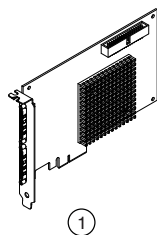
1. Hardware
2. NI-RIO Media
3. Getting Started Guide

Installing Software on the Host Computer

Before using the PCIe-7857, you must install the following application software and device drivers on the host computer.

1. LabVIEW 2018 SP1 or later
2. LabVIEW FPGA Module 2018 or later
3. NI R Series Multifunction RIO Device Drivers January 2019 or later

Visit *ni.com/info* and enter the Info Code `softwareversion` for minimum software support information.

Installing the PCIe-7857

1. Power off and unplug the computer.
2. Access the computer system expansion slots. This step might require you to remove one or more access panels on the computer case.
3. Locate a compatible slot and remove the corresponding slot cover on the computer back panel.
4. Touch any metal part of the computer to discharge any static electricity.
5. Insert the PCIe-7857 into the applicable PCI Express system slot. Gently rock the PCIe-7857 into place. Do not force the device into place.

   You cannot install PCI Express devices in PCI slots. PCI Express devices support up-plugging into a PCI Express slot of higher lane width. For more information, refer to *ni.com/pciexpress*.

Figure 2. Installing a PCI Express Device
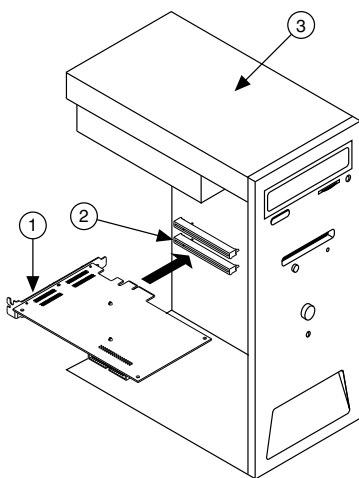
1. PCI Express Device
2. PCI Express System Slot
3. PC with PCI Express Slot

6. Secure the module mounting bracket to the computer back panel rail.
7. Replace any access panels on the computer case.
8. Plug in and power on your computer.
9. If applicable, install accessories and/or terminal blocks as described in the installation guides.
10. Attach sensors and signal lines to the device, terminal block, or accessory terminals.

Verifying Hardware Installation

You can verify that the system recognizes the PCIe-7857 by using Measurement & Automation Explorer (MAX).

1. Launch MAX by navigating to **Start**»**All Programs**»**National Instruments**»**MAX** or by clicking the MAX desktop icon.

2. Expand **Devices and Interfaces**.

3. Verify that the device appears under **Devices and Interfaces**.

   If the device does not appear, press <F5> to refresh the view in MAX. If the device does not appear after refreshing the view, visit *ni.com/support* for troubleshooting information.
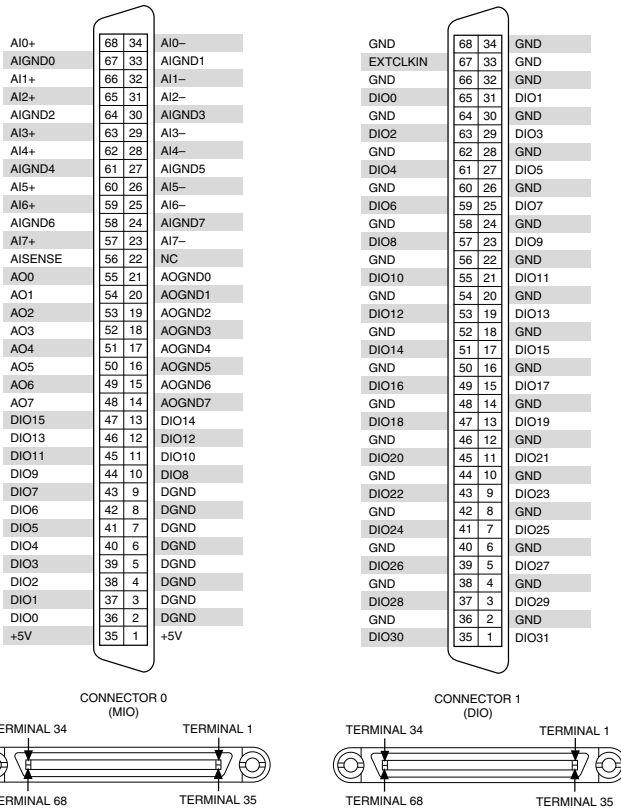
Pinout

