

C Series Digital Input and Counter/Timer Modules

NI 9401, NI 9411, NI 942x, NI 9435 **NEW!**

- High- and low-speed 24 V logic (IEC 1131-2), 5 V/TTL, differential/single-ended inputs, or universal AC/DC inputs up to 250 VAC/VDC
- Isolation up to 2,300 V_{rms} (withstand), up to 250 V_{rms} (continuous)
- Channel-to-channel isolation up to 1,390 V_{rms} (withstand), up to 250 V_{rms} (continuous)
- Up to 100 ns input rate for ultrahigh-speed digital communication
- Up to 500 ns input rate for high-speed control or long-distance digital communication
- Internal current limiting and industrial logic thresholds for direct connection to a wide array of industrial switches, encoders, and transducers



Product	Compatibility		Logic	Channels	Source/Sink	I/O Delay Time	Signal Levels	Isolation	Connector Options
	CompactRIO	NI CompactDAQ							
NI 9401	✓	✓	5 V/TTL	8	Sink/Source	100 ns	5 V	✓	D-Sub
NI 9411	✓	✓	Differential or 5 V/TTL	6	—	500 ns	±5 to ±24 V	✓	D-Sub
NI 9421	✓	✓	24 V	8	Sink	100 μs	24 V	✓	Screw Terminal, D-Sub
NI 9422	✓	✓	24 V	8	Sink/Source	250 μs	Up to 60 V	✓ (ch-to-ch)	Screw Terminal
NI 9423	✓	✓	24 V	8	Sink	1 μs	24 V	✓	Screw Terminal
NI 9425	✓	✓	24 V	32	Sink	7 μs	24 V	✓	D-Sub
NI 9435	✓	✓	Universal	4	Sink/Source	3 ms	±5 to 250 VDC, 10 to 250 VAC	✓	Screw Terminal

Table 1. C Series Digital Input and Counter/Timer Module Selection Guide

Overview

High-performance digital input switching modules for National Instruments CompactRIO embedded systems, R Series expansion chassis, and NI CompactDAQ provide industrial logic levels for direct connection to a wide array of industrial automotive switches and transducers. Each module features an integrated connector junction box with screw terminal or cable options for flexible and low-cost signal wiring. All modules feature the NI CompactRIO Extreme Industrial Certifications and Ratings.

System Compatibility

You can use NI C Series modules in multiple system types depending on available software. See Table 1 for CompactRIO and NI CompactDAQ module compatibility because not all modules work with both systems. Many of the advanced features described apply only to reconfigurable I/O systems and not to NI CompactDAQ.

Advanced Features

When used in CompactRIO, C Series digital input modules connect directly to reconfigurable I/O (RIO) FPGA hardware to create high-performance embedded systems. The reconfigurable FPGA hardware within CompactRIO provides a variety of options for timing, triggering, synchronization, change detection, digital pattern matching, or digital communication. For instance, with CompactRIO you can implement a circuit to detect digital events and record a timestamp, implement high-reliability digital control logic

in silicon, or perform redundant safety enforcement and interlocks. Unlike traditional digital control devices, the performance of a CompactRIO digital control system does not decrease as the amount of digital logic increases because of the parallel nature of the RIO FPGA circuitry.

Key Features

- High-performance digital and counter/timer input modules for CompactRIO embedded system, R Series expansion chassis, or NI CompactDAQ system
- Screw terminal, D-Sub, strain relief, high-voltage cable, solder-cup backshell, and other connectivity options
- NI CompactRIO Extreme Industrial Certifications and Ratings
- NI 9411 module that generates regulated 5 V power for quadrature encoder or other devices
- Channel-to-earth ground double-isolation barrier for safety and noise immunity and channel-to-channel isolation

Visit ni.com/compactrio or ni.com/compactdaq for up-to-date information on module availability, example programs, application notes, and other developer tools.



Typical certifications – Actual specifications vary from product to product. Visit ni.com/certification for details.

C Series Module Accessories

Connectivity Accessories

CompactRIO and NI CompactDAQ systems are designed to provide flexible options for low-cost field wiring and cabling. Most C Series modules have a unique connector block option to provide secure and safe connections to your CompactRIO or NI CompactDAQ system. The table below contains all of the connector blocks available for C Series I/O modules.

Accessory	Description
NI 9932	10-position strain relief and high-voltage screw-terminal connector kit
NI 9933	37-pin D-Sub connector kit with strain relief and D-Sub shell
NI 9934	25-pin D-Sub connector kit with strain relief and D-Sub shell
NI 9935	15-pin D-Sub connector kit with strain relief and D-Sub shell
NI 9936	10-position screw-terminal plugs (quantity 10)
NI 9939	16-position strain relief and high-voltage screw-terminal connector kit

Note: To meet shock and vibration requirements, you must affix ferrules to the ends of the wires on all screw-terminal connectors.

The table below lists the recommended connector block accessories for each CompactRIO digital input and counter/timer module.

C Series Digital Input and Counter Module	Recommended Module Accessory
NI 9401	NI 9934 ¹
NI 9411	NI 9935 ²
NI 9421	NI 9932, NI 9936
NI 9421 with D-Sub	NI 9934 ¹
NI 9422	NI 9939
NI 9423	NI 9932, NI 9936
NI 9425	NI 9933 ³
NI 9435	NI 9932, NI 9936

¹Requires a 25-pin D-Sub connector such as the NI 9934 accessory kit.

²Requires a 15-pin D-Sub connector such as the NI 9935 accessory kit.

³Requires a 37-pin D-Sub connector such as the NI 9933 accessory kit.

The NI 9932 kit provides strain relief and operator protection from high-voltage signals for any 10-position screw-terminal module.



