

## SPECIFICATIONS

# NI PXIe-7820R

R Series for PXI Express Digital RIO with Kintex-7 160T FPGA

Français	Deutsch	日本語	한국어	简体中文
<a href="http://ni.com/manuals">ni.com/manuals</a>				

This document contains the specifications for the NI PXIe-7820R. Specifications are typical at 25 °C unless otherwise noted.



**Caution** Using the NI PXIe-7820R in a manner not described in this document may impair the protection the NI PXIe-7820R provides.

## Digital I/O

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Number of connectors.....	4
Number of channels per connector.....	32
Maximum frequency.....	80 MHz
Compatibility.....	LVTTL, LVCMOS
Logic family.....	Software-selectable
Default software setting.....	3.3 V

**Table 1.** Digital Input Logic Levels

Logic Family	Input Low Voltage ( $V_{IL}$ ) Max	Input High Voltage ( $V_{IH}$ ) Min
1.2 V	0.42 V	0.84 V
1.5 V	0.51 V	1.01 V
1.8 V	0.61 V	1.21 V

**Table 1. Digital Input Logic Levels (Continued)**

Logic Family	Input Low Voltage ( $V_{IL}$ ) Max	Input High Voltage ( $V_{IH}$ ) Min
2.5 V	0.70 V	1.60 V
3.3 V	0.80 V	2.00 V

Minimum input.....-0.3 V  
 Maximum input.....3.6 V  
 Input leakage current..... $\pm 15 \mu\text{A}$  max  
 Input impedance.....50 k $\Omega$  typ, pull-down

**Table 2. Digital Output Logic Levels**

Logic Family	Current	Output Low Voltage ( $V_{OL}$ ) Max	Output High Voltage ( $V_{OH}$ ) Min
1.2 V	100 $\mu\text{A}$	0.20 V	1.00 V
1.5 V	100 $\mu\text{A}$	0.20 V	1.25 V
1.8 V	100 $\mu\text{A}$	0.20 V	1.54 V
2.5 V	100 $\mu\text{A}$	0.20 V	2.22 V
3.3 V	100 $\mu\text{A}$	0.20 V	3.00 V
	4 mA	0.40 V	2.40 V

Maximum DC output current per channel  
 Source.....4.0 mA  
 Sink.....4.0 mA  
 Output impedance.....50  $\Omega$   
 Power-on state.....Programmable, by line  
 Protection..... $\pm 20$  V, single line<sup>1</sup>  
 Digital I/O voltage selection.....Programmable, per connector, and defined at compilation (not run-time configurable)

<sup>1</sup> NI recommends minimizing long-term over/under-voltage exposure to the Digital I/O. Prolonged DC voltage stresses that violate the maximum and minimum digital input voltage ratings may reduce device longevity. Over/under-voltage stresses are considered prolonged if the cumulative time in the abnormal condition exceeds 1 year.

Direction control of digital I/O.....	Per channel channels
Minimum I/O pulse width.....	6.25 ns
Minimum sampling period.....	5 ns

## External Clock

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Direction.....	Input into device
Maximum input leakage.....	$\pm 15 \mu\text{A}$
Characteristic impedance.....	50 $\Omega$
Power-on state.....	Tristated
Minimum input.....	-0.3 V
Maximum input.....	3.6 V
Logic level.....	Inherited from programmed digital voltage selection per connector
Maximum input frequency.....	80 MHz

## Reconfigurable FPGA

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FPGA type.....	Kintex-7 160T
Number of flip-flops.....	202,800
Number of LUTs.....	101,400
Embedded Block RAM.....	11,700 kbits
Number of DSP48 slices.....	600
Timebase.....	10, 40, 80, 100, 120, 160, or 200 MHz
Default timebase.....	40 MHz
Timebase reference source.....	PXI Express 100 MHz (PXIe_CLK100)
Timebase accuracy.....	$\pm 100$ ppm, 250 ps peak-to-peak jitter
Data transfers.....	DMA, interrupts, programmed I/O

# Synchronization Resources

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Input/output source.....	PXI_Trig<0..7>
Input source.....	PXI_Star, PXIe_DStarA, PXIe_DStarB, PXI_Clk10, PXIe_Clk100, External Clock x
Output source.....	PXIe_DStarC

# Bus Interface

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Form factor.....	x4 PXI Express, specification v1.0 compliant
Slot compatibility.....	x4, x8, and x16 PXI Express or PXI Express hybrid slots
Data transfers.....	DMA, interrupts, programmed I/O
Number of DMA channels.....	16

# Maximum Power Requirements

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Power requirements are dependent on the digital output loads and configuration of the LabVIEW FPGA VI used in your application.

