

## COMPREHENSIVE SERVICES

We offer competitive repair and calibration services, as well as easily accessible documentation and free downloadable resources.

## SELL YOUR SURPLUS

We buy new, used, decommissioned, and surplus parts from every NI series. We work out the best solution to suit your individual needs.

 Sell For Cash    Get Credit    Receive a Trade-In Deal

## OBSOLETE NI HARDWARE IN STOCK & READY TO SHIP

We stock **New**, **New Surplus**, **Refurbished**, and **Reconditioned** NI Hardware.



*Bridging the gap between the manufacturer and your legacy test system.*

 1-800-915-6216

 [www.apexwaves.com](http://www.apexwaves.com)

 [sales@apexwaves.com](mailto:sales@apexwaves.com)

*All trademarks, brands, and brand names are the property of their respective owners.*

**Request a Quote**

 **CLICK HERE**

**PXIe-4340**

# DEVICE SPECIFICATIONS

# NI PXIe-4340

## 4 Ch, 24-bit, 25.6 kS/s Simultaneous AC LVDT Input Module

Français    Deutsch    日本語    한국어    简体中文

[ni.com/manuals](http://ni.com/manuals)

This document lists specifications for the NI PXIe-4340 simultaneous AC LVDT input module. All specifications are subject to change without notice. Visit [ni.com/manuals](http://ni.com/manuals) for the most current specifications and product documentation.



**Note** To maintain forced air cooling in the PXI Express system, refer to the *Maintain Forced-Air Cooling Note to Users*.

## Terminology

*Maximum* and *minimum* specifications characterize the warranted performance of the instrument within the recommended calibration interval and under the stated operating conditions. These specifications are subject to production verification or guaranteed by design.

*Typical* specifications are specifications met by the majority of the instruments within the recommended calibration interval and under the stated operating conditions, based on measurements taken during production verification and/or engineering development. The performance of the instrument is not warranted.

*Supplemental* specifications describe the basic function and attributes of the instrument established by design and are not subject to production verification. They provide information that is relevant for the adequate use of the instrument that is not included in the previous definitions.

All performance specifications are *typical* unless otherwise noted. These specifications are valid within the full operating temperature range. Accuracy specifications are valid within  $\pm 5$  °C of the calibration or over the full operating range as specifically noted.

## Input Characteristics

Number of channels.....	4 analog input channels
ADC resolution.....	24 bits
Type of ADC.....	Delta-Sigma

Sampling mode .....	Simultaneous
Sample rates ( $f_s$ )	
Range .....	1 S/s to 25.6 kS/s
Resolution .....	$\leq 181.9 \mu\text{S/s}$
Maximum working voltage (signal + common mode) .....	4 V <sub>rms</sub>
AI absolute input range .....	7 V <sub>rms</sub>
Differential input impedance .....	200 k $\Omega$
Linearity .....	0.01%
Crosstalk .....	-100 dB
Input protection .....	$\pm 30 \text{ V}$
FIFO buffer size .....	1,023 samples
Data transfers .....	Direct memory access (DMA), programmed I/O

## Excitation Characteristics

---

Excitation selection .....	Software selectable, per channel
Excitation type .....	Constant differential voltage (balanced)
Excitation protection .....	$\pm 30 \text{ V}$
Output impedance .....	3 $\Omega$
Excitation current drive .....	30 mA
Excitation voltage programmability .....	1 V <sub>rms</sub> to 7 V <sub>rms</sub> , 0.5 V <sub>rms</sub> steps
Excitation frequency programmability .....	400 Hz to 10 kHz, 10 Hz steps
Excitation gain accuracy .....	5%, max
Excitation DC offset .....	$\pm 10 \text{ mV}$ , max

## Open Coil Detection

---

Detection time .....	200 ms
AI/RS open coil threshold voltage .....	$\pm 12 \text{ V}$
Excitation open coil threshold impedance .....	$> 5 \text{ k}\Omega$

