NI-9474 Specifications

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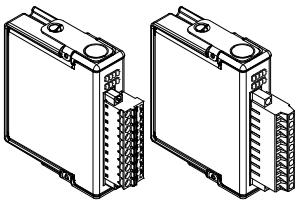
NI-9474 Datasheet



- Screw Terminal or spring terminal connectivity
- CompactDAQ counter compatibility
- 250 V RMS, CAT II, channel-to-earth isolation

The NI-9474 is a digital output module for CompactDAQ and CompactRIO systems. Each channel is compatible with 5 V to 30 V signals and features 2,300 Vrms of transient overvoltage protection between the output channels and the backplane. Each channel also has an LED that indicates the state of that channel. With the NI-9474, you can connect directly to a variety of industrial devices such as motors, actuators, and relays.

There are two connector options for the NI-9474—a 10-position screw-terminal connector or a 10-position spring-terminal connector.

Kit Contents	• NI 9474 •NI 9474 Getting Started Guide
Required Accessories	• NI 9927 Backshell Connector Kit (screw terminal) • NI 9981 Backshell Connector Kit (spring terminal)

C SERIES DIGITAL OUTPUT MODULE COMPARISON

Name	Type	Output	Channels	Rate	Current	Connectivity	Isolation
NI 9375	Sourcing Output	30 V DC	16	7 µs	100 mA/ch	Spring Terminal, 37-Pin DSUB	250 V RMS Ch-Earth (Spring) 60 V DC Ch-Earth (DSUB)
NI 9472	Sourcing Output	30 V	8	100 µs	750 mA/ch	Screw Terminal, Spring Terminal, 25-Pin DSUB,	250 V RMS Ch-Earth (Screw/Spring) 60 V DC Ch-Earth (DSUB)
NI 9474	Sourcing Output	30 V	8	1 µs	1 A/ch	Screw Terminal, Spring Terminal	250 V RMS Ch-Earth
NI 9475	Sourcing Output	60 V	8	1 µs	1 A/ch	25-Pin DSUB	60 V DC Ch-Earth
NI 9476	Sourcing Output	36 V	32	500 µs	250 mA/ch	Spring Terminal, 37-Pin DSUB	250 V RMS Ch-Earth (Spring) 60 V DC Ch-Earth (DSUB)
NI 9477	Sinking Output	60 V	32	8 µs	1 A/ch (20 A/module)	37-Pin DSUB	60 V DC Ch-Earth
NI 9478	Sinking Output	60 V	16	7 µs	1.2 A/ch	37-Pin DSUB	60 V DC Ch-Earth

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.

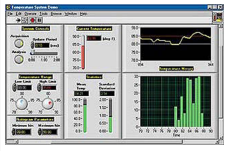
CompactDAQ

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

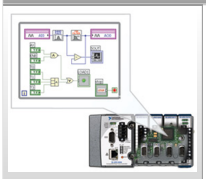


- Use advanced software tools for large project development
- Generate code automatically using DAQ Assistant and Instrument I/O Assistant
- Use advanced measurement analysis and digital signal processing

LabVIEW Professional Development System for Windows

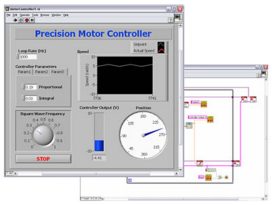
- Take advantage of open connectivity with DLLs, ActiveX, and .NET objects
- Build DLLs, executables, and MSI installers

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
- Purchase individually or as part of a LabVIEW suite

NI-9474 Circuitry

- The DO channels are internally referenced to COM.

- The NI-9474 has sourcing outputs. Sourcing outputs drive current from Vsup to DO when the channel is on.



Tip For more information about sourcing outputs, visit ni.com/info and enter the Info Code sinksource.

NI-9474 Specifications

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

> **Caution** Do not operate the NI-9474 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.