+3.3 VDC (±5%).....	3 A
+12 V.....	2 A

# Physical Characteristics

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**Note** If you need to clean the device, wipe it with a dry, clean towel.

Dimensions.....	16 cm by 10 cm (6.3 in. by 3.9 in.)
Weight.....	183 g (0.403 lb)
I/O connectors.....	x4 68-pin female high-density VHDCI type

# Environmental

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Ambient Operating temperature.....	0 °C to 55 °C (IEC 60068-2-1, IEC 60068-2-2)
Ambient Storage temperature.....	-40 °C to 71 °C (IEC 60068-2-1, IEC 60068-2-2)
Operating humidity.....	10% RH to 90% RH, noncondensing (IEC 60068-2-56)
Storage humidity (IEC 60068-2-56).....	5% RH to 95% RH, noncondensing
Pollution Degree.....	2
Maximum altitude.....	2,000 m at 25 °C
Indoor use only.	

# Shock and Vibration

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Operational 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>
Non-operating.....	5 Hz to 500 Hz, 2.4 g <sub>rms</sub> (Tested in accordance with IEC 60068-2-64. Meets MIL-PRF-28800F Class 3.)

# Safety Standards

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This product meets 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
- EN 60079-0:2012, EN 60079-15:2010
- IEC 60079-0: Ed 6, IEC 60079-15: Ed 4
- UL 60079-0: Ed 5, UL 60079-15: Ed 3
- CSA 60079-0: 2011, CSA 60079-15: 2012



**Note** For UL and other safety certifications, refer to the product label or the [Online Product Certification](#) section.

# Electromagnetic Compatibility

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



**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 and certifications, and additional information, refer to the *Online Product Certification* section.



**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.

## CE Compliance

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

- 2006/95/EC; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

## Online Product Certification

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Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. 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

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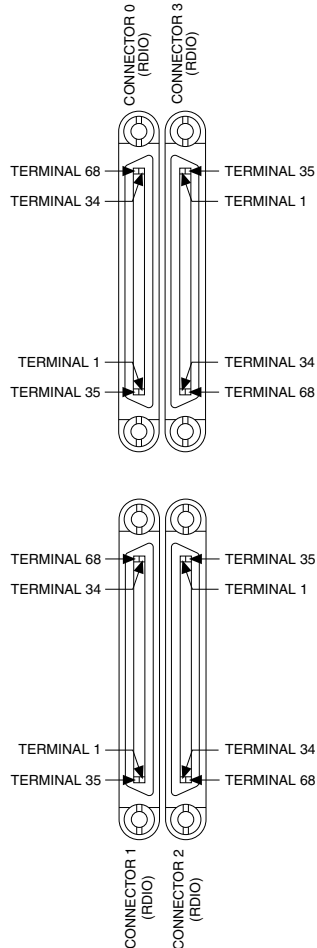
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## NI PXIe-7820R Pinout

GND	68	34	GND
External Clock x*	67	33	GND
GND	66	32	GND
DIO0	65	31	DIO1
GND	64	30	GND
DIO2	63	29	DIO3
GND	62	28	GND
DIO4	61	27	DIO5
GND	60	26	GND
DIO6	59	25	DIO7
GND	58	24	GND
DIO8	57	23	DIO9
GND	56	22	GND
DIO10	55	21	DIO11
GND	54	20	GND
DIO12	53	19	DIO13
GND	52	18	GND
DIO14	51	17	DIO15
GND	50	16	GND
DIO16	49	15	DIO17
GND	48	14	GND
DIO18	47	13	DIO19
GND	46	12	GND
DIO20	45	11	DIO21
GND	44	10	GND
DIO22	43	9	DIO23
GND	42	8	GND
DIO24	41	7	DIO25
GND	40	6	GND
DIO26	39	5	DIO27
GND	38	4	GND
DIO28	37	3	DIO29
GND	36	2	GND
DIO30	35	1	DIO31

\* x is the connector number.  
External Clock x is an input only.





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