

**Aumictech**

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Data Sheet

August 13, 2026

NI

NI USB-4431 Five-Channel Dynamic Signal Acquisition Module

The NI USB-4431 is a high-accuracy, five-channel dynamic signal acquisition (DSA) module designed for portable or distributed measurement applications. It offers 24-bit resolution, built-in anti-aliasing filters, and IEPE conditioning for precision measurement of sound, vibration, and other dynamic signals.



MODEL

NI USB-4431

CALIBRATION

Available on request

CONDITION

Used

STATUS

In stock

RFQ / SKU

USB-4431

LISTING

<https://aumictechlabs.com/products/usb-4431-2/>

NIST-traceable cal

SAM registered

30-day returns

NAICS 423690 · 811210 · 541380

This unit

The NI USB-4431 is a five-channel dynamic signal acquisition module delivering 24-bit resolution across four simultaneous analog input channels and one output channel. Purpose-built for sound and vibration measurements, it integrates software-selectable IEPE signal conditioning (0 or 2.1 mA) for direct accelerometer and microphone connectivity. Simultaneous sampling from 1 kS/s to 102.4 kS/s with 100 dB dynamic range and built-in anti-aliasing filters ensures high-fidelity data capture across a 0 Hz to 0.453× update rate measurement bandwidth. The single analog output channel operates to 96 kS/s and enables stimulus-response testing synchronized with input acquisition. Technical Specifications Analog Input 4 pseudodifferential channels, 24-bit resolution Sampling: 1 kS/s to 102.4 kS/s simultaneous Input range: ± 10 V; dynamic range: 100 dB IEPE

conditioning: software-selectable 0 or 2.1 mA AC/DC coupling with 0.8 Hz high-pass filter (AC mode) Overvoltage protection: ± 60 V BNC connectors; 1 k Ω minimum load impedance Analog Output 1 channel, 24-bit resolution Output range: ± 3.5 V; update rate to 96 kS/s Frequency response: DC to 43.5 kHz 50 k Ω output impedance; indefinite short-circuit protection Digital I/O TTL trigger support (5 V compatibility); $\pm 5.6/-0.5$ V input protection Performance Delta-sigma ADC architecture with simultaneous sampling TEDS Class 1 read/write support for smart sensors Physical & Environmental 142 $\times$ 180 $\times$ 38 mm; 675 g Operating/storage: -30 $^{\circ}$ C to 70 $^{\circ}$ C 10–80% RH non-condensing Power: 2.5 W maximum via USB 2.0

Key Features Simultaneous four-channel acquisition with phase coherence Direct IEPE sensor excitation eliminates external conditioning Anti-aliasing filtering automatically tracks sample rate Overvoltage protection for field-deployed sensors TEDS compatibility for automatic sensor identification

Typical Applications Machinery vibration monitoring and fault diagnostics Acoustic testing and noise characterization Transient and shock event capture Order tracking and rotational analysis Sound quality assessment

Compatibility & Integration NI-DAQmx driver (v8.8+); Windows operating systems LabVIEW, Measurement Studio, LabWindows, MATLAB, Python, ANSI C, C#.NET support Built-in DSP: power spectra, zoom FFTs, fractional-octave analysis, order spectra

Features & description

From manufacturer datasheet

Features

- Four simultaneous 24-bit delta-sigma analog inputs • 1 kS/s to 102.4 kS/s; 100 dB typical AI dynamic range at 102.4 kS/s • IEPE 0 or 2.1 mA independently per channel; 20 V minimum compliance • AC/DC coupling; 0.8 Hz AC coupled class • One 24-bit analog output, +/-3.5 Vpk, DC to 43.5 kHz, up to 96 kS/s • BNC analog connectors; USB 2.0 bus-powered

