NI-9421 Specifications

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Contents

NI 9421 Datasheet

- 8-channel, 100 µs digital input
- 24 V logic, sinking digital input
- Compatible with NI CompactDAQ counters
- 60 VDC, CAT I (DSUB) or 250 Vrms, CAT II (screw and spring terminal) isolation
- 25-pin DSUB, 10-position spring-terminal, or 10-position screw-terminal connectors available
- -40 °C to 70 °C operating, 5 g vibration, 50 g shock

The NI-9421 is an 8-channel, 100 µs sinking digital input module for any NI CompactDAQ or CompactRIO chassis. Each channel is compatible with 24 V signals and features transient overvoltage protection of 2,300 Vrms between the input channels and earth ground. Each channel also has an LED that indicates the state of that channel. The NI-9421 works with industrial logic levels and signals for direct connection to a wide array of industrial switches, transducers, and devices.

NI C Series Overview

NI provides more than 100 C Series modules for measurement, control, and communication applications. C Series modules can connect to any sensor or bus and allow for high-accuracy measurements that meet the demands of advanced data acquisition and control applications.

- Measurement-specific signal conditioning that connects to an array of sensors and signals
- Isolation options such as bank-to-bank, channel-to-channel, and channel-to-earth ground
- -40 °C to 70 °C temperature range to meet a variety of application and environmental needs
- Hot-swappable

The majority of C Series modules are supported in both CompactRIO and CompactDAQ platforms and you can move modules from one platform to the other with no modification.

CompactRIO

CompactRIO combines an open-embedded architecture with small size, extreme ruggedness, and C Series modules in a platform powered by the NI LabVIEW reconfigurable I/O (RIO) architecture. Each system contains an FPGA for custom timing, triggering, and processing with a wide array of available modular I/O to meet any embedded application requirement.

CompactDAQ

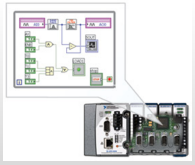
CompactDAQ is a portable, rugged data acquisition platform that integrates connectivity, data acquisition, and signal conditioning into modular I/O for directly interfacing to any sensor or signal. Using CompactDAQ with LabVIEW, you can easily customize how you acquire, analyze, visualize, and manage your measurement data.

Software

LabVIEW Professional Development System for Windows

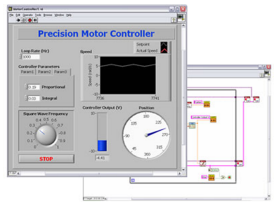
- Use advanced software tools for large project development
- Generate code automatically using DAQ Assistant and Instrument I/O Assistant
- Use advanced measurement analysis and digital signal processing
- Take advantage of open connectivity with DLLs, ActiveX, and .NET objects
- Build DLLs, executables, and MSI installers

NI LabVIEW FPGA Module



- Design FPGA applications for NI RIO hardware
- Program with the same graphical environment used for desktop and real-time applications
- Execute control algorithms with loop rates up to 300 MHz
- Implement custom timing and triggering logic, digital protocols, and DSP algorithms
- Incorporate existing HDL code and third-party IP including Xilinx IP generator functions
- Purchase as part of the LabVIEW Embedded Control and Monitoring Suite

NI LabVIEW Real-Time Module



- Design deterministic real-time applications with LabVIEW graphical programming
- Download to dedicated NI or third-party hardware for reliable execution and a wide selection of I/O
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Take advantage of real-time OS, development and debugging support, and board support

NI LabVIEW Real-Time Module	
	▪ Purchase individually or as part of a LabVIEW suite

NI-9421 Specifications

The following specifications are typical for the range -40 °C to 70 °C unless otherwise noted.

> **Caution** Do not operate the NI-9421 in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to NI for repair.

Input Characteristics

Number of channels	8 digital input channels
Input type	Sinking

Digital logic levels

OFF state

Input voltage	≤5 V
Input current	≤300 µA

ON state

Input voltage	11 V to 30 V
Input current	.≥3 mA

I/O protection

Input voltage	40 V maximum

Reverse-biased voltage	-30 V maximum
Input current	7 mA maximum, internally limited
Input delay time	100 µs maximum
MTBF	2,086,204 hours at 25 °C; Bellcore Issue 2, Method I, Case 3, Limited Part Stress Method

Power Requirements

Power consumption from chassis	
Active mode	240 mW maximum
Sleep mode	7 mW maximum
Thermal dissipation (at 70 °C)	
Active mode	1.3 W maximum
Sleep mode	1.1 W maximum

Physical Characteristics

Spring-terminal wiring	
Gauge	0.2 mm^2 to 2.5 mm^2 (30 AWG to 12 AWG) copper conductor wire
Wire strip length	10 mm (0.39 in.) of insulation stripped from the end
Temperature rating	90 °C, minimum

Wires per spring terminal	One wire per spring terminal; two wires per spring terminal using a 2-wire ferrule

Connector securement

Securement type	Screw flanges provided
Torque for screw flanges	0.2 N · m (1.80 lb · in.)

NI-9421 with Screw Terminal and NI-9421 with Spring Terminal Safety Voltages

Connect only voltages that are within the following limits:

Channel-to-COM	30 V maximum
Overvoltage protection	40 V maximum
Reverse-biased voltage	-30 V maximum

Isolation

Channel-to-channel	None

Channel-to-earth ground

Continuous	250 V RMS, Measurement Category II
Withstand	2,300 V RMS, verified by a 5 s dielectric withstand test

NI-9421 with DSUB Safety Voltages

Connect only voltages that are within the following limits:

Channel-to-COM	30 V maximum
Overvoltage protection	40 V maximum
Reverse-biased voltage	-30 V maximum

Isolation

Channel-to-channel	None

Channel-to-earth ground

Continuous	60 V DC, Measurement Category I
Withstand	1,000 V RMS, verified by a 5 s dielectric withstand test

Hazardous Locations

U.S. (UL)	; ,
Canada (C-UL)	;
Europe (ATEX) and International (IECEx)	DEMKO ATEX IECEx

Safety Compliance and Hazardous Locations Standards

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 C22.2 No. 61010-1
- EN 60079-0, EN 60079-7
- IEC 60079-0, IEC 60079-7
- UL 60079-0, UL 60079-7
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-7

Note For safety certifications, refer to the product label or the Product Certifications and Declarations section.

Electromagnetic Compatibility

- EN 61326 (IEC 61326): Class A emissions; Industrial immunity

CE Compliance CE

- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

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.

Shock and Vibration

To meet these specifications, you must panel mount the system.

Operating vibration	
Random	5 g RMS, 10 Hz to 500 Hz

Sinusoidal	5 g, 10 Hz to 500 Hz
Operating shock	30 g, 11 ms half sine; 50 g, 3 ms half sine; 18 shocks at 6 orientations

Environmental

Refer to the manual for the chassis you are using for more information about meeting these specifications.

Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 70 °C
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 85 °C
Ingress protection	IP40
Operating humidity (IEC 60068-2-30)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-30)	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	2,000 m

Indoor use only.

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.)