

SPECIFICATIONS

NI PXIe-4322

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

This document lists specifications for the NI PXIe-4322 module. These specifications are typical for the range of 0 °C to 55 °C unless otherwise stated. The system must be allowed to warm up for 15 minutes to achieve the rated accuracy. All specifications are subject to change without notice. Visit ni.com/manuals for the most current specifications and product documentation.



Note Keep the filler panels on all unused slots in your chassis to maintain forced air cooling.

Analog Characteristics

Number of channels.....	8 analog output channels
DAC resolution.....	16 bits
Type of DAC.....	R-2R
Monotonicity	16 bits
DNL	±1 LSB max
INL (best fit)	±4 LSBs max
Power-on output state ¹	
Voltage mode	0 V
Current mode	0 mA



Note You can program the power-on output states. Refer to your software documentation for information about programming the power-on output states using NI-DAQmx with LabVIEW or other National Instruments application development environments (ADEs).

Power-off output state..... High impedance

¹ When the output stage powers on, a current glitch occurs for 1 ms peaking at 5 µA.
When the output stage powers off, a current glitch occurs for 3 ms peaking at 5 µA.

Protection

Overvoltage.....	±120 VDC
Short circuit.....	Indefinitely

Update rate

Maximum.....	250 kS/s per channel
Minimum	No minimum

Timing accuracy..... 50 ppm of sample rate

Timing resolution..... 10 ns

Data transfers

DMA (scatter-gather), programmed I/O

Output FIFO size

8,191 samples shared among channels used

AO waveform modes

- Nonperiodic waveform
- Periodic waveform regeneration mode from onboard FIFO
- Periodic waveform regeneration from host buffer including dynamic update

Voltage Mode

Output voltage range¹

Nominal	±16 V
Minimum	±16.57 V
Typical.....	±16.70 V
Maximum.....	±16.83 V

Current drive..... ±20 mA per channel max

Output impedance..... 25 mΩ

Noise (rms)

10 Hz to 1 kHz bandwidth	30 μV_{rms}
10 Hz to 300 kHz bandwidth	250 μV_{rms}
10 Hz to 20 MHz bandwidth	500 μV_{rms}

Slew rate..... ±10 V/ μs

Crosstalk

Channel-to-channel @ 10 kHz.....	-100 dB
Common-mode voltage @ 60 Hz	-120 dB

¹ Refer to the *Increasing Output Voltage Range in Voltage Mode* section in the *NI PXIe-4322 User Manual* for information about how to increase the nominal output voltage range by connecting multiple voltage channels in series.

Settling time

1000 pF load, to 1 LSB

20 V step..... 20 μs

1 V step..... 12 μs

0.1 V step..... 10 μs

500 Ω||100 pF, to 1 LSB

20 V step..... 20 μs

Capacitive drive..... 4500 pF

Accuracy¹

Measurement Conditions	Percent of Output (Gain Error)	Percent of Range* (Offset Error)
Calibrated, max (0 °C to 55 °C)	0.076%	0.018%
Calibrated, max (0 °C to 40 °C)	0.054%	0.014%
Calibrated, max (23 °C ±5 °C)	0.014%	0.007%
Calibrated, typ (23 °C ±5 °C)	0.010%	0.003%
* Range equals 16 V.		

Stability

Gain drift..... 7 ppm/°C

Offset drift 25 μV/°C

Absolute Voltage Output Accuracy Equation

$$\text{AbsoluteVoltageAccuracy} = \text{Output} * (\text{GainError}) + \text{Range} * (\text{OffsetError})$$

Absolute Voltage Output Accuracy Example

For a 10 V voltage output, the absolute output accuracy for an external temperature range of 18 °C to 28 °C is as follows:

$$\text{GainError} = 0.014\%$$

$$\text{OffsetError} = 0.007\%$$

$$\text{AbsoluteAccuracy} = 10 \text{ V} * (\text{GainError}) + 16 \text{ V} * (\text{OffsetError}) = 2.52 \text{ mV}$$

¹ Accuracies listed are warranted for the conditions described in the table for up to one year from the module external calibration.

Current Mode

Output current range¹

Nominal	±20 mA
Minimum	±20.6 mA
Typical.....	±20.9 mA
Maximum.....	±21.1 mA

Compliance voltage ±16 V per channel max

Output impedance 100 MΩ

Noise (rms)

10 Hz to 1 kHz bandwidth 50 nA

10 Hz to 300 kHz bandwidth 600 nA

Slew rate ±20 mA/μs

Crosstalk

Channel-to-channel @ 1 kHz..... -100 dB

Common-mode voltage @ 60 Hz 50 nA/V

Settling time

100 Ω load

Full-scale step to 2 LSB..... 20 μs

800 Ω load

Full-scale step to 2 LSB..... 25 μs

2 mA step to 1 LSB..... 15 μs

Inductive drive 10 μH

¹ Refer to the *Increasing Output Current Range in Current Mode* section of the *NI PXIe-4322 User Manual* for information about how to increase the nominal output current range by connecting current channels in parallel.