# Accuracy

Nominal Full-Scale range .....  $7V_{\text{rms}}/V_{\text{ex}}$



**Note**  $V_{\text{ex}}$  is the excitation voltage.

Maximum remote-sense lead drop ..... 10% of  $V_{\text{ex}}$

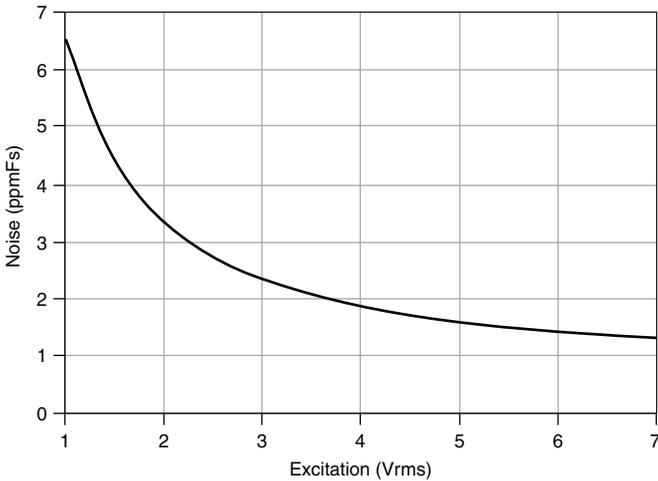
CMRR ..... -60 dB

Self-cal performed within the last 24 hours

<b>Typical Accuracy</b> ±(% of reading + % of full-scale) Tcal ± 5 °C	<b>Maximum Accuracy</b> ±(% of reading + % of full-scale) Tcal ± 5 °C
0.007% + 0.003%	0.025% + 0.015%

# Input Noise

**Figure 1. Input Noise**



**Note** ppmFs denotes ppm of full scale.



**Note** Noise may increase for inputs below 10 mV<sub>rms</sub>.

# Temperature Stability

---

AI gain .....±5 ppm/°C  
AI offset .....±5 ppm/°C  
Excitation gain .....±150 ppm/°C  
Excitation DC offset .....±150 μV/°C

## Filter Group Delay

---

Analog delay .....0.7 μs  
Compensated digital filter group delay<sup>1</sup> ..... Base Filter Group Delay + Variable Filter Delay

<b>Excitation Frequency (<math>f_{ex}</math>)</b>	<b>Base Filter Group Delay (ms)</b>
400 Hz ≤ $f_{ex}$ < 625 Hz	14.73664
625 Hz ≤ $f_{ex}$ < 1.25 kHz	7.89632
1.25 kHz ≤ $f_{ex}$ < 2.5 kHz	4.47616
2.5 kHz ≤ $f_{ex}$ < 5 kHz	2.76608
5 kHz ≤ $f_{ex}$ ≤ 10 kHz	1.88544

---

<sup>1</sup> The compensated digital filter group delay is a result of digital filtering in buffered mode. Hardware automatically compensates for this group delay when synchronizing.