USB4431 Characteristics / Specifications

PARAMETER	VALUE
Model	USB-4431
Manufacturer	National Instruments
Instrument Type	USB Sound and Vibration / DSA Device
Series	USB-443x
Alias	USB-4431; NI USB-4431; 780164-01
AI Channels	4 simultaneous differential
ADC Resolution	24 bits
ADC Type	delta-sigma
Sample Rate Range	1 kS/s to 102.4 kS/s
Sample Rate Resolution	less than or equal to 2.10 mS/s (rate-dependent)
Timebase Accuracy	+/-100 ppm maximum
AI Dynamic Range	100 dB typical, 98 dB minimum (-60 dBFS, 1 kHz, fs = 102.4 kS/s)
AI SFDR	104 dB (-1 dBFS, 1 kHz, fs = 102.4 kS/s)
AI Nonharmonic SFDR	110 dB (same conditions)
AI IMD	-100 dB (CCIF 11 kHz + 12 kHz, 1:1, -6 dBFS)
IEPE Channels	AI0, AI1, AI2, AI3
IEPE Current	0 or 2.1 mA, independently software selectable
IEPE Compliance	20 V minimum
IEPE Output Impedance	200 kohm at 1 kHz
IEPE Current Noise	25 pA/sqrt(Hz) at 10 kHz
IEPE Fault Short	less than 1.5 V
IEPE Fault Open	greater than 19.5 V
IEPE Fault Indication	software, per channel
Coupling	AC/DC
AC Cutoff	0.8 Hz class

PARAMETER	VALUE
Anti Aliasing	integrated analog anti-aliasing filters
Input Connection	BNC
AO Channels	1 (USB-4431 only in the 443x pair)
DAC Resolution	24 bits
DAC Type	delta-sigma
AO Connection	BNC
AO Frequency Range	DC to 43.5 kHz
AO Signal Range	+/-3.5 Vpk
AO Update Master Rates	51.2 kS/s, 80 kS/s, 96 kS/s with integer divisors n = 1, 2, 4, 8, 16, 32, 64
AO Dynamic Range 96 kS/s	86 dB typical, 82 dB minimum (-60 dBFS, 1 kHz)
AO THD 96 kS/s	-95 dB typical, -85 dB maximum (20 Hz to 20 kHz)
AO IMD	-96 dB (CCIF 11 kHz + 12 kHz, 1:1, -6 dBFS)
DAC Filter Delay	63.3 samples maximum
USB Interface	USB 2.0
Power	USB bus-powered
Weight	1.11 kg (listing)
Calibration	NIST-traceable class
Software	LabVIEW; Sound and Vibration Measurement Suite class
Compared Sibling	USB-4432 is 5 AI, no AO, 101 dB typical AI dynamic range Notes Specs from NI USB-443x Specifications. AO update rates are the fM/n set (51.2, 80, 96 kS/s masters). Confirm IEPE on/off and AC/DC coupling per channel in software.

Full OEM specifications

Complete technical content extracted from the manufacturer datasheet. Sparse OEM tables are reconstructed as tables below; other text is preserved as paragraphs.

Specifications	
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IEPE Fault Indication	software, per channel
Coupling	AC/DC
AC Cutoff	0.8 Hz class
Anti Aliasing	integrated analog anti-aliasing filters

PARAMETER	VALUE
Input Connection	BNC
A0 Channels	1 (USB-4431 only in the 443x pair)
DAC Resolution	24 bits
DAC Type	delta-sigma
A0 Connection	BNC
A0 Frequency Range	DC to 43.5 kHz
A0 Signal Range	+/-3.5 Vpk
A0 Update Master Rates	51.2 kS/s, 80 kS/s, 96 kS/s with integer divisors n = 1, 2, 4, 8, 16, 32, 64
A0 Dynamic Range 96 kS/s	86 dB typical, 82 dB minimum (-60 dBFS, 1 kHz)
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Calibration	NIST-traceable class
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Compared Sibling	USB-4432 is 5 AI, no A0, 101 dB typical AI dynamic range

Notes

Specs from NI USB-443x Specifications. A0 update rates are the fM/n set (51.2, 80, 96 kS/s masters). Confirm IEPE on/off and AC/DC coupling per channel in software.

Available from Aumictech

Used and refurbished unit evaluated in-house. Calibration: Available on request. Used · In stock.

Request a quote: sales@aumictech.com · +1 (484) 841-9341

Aumictech

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Technical content from manufacturer specifications. Unit photo/stock from Aumictech listing when available. Specifications subject to OEM documentation and unit condition.