AI0+	68	34	AI0–		GND	68	34	GND
AIGND0	67	33	AIGND1		EXTCLKIN	67	33	GND
AI1+	66	32	AI1–		GND	66	32	GND
AI2+	65	31	AI2–		DIO0	65	31	DIO1
AIGND2	64	30	AIGND3		GND	64	30	GND
AI3+	63	29	AI3–		DIO2	63	29	DIO3
AI4+	62	28	AI4–		GND	62	28	GND
AIGND4	61	27	AIGND5		DIO4	61	27	DIO5
AI5+	60	26	AI5–		GND	60	26	GND
AI6+	59	25	AI6–		DIO6	59	25	DIO7
AIGND6	58	24	AIGND7		GND	58	24	GND
AI7+	57	23	AI7–		DIO8	57	23	DIO9
AISENSE	56	22	NC		GND	56	22	GND
AO0	55	21	AOGND0		DIO10	55	21	DIO11
AO1	54	20	AOGND1		GND	54	20	GND
AO2	53	19	AOGND2		DIO12	53	19	DIO13
AO3	52	18	AOGND3		GND	52	18	GND
AO4	51	17	AOGND4		DIO14	51	17	DIO15
AO5	50	16	AOGND5		GND	50	16	GND
AO6	49	15	AOGND6		DIO16	49	15	DIO17
AO7	48	14	AOGND7		GND	48	14	GND
DIO15	47	13	DIO14		DIO18	47	13	DIO19
DIO13	46	12	DIO12		GND	46	12	GND
DIO11	45	11	DIO10		DIO20	45	11	DIO21
DIO9	44	10	DIO8		GND	44	10	GND
DIO7	43	9	DGND		DIO22	43	9	DIO23
DIO6	42	8	DGND		GND	42	8	GND
DIO5	41	7	DGND		DIO24	41	7	DIO25
DIO4	40	6	DGND		GND	40	6	GND
DIO3	39	5	DGND		DIO26	39	5	DIO27
DIO2	38	4	DGND		GND	38	4	GND
DIO1	37	3	DGND		DIO28	37	3	DIO29
DIO0	36	2	DGND		GND	36	2	GND
+5V	35	1	+5V		DIO30	35	1	DIO31

CONNECTOR 0
(MIO)

TERMINAL 34   TERMINAL 1

TERMINAL 68   TERMINAL 35

CONNECTOR 1
(DIO)

TERMINAL 34   TERMINAL 1

TERMINAL 68   TERMINAL 35

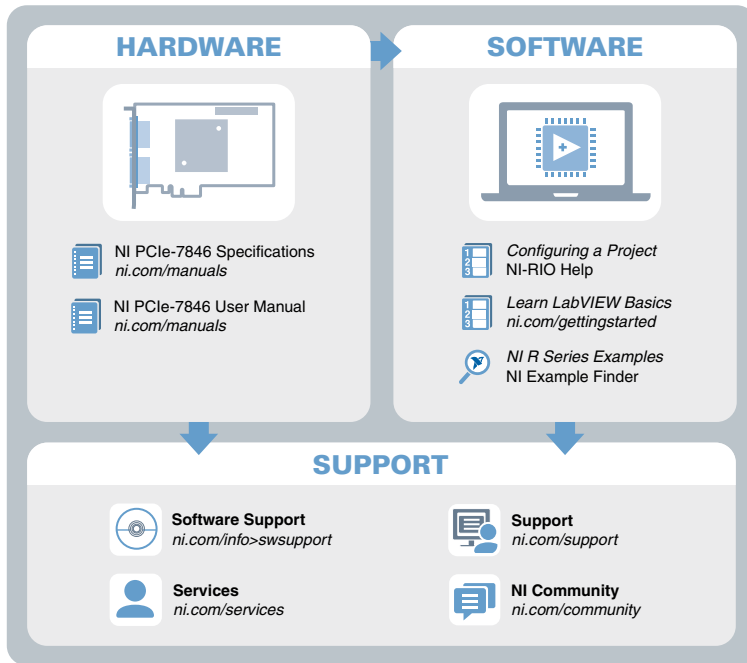**Table 1.** PCIe-7857 Signal Descriptions

Signal	Description
AI+	Positive analog input signal connection
AI-	Negative analog input signal connection
AISENSE	Reference connection for NRSE measurements
AIGND	Ground reference for the analog input signal
AO	Analog output signal connection
AOGND	Ground reference for the analog output signal
DIO	Digital input/output signal connection
DGND	Ground reference for the digital signal
EXTCLKIN	External clock input source that can be used for source synchronous acquisitions. The provided clock source must be stable and glitch-free.
GND	Ground connection
Supply (+5 V_{out})	5 V power output connection for external devices
NC	No connection

The PCIe-7857 is protected from overvoltage and overcurrent conditions.

Note Refer to the device specifications, available at *ni.com/manuals* for more information.

Where to Go Next

HARDWARE

NI PCIe-7846 Specifications
ni.com/manuals

NI PCIe-7846 User Manual
ni.com/manuals

SOFTWARE

Configuring a Project
NI-RIO Help

Learn LabVIEW Basics
ni.com/gettingstarted

NI R Series Examples
NI Example Finder

SUPPORT

Software Support
ni.com/info>swsupport

Support
ni.com/support

Services
ni.com/services

NI Community
ni.com/community

Worldwide Support and Services

The NI 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 information about the services NI offers.

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

NI corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. NI also has offices located around the world. For support in the United States, create your service request at *ni.com/support* or dial 1 866 ASK MYNI (275 6964). For 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.