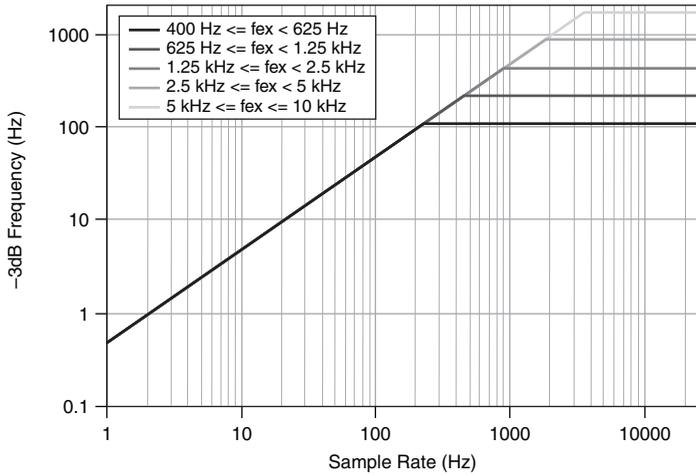
Sample Rate* ( $f_s$ )	Variable Filter Delay (Samples)
$1 \text{ S/s} \leq f_s < 25 \text{ S/s}$	3.999
$25 \text{ S/s} \leq f_s \leq 47.7 \text{ S/s}$	57.970
$47.7 \text{ S/s} < f_s \leq 95.4 \text{ S/s}$	57.943
$95.4 \text{ S/s} < f_s \leq 190.7 \text{ S/s}$	57.887
$190.7 \text{ S/s} < f_s \leq 381.5 \text{ S/s}$	57.773
$381.5 \text{ S/s} < f_s \leq 762.9 \text{ S/s}$	57.547
$762.9 \text{ S/s} < f_s \leq 1525.9$	57.094
$1525.9 \text{ S/s} < f_s \leq 3051.8 \text{ S/s}$	56.188
$3051.8 \text{ S/s} < f_s \leq 6103.5 \text{ S/s}$	54.375
$6103.5 \text{ S/s} < f_s \leq 12207.0 \text{ S/s}$	50.750
$12207.0 \text{ S/s} < f_s \leq 24414.1 \text{ S/s}$	43.500
$24414.1 \text{ S/s} < f_s \leq 25600 \text{ S/s}$	29.000

\*Sample rate range shown is rounded to 0.1 S/s.  
Precise numbers can be calculated at  $100,000,000/2^n$  where  $n$  is in the range of 12 to 21.  
For example, the full number for 24414.1 is  $100,000,000/2^{12} = 24414.0625$ .

## Bandwidth

Excitation Frequency ( $f_{\text{ex}}$ )	Demodulation Filter (-3 dB Bandwidth)
$400 \text{ Hz} \leq f_{\text{ex}} < 625 \text{ Hz}$	110 Hz
$625 \text{ Hz} \leq f_{\text{ex}} < 1.25 \text{ kHz}$	219 Hz
$1.25 \text{ kHz} \leq f_{\text{ex}} < 2.5 \text{ kHz}$	438 Hz
$2.5 \text{ kHz} \leq f_{\text{ex}} < 5 \text{ kHz}$	876 Hz
$5 \text{ kHz} \leq f_{\text{ex}} \leq 10 \text{ kHz}$	1750 Hz

**Figure 2. Aggregate Digital Filter Bandwidth**



## Hardware-Timed Single Point Sample Mode

Acquisition rate<sup>1</sup>

Min..... 1 S/s

Max ..... 25.6 kS/s

HWTSP latency ..... 63.68  $\mu$ s + Demodulation Latency

Excitation Frequency ( $f_{ex}$ )	Demodulation Latency
400 Hz $\leq f_{ex} < 625$ Hz	9661.44 $\mu$ s
625 Hz $\leq f_{ex} < 1.25$ kHz	4787.20 $\mu$ s
1.25 kHz $\leq f_{ex} < 2.5$ kHz	2350.08 $\mu$ s
2.5 kHz $\leq f_{ex} < 5$ kHz	1131.52 $\mu$ s
5 kHz $\leq f_{ex} < 10$ kHz	496.64 $\mu$ s

## Internal Frequency Timebase

Frequency..... 100 MHz

Accuracy .....  $\pm 50$  ppm

<sup>1</sup> Dependent upon system setup and application.