Accuracy¹

Measurement Conditions	Percent of Output (Gain Error)	Percent of Range* (Offset Error)
Calibrated, max (0 °C to 55 °C)	0.12%	0.05%
Calibrated, max (0 °C to 40 °C)	0.09%	0.035%
Calibrated, max (23 °C ±5 °C)	0.033%	0.019%
Calibrated, typ (23 °C ±5 °C)	0.028%	0.004%
*Range equals 20 mA.		

Stability

Gain drift..... ±15 ppm/°C

Offset drift ±75 nA/°C

Absolute Current Output Accuracy Equation

$$\text{AbsoluteCurrentAccuracy} = \text{Output} * (\text{GainError}) + \text{Range} * (\text{OffsetError})$$

Absolute Current Output Accuracy Example

For a 10 mA current output, the absolute output accuracy for an external temperature range of 18 °C to 28 °C is as follows:

$$\text{GainError} = 0.033\%$$

$$\text{OffsetError} = 0.019\%$$

$$\text{AbsoluteAccuracy} = 10 \text{ mA} * (\text{GainError}) + 20 \text{ mA} * (\text{OffsetError}) = 7.1 \mu\text{A}$$

Synchronization

Reference clock source..... PXIe_DSTAR<A.. B>, PXI_STAR,
PXIe_Clk100, PXI_TRIG<0..7>

Digital Triggers

Source PXI_TRIG<0..7>, PXI_STAR,
PXIe_DSTAR<A..B> PFI<0..1>

Purpose Start Trigger,
Pause Trigger

¹ Accuracies listed are warranted for the conditions described in the table for up to one year from the module external calibration.

Polarity Software-selectable

Debounce filter settings Disable, 90 ns, 5.12 μ s, 2.56 ms, custom interval

ClOCKING

Source Onboard Clock, PXI_TRIG<0..7>, PXI_STAR, PXIe_DSTAR<A..B>, PXIe_Clk100 (RefClk only)

Destination Sample Clock, Sample Clock Timebase, Reference Clock

Polarity Software-selectable (except Reference Clock)

Debounce filter settings (Sample Clock only) Disable, 90 ns, 5.12 μ s, 2.56 ms, custom interval

Reference clock locking frequencies

Reference Signal	Locking Input Frequency (MHz)		
	10	20	100
PXIe_DSTAR<A..B>	✓	✓	✓
PXI_STAR	✓	✓	—
PXIe_Clk100	—	—	✓
PXI_TRIG<0..7>	✓	✓	—



Note National Instruments does not recommend locking to non-selected frequencies.

Output Timing Signals

Source Start Trigger, Pause Trigger, Sample Clock, various derived timebases and clocks

Destination PXI_TRIG<0..7> PXIe_DSTARC

Polarity Software-selectable

Bus Interface

Form factor	x1 PXI Express peripheral module, specification rev 1.0 compliant
Slot compatibility	x1 and x4 PXI Express or PXI Express hybrid slots
DMA channels	1 analog output

NI PXIe-4322 modules may be installed in PXI Express slots or PXI Express hybrid slots.

Calibration

Recommended warm-up time.....	15 minutes
Calibration interval.....	1 year

Power Requirements

+3.3 V	800 mA
+12 V	700 mA

Physical Requirements

Dimensions	Standard 3U PXIe, 16 × 10 cm (6.3 × 3.9 in.)
Weight.....	161 g (5.7 oz)
I/O connector	96-pin male DIN 41612/IEC 60603-2 connector



Caution Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

Environmental Specifications

Maximum altitude.....	2,000 m (800 mbar), at 25 °C ambient temperature
Pollution Degree	2
Indoor use only	

Channel to earth ground

Continuous.....	300 V _{rms} , Measurement Category II
Withstand.....	3,000 V _{rms} , verified by a 5 s dielectric withstand test

Measurement Category II is for measurements performed on circuits directly connected to the electrical distribution system. This category refers to local-level electrical distribution, such as that provided by a standard wall outlet, for example, 115 V for U.S. or 230 V for Europe.



Caution Do *not* use for measurements within Measurement Categories III or IV.



Caution The protection provided by the NI PXIe-4322 can be impaired if it is used in a manner not described in this document.



Caution When hazardous voltages ($>30 V_{\text{rms}}/42.4 V_{\text{pk}}/60 \text{ VDC}$) are present on any terminal, safety low-voltage ($\leq 30 V_{\text{rms}}/42.4 V_{\text{pk}}/60 \text{ VDC}$) cannot be connected to any other terminal.



Caution Do *not* supply hazardous voltages ($>30 V_{\text{rms}}/42.4 V_{\text{pk}}/60 \text{ VDC}$) to the terminal block without the terminal block being connected to the NI PXIe-4322.

Safety

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



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 and 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

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 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 and Electronic Equipment, visit ni.com/environment/weee.

电子信息产品污染控制管理办法（中国 RoHS）



中国客户 National Instruments 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 National Instruments 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.)

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At ni.com/support you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at ni.com/support and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, visit the Worldwide Offices section of ni.com/niglobal to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

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