

DEVICE SPECIFICATIONS

NI PXIe-6591R

High-Speed Serial Module

This document lists specifications for the NI PXIe-6591R (NI 6591R). Specifications are subject to change without notice. For the most recent device specifications, refer to ni.com/manuals.

Nominal and *Characteristic* specifications describe basic functions and attributes of the device established by design. *Nominal* and *Characteristic* values are not covered by warranty.



Caution The protection provided by the NI 6591R can be impaired if it is used in a manner not described in this document.

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How to Use Your Documentation Set

Refer to the following table to learn how to use your documentation set.

Document	Location	Description
<i>NI PXIe-6591R Getting Started Guide</i>	Available from the Start menu and at ni.com/manuals .	Contains installation instructions for your NI 6591R device and driver software.
<i>NI High Speed Serial Instruments User Manual</i>	Available from the Start menu and at ni.com/manuals .	Contains information about developing applications for the NI 6591R and NI 6592R.
<i>NI LabVIEW Instrument Design Libraries for High Speed Serial Instruments Help</i>	Available from the Start menu and at ni.com/manuals .	Contains hardware and programming support for NI LabVIEW Instrument Design Libraries for High Speed Serial Instruments and the NI 6591R and NI 6592R modules.
<i>NI PXIe-6591R Specifications</i>	Available from the Start menu and at ni.com/manuals .	Contains specifications for your NI 6591R module.

Front Panel Connectors

Port 0 and Port 1

Data rate.....	500 Mbps to 8 Gbps and 9.8 Gbps to 12.5 Gbps, characteristic
Connector.....	Mini-SAS HD
Number of TX channels.....	8 (4 per port)
Number of RX channels.....	8 (4 per port)
Supported high speed cable type.....	Electrical/optical
Optical cable power.....	3.3V ± 5%, 1 A per port, characteristic
I/O AC coupling capacitor.....	100 nF

For detailed FPGA and High Speed Serial Link specifications, refer to Xilinx documentation.

TX Channel

Minimum differential generation 1000 mV¹ into 100 Ω , characteristic peak-to-peak voltage

RX Channel

Differential peak-to-peak input voltage range

≤ 6.6 Gb/s 150 mV to 2,000 mV, nominal

> 6.6 Gb/s 150 mV to 1,250 mV, nominal

Differential input resistance 100 Ω , nominal

CLK IN/OUT

Connector SMA

Coupling AC

Input impedance 50 Ω , nominal

Input frequency range 10 MHz to 500 MHz, characteristic

Input frequency accuracy tolerance ± 100 ppm

Input amplitude

 Square wave 0.7 V_{pp} to 5 V_{pp} into 50 Ω , characteristic

 Sine wave 1.4 V_{pp} to 5 V_{pp} into 50 Ω , characteristic

Output impedance 50 Ω , nominal

Supported output amplitude (into high-impedance) 3.3 V, 2.5 V, 1.8 V, 1.5 V, 1.2 V

Maximum output frequency 156.25 MHz, characteristic

Digital Data & Control

Connector VHDCI

Number of channels 20

Signal type Single-ended

Tristate control Per channel, dynamic

Supported voltage families 3.3 V, 2.5 V, 1.8 V, 1.5 V, and 1.2 V

Input impedance 50 k Ω , nominal

¹ When transmitter output swing is set to the maximum setting.

Input protection.....	-1 V to 5 V
Output impedance.....	50 Ω , nominal
Output protection.....	The device can indefinitely sustain a short to any voltage between 0 V and 5 V.
Maximum data rate.....	200 Mbps, characteristic

Multi-Gigabit Transceiver Reference Clock Generator

Frequency range.....	60 MHz to 700 MHz, characteristic
Locking resources.....	PX1e_CLK100 ² , PX1e_DStarA, CLK IN

Reconfigurable FPGA

FPGA.....	Xilinx Kintex-7 XC7K410T
Package.....	FFG900
LUTs.....	254,200
Flip-flops.....	508,400
DSP48 slices (25 × 18 multiplier).....	1,540
Embedded block RAM (kbits).....	28,620
Data transfers.....	DMA, interrupts, programmed I/O
DMA interrupts.....	32 interrupt channels numbered 0-31

Onboard DRAM

Memory size.....	2 GB, single bank
Theoretical maximum data rate.....	10.5 GB/s

² Frequency accuracy is ± 25 ppm, characteristic.

Bus Interface

Form factor.....	Gen 2×8 PXI Express, specification v1.0 compliant
Slot compatibility.....	×1, ×4, ×8, and ×16 PXI Express or PXI Express hybrid slots

Maximum Power Requirements



Note Power requirements are dependent on the contents of the LabVIEW FPGA VI used in your application. Use a maximum total of 38.25 W from the backplane. Exceeding this amount may cause the FPGA to overheat and force the device into a power/thermal shutdown state.

+3.3V.....	3 A
+12 V.....	3 A

Physical

Dimensions (not including connectors).....	18.3 cm × 13.0 cm × 2.0 cm (7.4 in. × 5.1 in. × 0.8 in.)
Weight.....	414 g (14.0 oz)

Environment

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 45 °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.....	-40 °C to 71 °C (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2. Meets MIL-PRF-28800F Class 3 limits.)
Relative humidity range.....	5% to 95%, noncondensing (Tested in accordance with IEC 60068-2-56.)

Shock and Vibration

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

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)
- 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.

Waste Electrical and Electronic Equipment (WEEE)



EU Customers 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）



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