

## DEVICE SPECIFICATIONS

# NI PXIe-7971R

## NI FlexRIO™ FPGA Module for PXI Express

This document lists the specifications for the NI PXIe-7971R (NI 7971R) FPGA module. Specifications are subject to change without notice. For the most recent device specifications, refer to [ni.com/manuals](http://ni.com/manuals). Refer to your adapter module documentation for the adapter module specifications.



**Note** Typical values are representative of an average unit operating at room temperature. These specifications are typical at 25 °C unless otherwise noted.

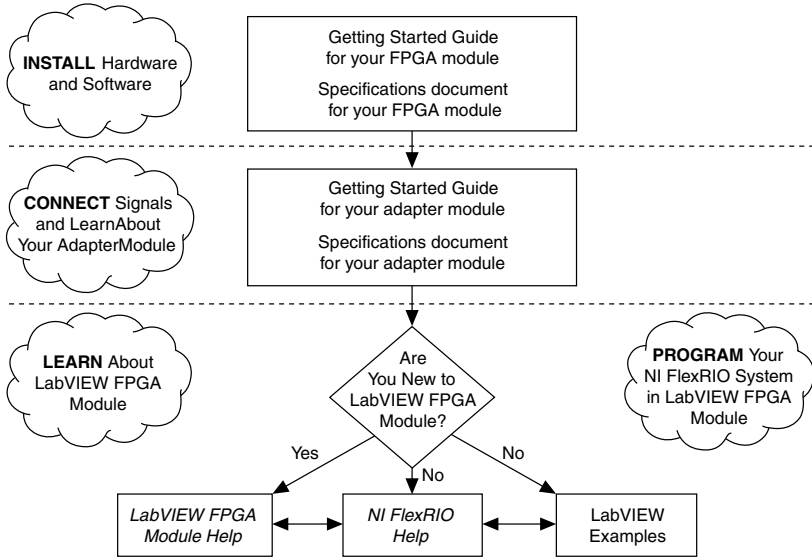
## Contents

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How to Use Your NI FlexRIO Documentation Set.....	2
Reconfigurable FPGA .....	3
FPGA Digital Input/Output.....	4
Bus Interface.....	4
Maximum Power Requirements.....	5
Physical.....	5
NI FlexRIO FPGA Module Signals.....	5
Maximum Working Voltage.....	6
Environment.....	7
Operating Environment.....	7
Storage Environment.....	7
Shock and Vibration.....	7
Compliance and Certifications.....	8
Safety.....	8
Electromagnetic Compatibility.....	8
CE Compliance .....	8
Online Product Certification.....	9
Environmental Management.....	9

# How to Use Your NI FlexRIO Documentation Set

**Figure 1.** How to Use Your NI FlexRIO Documentation Set



**Table 1.** NI FlexRIO Documentation Locations and Descriptions

Document	Location	Description
Getting started guide for your FPGA module	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains installation instructions for your NI FlexRIO system.
Specifications document for your FPGA module	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains specifications for your NI 7971R module.
Getting started guide for your adapter module	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains signal information, examples, and CLIP details for your adapter module.
Specifications document for your adapter module	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains specifications for your adapter module.
<i>LabVIEW FPGA Module Help</i>	Embedded in <i>LabVIEW Help</i> and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains information about the basic functionality of the LabVIEW FPGA Module.

**Table 1.** NI FlexRIO Documentation Locations and Descriptions (Continued)

Document	Location	Description
<i>NI FlexRIO Help</i>	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains information about the FPGA module, adapter module, and CLIP configuration information.
LabVIEW Examples	Available in NI Example Finder. In LabVIEW, click <b>Help»Find Examples»Hardware Input and Output»FlexRIO</b> .	Contains examples of how to run FPGA VIs and Host VIs on your device.
IPNet	<a href="http://ni.com/ipnet">ni.com/ipnet</a>	Contains LabVIEW FPGA functions and intellectual property to share.
NI FlexRIO product page	<a href="http://ni.com/flexrio">ni.com/flexrio</a>	Contains product information and data sheets for NI FlexRIO devices.

## Reconfigurable FPGA

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FPGA.....	Kintex-7 XC7K325T
LUTs.....	203,800
DSP48 Slices (25 × 18 Multiplier).....	840
Embedded Block RAM (kbits).....	16,020
Default timebase.....	40 MHz
Timebase reference sources.....	PXI Express 100 MHz (PXIe_CLK100)
Timebase accuracy.....	±100 ppm, 250 ps peak-to-peak jitter
Data transfers.....	DMA, interrupts, programmed I/O
Number of DMA channels.....	32

# FPGA Digital Input/Output

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Number of general-purpose channels.....	136, configurable as 136 single-ended, 68 differential, or a combination of both <sup>1</sup>
Channels per bank	
Bank 0/Bank 1.....	48
Bank 2.....	40
Compatibility.....	Configured through the FPGA and based on the attached adapter module; 1.2 V, 1.5 V, 1.8 V, 2.5 V, and 3.3 V I/O standards (refer to <a href="http://xilinx.com">xilinx.com</a> ).
Protection.....	Refer to <a href="http://xilinx.com">xilinx.com</a> .
Current.....	Refer to <a href="http://xilinx.com">xilinx.com</a> .
Maximum I/O data rates	
Single-ended.....	400 Mb/s
Differential.....	1 Gb/s for LVDS
Multi-region clock inputs.....	6
Single-region clock inputs.....	5
Connection resources.....	PXI triggers, PXI_CLK10, PXI star trigger, PXIe_DStarA, PXIe_DStarB, PXIe_DStarC, and PXIe_Sync100

## Bus Interface

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Form factor.....	x4 PXI Express, specification v2.1 compliant
Slot compatibility.....	x4, x8, and x16 PXI Express or PXI Express hybrid slots

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<sup>1</sup> The 136 channels span across three FPGA banks.