Output Characteristics

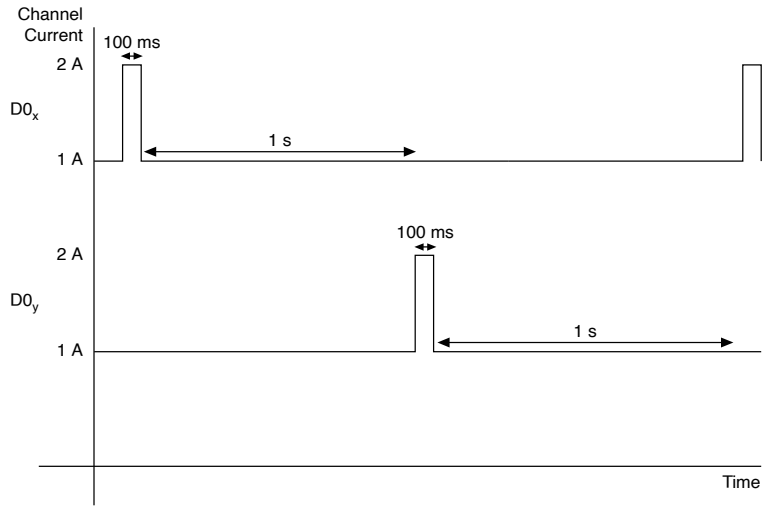
Number of channels	8 digital output channels
Output type	Sourcing
Power-on output state	Channels off
External power supply voltage range (Vsup)	5 V DC to 30 V DC
Output impedance (R_0)	
Typical	0.07 Ω
Maximum	0.13 Ω
Continuous output current (I_0), per channel	1.0 A maximum
Output voltage (V_0)	Vsup - ($I_0 \cdot R_0$)
I/O protection	

Voltage	30 V DC maximum
Reversed voltage	None
Short circuit trip time	10 µs at 14 A

Current	Channel Behavior	Module Protection
Less than 1 A	Channel does not trip	Module is not damaged
1 A to 2 A for 100 ms maximum, repeatable after 1 s[1]	Channel does not trip	Module is not damaged
2 A to 4.4 A	Channel does not trip	Module may be damaged
4.4 A to 14 A	Channel may trip	Module may be damaged
Greater than 14 A	Channel trips	Module is not damaged

Table 1. Short-circuit Behavior

Figure 1. Short-circuit Behavior



Output delay time (full load)	1 µs maximum
MTBF	479,889 hours at 25 °C; Bellcore Issue 2, Method 1, Case 3, Limited Part Stress Method

Power Requirements

Power consumption from chassis	
Active mode	660 mW maximum
Sleep mode	0.6 mW maximum
Thermal dissipation (at 70 °C)	
Active mode	1.5 W maximum
Sleep mode	0.6 mW maximum

Physical Characteristics

Spring-terminal wiring	
Gauge	copper conductor wire
Wire strip length	of insulation stripped from the end
Temperature rating	
Wires per spring terminal	
Connector securement	
Securement type	Screw flanges provided
Torque for screw flanges	
Weight	

NI-9474 with screw terminal
NI-9474 with spring terminal

Safety Voltages

Connect only voltages that are within the following limits.

Channel-to-COM	30 V DC maximum
External power supply (Vsup) voltage range	5 V DC to 30 V DC

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

Caution Do not connect the product to signals or use for measurements within Measurement Categories III or IV.

Attention Ne pas connecter le produit à des signaux dans les catégories de mesure III ou IV et ne pas l'utiliser pour effectuer des mesures dans ces catégories.

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.

Hazardous Locations

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

Safety 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 61010-1
- EN 60079-0:2012, EN 60079-15:2010
- IEC 60079-0: Ed 6, IEC 60079-15; Ed 4
- UL 60079-0; Ed 5, UL 60079-15; Ed 3
- CSA 60079-0:2011, CSA 60079-15:2012

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 EMC requirements; Minimum Immunity

- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note For EMC declarations and certifications, and additional information, refer to the Online Product Certification section.

Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

CE Compliance CE

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)
- 94/9/EC; 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 (IEC 60068-2-64)	5 g_{rms}, 10 Hz to 500 Hz

Sinusoidal (IEC 60068-2-6)	5 g, 10 Hz to 500 Hz
Operating shock (IEC 60068-2-27)	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 60068-2-78)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-78)	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.)

[1] One channel at a time.

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