# Synchronization

---

Reference clock source ..... Onboard 100 MHz clock, Backplane  
PXIe\_CLK100

## Triggers

---

### Analog trigger

Purpose ..... Reference trigger only  
Source ..... AI <0..3>  
Level ..... Full scale (depending on input range),  
programmable  
Mode ..... Rising-edge, Rising-edge with hysteresis,  
Falling-edge, Falling-edge with hysteresis,  
Entering Window, Leaving Window  
Resolution ..... 24 bits

### Digital trigger

Purpose ..... Start or reference trigger  
Source ..... PFI0, PXI\_TRIG<0..7>, PXI\_STAR,  
PXIe\_DSTARC<A..B>  
Polarity ..... Software-selectable  
Minimum pulse width ..... 100 ns for PXI\_TRIG<0..7>, 20 ns for others

## Output Timing Signals

---

Sources ..... Sample Clock, Start Trigger Out,  
Reference Trigger Out  
Destinations ..... PFI0, PXI\_TRIG<0..7>, PXIe\_DSTARC  
Polarity ..... Software-selectable

## PFI Characteristics

---

### Input

Logic compatibility ..... 3.3 V to 5 V  
High,  $V_{IH}$  ..... 2.40 V  
Low,  $V_{IL}$  ..... 0.95 V  
Input impedance ..... 10 k $\Omega$

## Output

High, $V_{OH}$ .....	3.46 V max
Sourcing 5 mA.....	2.61 V min
Low, $V_{OL}$ sinking 5 mA.....	0.38 V max
Output impedance.....	50 $\Omega$
Output current.....	$\pm 5$ mA min

## Bus Interface

---

Form factor.....	x1 PXI Express peripheral module, Specification rev 1.0 compliant
Slot compatibility.....	PXI Express or PXI Express hybrid slots
DMA channels.....	4, analog input

## Calibration

---

You can obtain the calibration certificate and information about calibration services for the PXIe-4340 at [ni.com/calibration](http://ni.com/calibration).

Recommended warm-up time..... 15 minutes

Calibration interval..... 1 year

## Power Requirement

---

12 V..... 0.9 A

3.3 V..... 0.9 A

## Physical Characteristics

---

Dimensions..... Standard 3U PXIe,  
16 cm  $\times$  10 cm (6.3 in.  $\times$  3.9 in.)

Weight..... 168 g (5.9 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

---

Maximum altitude..... 2,000 m (800 mbar)

Pollution Degree..... 2

Indoor use only.

## Operating Environment

Ambient temperature range .....	0 °C to 55 °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 <sub>rms</sub>
Non-operating.....	5 Hz to 500 Hz, 2.4 g <sub>rms</sub> (Tested in accordance with IEC 60068-2-64. Non-operating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

## 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.



**Caution** The protection provided by the PXIe-4340 can be impaired if it is used in a manner not described in this documents.

# 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:

- 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](http://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](http://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](http://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](http://ni.com/environment/rohs_china)。(For information about China RoHS compliance, go to [ni.com/environment/rohs\\_china](http://ni.com/environment/rohs_china).)

# World Wide Support and Services

---

The National Instruments website is your complete resource for technical support. At [ni.com/support](http://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.

Visit [ni.com/services](http://ni.com/services) for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit [ni.com/register](http://ni.com/register) to register your National Instruments product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world. For telephone support in the United States, create your service request at [ni.com/support](http://ni.com/support) or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the Worldwide Offices section of [ni.com/niglobal](http://ni.com/niglobal) to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Refer to the *NI Trademarks and Logo Guidelines* at [ni.com/trademarks](http://ni.com/trademarks) for more information on National Instruments trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies. For patents covering National Instruments products/technology, refer to the appropriate location: **Help»Patents** in your software, the `patents.txt` file on your media, or the *National Instruments Patents Notice* at [ni.com/patents](http://ni.com/patents). You can find information about end-user license agreements (EULAs) and third-party legal notices in the readme file for your NI product. Refer to the *Export Compliance Information* at [ni.com/legal/export-compliance](http://ni.com/legal/export-compliance) for the National Instruments global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data. NI MAKES NO EXPRESS OR IMPLIED WARRANTIES AS TO THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND SHALL NOT BE LIABLE FOR ANY ERRORS. U.S. Government Customers: The data contained in this manual was developed at private expense and is subject to the applicable limited rights and restricted data rights as set forth in FAR 52.227-14, DFAR 252.227-7014, and DFAR 252.227-7015.

© 2016 National Instruments. All rights reserved.