# Maximum Power Requirements

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**Note** Power requirements are dependent on the adapter module and contents of the LabVIEW FPGA VI used in your application.

+3.3 VDC ( $\pm 5\%$ ).....	3 A
+12 V.....	3 A

## Physical

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Dimensions (not including ..... 18.8 cm  $\times$  12.9 cm (7.4 in.  $\times$  5.1 in.)  
connectors)

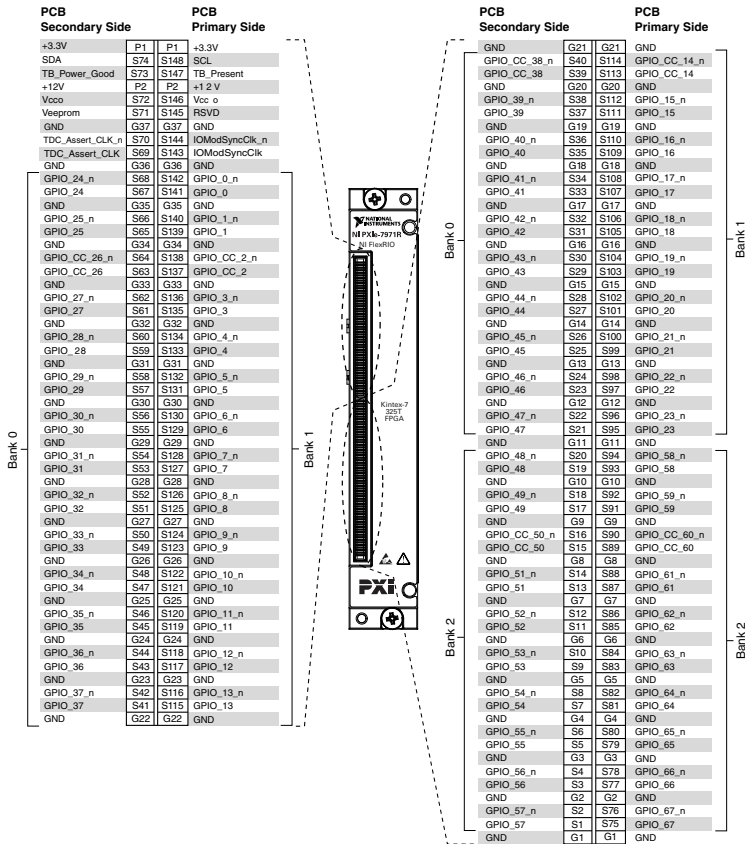
Weight..... 190 g (6.7 oz)

## NI FlexRIO FPGA Module Signals

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The following figure shows the available signals on the NI FlexRIO FPGA module. Refer to your adapter module specifications for your adapter module pinout.

**Figure 2. NI FlexRIO FPGA Module Front Connector Pin Assignments and Locations**



**Note** Pins S72 and S146 are shorted together on the NI 7971R.

## Maximum Working Voltage



**Note** Maximum working voltage refers to the signal voltage plus the common-mode voltage.

Channel-to-earth.....0 V to 3.3 V, Measurement Category I

Channel-to-channel.....0 V to 3.3 V, Measurement Category I



**Caution** Do not use this device for connecting to signals in Measurement Categories II, III, or IV.

# Environment

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Maximum altitude.....2,000 m (800 mbar) (at 25 °C ambient temperature)

Pollution Degree.....2

Indoor use only.

## Operating Environment

Ambient temperature range.....0 °C to 55 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit and MIL-PRF-28800F Class 2 high temperature limit.)

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

## Storage Environment

Ambient temperature range.....-20 °C to 70 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity range.....5% to 95%, noncondensing (Tested in accordance with IEC-60068-2-56.)

## Shock and Vibration

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Operating shock.....30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC-60068-2-27. Meets MIL-PRF-28800F Class 2 limits.)

Random vibration

    Operating.....5 Hz to 500 Hz, 0.3 g<sub>rms</sub>

    Nonoperating.....5 Hz to 500 Hz, 2.4 g<sub>rms</sub> (Tested in accordance with IEC-60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

# Compliance and Certifications

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## Safety

This product is designed to meet the requirements of the following electrical equipment safety standards 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 the [Online Product Certification](#) section.

## Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions



**Note** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia, and New Zealand (per CISPR 11), Class A equipment is intended for use only in heavy-industrial locations.



**Note** Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.



**Note** For EMC declarations, certifications, and additional information, refer to the [Online Product Certification](#) section.

## CE Compliance

This product meets the essential requirements of applicable European Directives, as follows:

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



## Online Product Certification

To obtain product certifications and the DoC for this product, visit [ni.com/certification](https://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at [ni.com/environment](https://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 the product life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit [ni.com/environment/weee](https://ni.com/environment/weee).

## 电子信息产品污染控制管理办法（中国 RoHS）



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