NI PXIe-7821 Specifications

2025-03-10

Contents

NI PXIe-7821 Specifications

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

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

NI PXIe-7821 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.

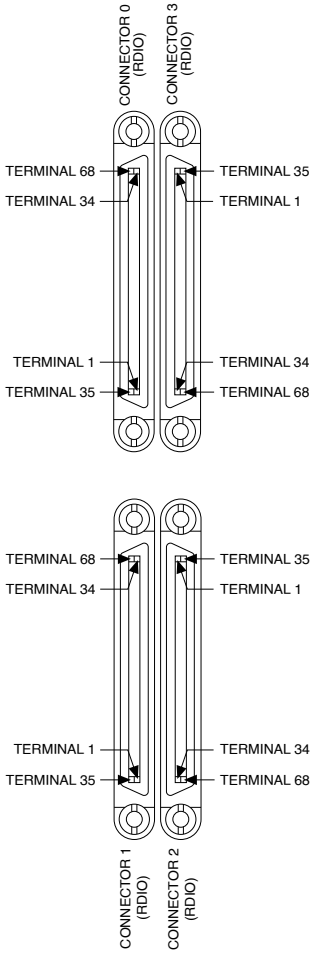

Table 1. Signal Descriptions

Signal	Description
DIO <0...31>	Digital I/O data through channels 0 through 31.
GND	Ground reference for signals.
External Clock	External clock input source that can be used for source synchronous acquisitions. The provided clock source must be stable and glitch-free.

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 2. Digital Input Logic Levels

Logic Family	Input Low Voltage (V_{IL})		Input High Voltage (V_{IH})	
	Minimum	Maximum	Minimum	Maximum
1.2 V	-0.3 V	0.40 V	0.84 V	1.5 V
1.5 V	-0.3 V	0.50 V	1.05 V	1.8 V
1.8 V	-0.3 V	0.60 V	1.25 V	2.1 V

Logic Family	Input Low Voltage (V_{IL})		Input High Voltage (V_{IH})	
	Minimum	Maximum	Minimum	Maximum
2.5 V	-0.3 V	0.70 V	1.70 V	2.8 V
3.3 V	-0.3 V	0.80 V	2.00 V	3.6 V

Input leakage current	±15 µA maximum
Input impedance	50 kΩ typical, pull-down

Table 3. Digital Output Logic Levels

Logic Family	Current	Output Low Voltage (V_{OL}) Maximum	Output High Voltage (V_{OH}) Minimum
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[1]	Programmable, by line
Protection[2]	±20 V, single line
Digital I/O voltage selection	Programmable, per connector, and defined at compilation (not run-time configurable)
Direction control of digital I/O channels	Per channel
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

1. Tristate by default
2. 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.

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

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

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 (IEC 60068-2-1, IEC 60068-2-2)	0 °C to 55 °C
Ambient Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 71 °C
Operating humidity (IEC 60068-2-56)	10% RH to 90% RH, noncondensing
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.)

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 ***Product Certifications and Declarations*** section.

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)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

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 ***Engineering a Healthy Planet*** 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.

EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国RoHS）

- **中国RoHS**— NI符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于NI中国RoHS合规性信息，请登录 ni.com/environment/

rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

NI Services

Visit ni.com/support to find support resources including documentation, downloads, and troubleshooting and application development self-help such as tutorials and examples.

Visit ni.com/services to learn about NI service offerings such as calibration options, repair, and replacement.

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 N Mopac Expwy, Austin, TX, 78759-3504, USA.