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Find the *National Instruments PXIe-7820* at our website: *Click HERE*

SPECIFICATIONS

# NI PXIe-7821R

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

| Français | Deutsch | 日本語 | 한국어 | 简体中文 |
|---|---|---|---|---|
| ni.com/manuals | | | | |

This document contains the specifications for the NI PXIe-7821R. Specifications are typical at 25 °C unless otherwise noted.

**Caution** Using the NI PXIe-7821R in a manner not described in this document may impair the protection the NI PXIe-7821R provides.

## Digital I/O

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 |

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**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.....±15 µA max

Input impedance.....50 kΩ 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 µA | 0.20 V | 1.00 V |
| 1.5 V | 100 µA | 0.20 V | 1.25 V |
| 1.8 V | 100 µA | 0.20 V | 1.54 V |
| 2.5 V | 100 µA | 0.20 V | 2.22 V |
| 3.3 V | 100 µA | 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 Ω

Power-on state.....Programmable, by line

Protection.....±20 V, single line[1]

Digital I/O voltage selection.....Programmable, per connector, and defined at compilation (not run-time configurable)

[1] 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.



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Direction control of digital I/O.....Per channel
channels

Minimum I/O pulse width.....6.25 ns

Minimum sampling period.....5 ns

# External Clock

Direction.....Input into device

Maximum input leakage.....±15 µA

Characteristic impedance.....50 Ω

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

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.....±100 ppm, 250 ps peak-to-peak jitter

Data transfers.....DMA, interrupts, programmed I/O



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# Onboard DRAM

Memory size.....1 Bank; 512 MB

Maximum theoretical data rate.....800 MB/s streaming

# Synchronization Resources

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

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

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



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# Physical Characteristics

**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

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

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 $g_{rms}$
- Non-operating.....5 Hz to 500 Hz, 2.4 $g_{rms}$ (Tested in accordance with IEC 60068-2-64. Meets MIL-PRF-28800F Class 3.)



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# Safety Standards

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

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.



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# CE Compliance CE

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

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)

# Online Product Certification

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*, 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*. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

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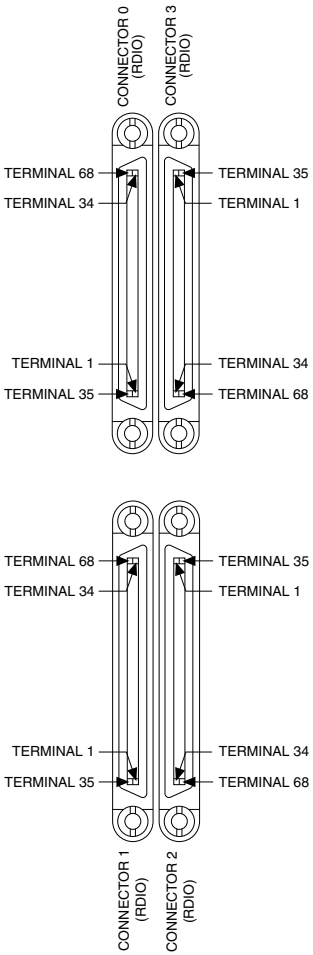


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# NI PXIe-7821R Pinout

| | | | |
|---|---|---|---|
| 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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