Figure 1. NI 9932 10-Position Strain Relief and High-Voltage Screw-Terminal Connector Kit

The NI 9933 includes a screw-terminal connector with strain relief as well as a D-Sub solder-cup backshell for creating custom cable assemblies for any module with a 37-pin D-Sub connector.

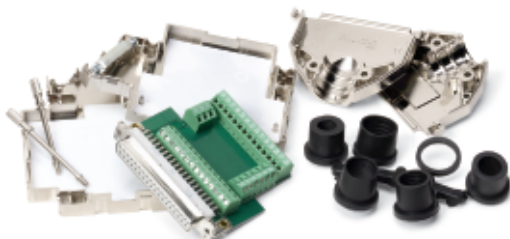


Figure 2. NI 9933 37-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

The NI 9934 includes a screw-terminal connector with strain relief as well as a D-Sub solder-cup backshell for creating custom cable assemblies for any module with a 25-pin D-Sub connector.

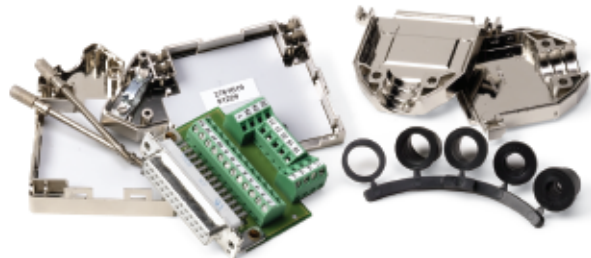


Figure 3. NI 9934 25-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

The NI 9935 includes a screw-terminal connector with strain relief as well as a D-Sub solder-cup backshell for creating custom cable assemblies for any module with a 15-pin D-Sub connector.



Figure 4. NI 9935 15-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

The NI 9936 consists of 10-position screw-terminal plugs for any 10-position screw-terminal module.



Figure 5. NI 9936 10-Position Screw-Terminal Plugs

Visit ni.com/compactrio or ni.com/compactdaq for up-to-date information on availability of accessories.

CompactRIO Ordering Information

Ordering Information

Developer Kits

NI cRIO-9961 Embedded System Developer Hardware Evaluation Kit	779107-01
NI Reconfigurable I/O Software Development Kit.....	779149-03

Reconfigurable Embedded Systems

Real-Time Controllers

NI cRIO-9002	779000-01
NI cRIO-9004	779055-01

Reconfigurable Chassis

NI cRIO-9101	779052-01
NI cRIO-9102	779007-01
NI cRIO-9103	779053-01
NI cRIO-9104	779054-01

Power Supplies

NI PS-1	777567-01
NI PS-2	
U.S. 120 VAC/Japan 100 VAC	777584-01
North American 240 VAC	777584-05
NI PS-3	
U.S. 120 VAC/Japan 100 VAC	777585-01
North American 240 VAC	777585-05
NI PS-4	778586-90
NI PS-5	778805-90

R Series Expansion Systems

Expansion Chassis

NI cRIO-9151 chassis	779008-01
SH68-C68-S cable, 2 m	186381-02

R Series Devices

PCI

NI PCI-7811R digital I/O	779363-01
NI PCI-7813R digital I/O	779370-01
NI PCI-7830R multifunction I/O	779361-01
NI PCI-7831R multifunction I/O	778797-01
NI PCI-7833R multifunction I/O	779359-01

PXI

NI PXI-7811R digital I/O	778800-01
NI PXI-7813R digital I/O	779362-01
NI PXI-7830R multifunction I/O	779364-01
NI PXI-7831R multifunction I/O	778668-01
NI PXI-7833R multifunction I/O	779360-01

C Series Modules¹

Analog Input Modules

NI 9201	779013-01
NI 9201 with D-Sub	779372-01
NI 9203	779516-01
NI 9205	779519-01
NI 9205 with D-Sub	779357-01

NI 9206	779526-01
NI 9211	779001-01
NI 9215	779011-01
NI 9215 with BNC	779138-01
NI 9217	779592-01
NI 9221	779014-01
NI 9221 with D-Sub	779373-01
NI 9233	779015-01
NI 9237	779521-01

Analog Output Module

NI 9263	779012-01
NI 9265	779334-01

Digital Input and Counter/Timer Modules

NI 9401	779351-01
NI 9411	779005-01
NI 9421	779002-01
NI 9421 with D-Sub	779136-01
NI 9422	779522-01
NI 9423	779009-01
NI 9425	779139-01
NI 9435	779010-01

Digital Output and Relay Modules

NI 9401	779351-01
NI 9472	779004-01
NI 9472 with D-Sub	779137-01
NI 9474	779003-01
NI 9476	779140-01
NI 9477	779517-01
NI 9481	779006-01

Accessories

NI 9912	779019-01
NI 9915	779018-01
NI 9917	779454-01
NI 9918	779455-01
NI 9932	779017-01
NI 9933	779103-01
NI 9934	779104-01
NI 9935	779016-01
NI 9936	779105-01
NI 9937	779106-01
NI 9939	192692-01

Ethernet Cables

CAT5	
5 m	182219-05
CAT5 Crossover	
5 m	187375-05

OEM Discounts Available

NI offers aggressive OEM pricing discounts for high-volume OEM applications. Contact NI for a quote.

¹Visit ni.com/compactrio for up-to-date information on module availability.

BUY NOW!

For complete product specifications, pricing, and accessory information, call (800) 813 3693 (U.S.) or go to ni.com/compactrio.

NI CompactDAQ Ordering Information

Ordering Information

System Chassis

NI cDAQ-9172	
U.S. (120 VAC)	779508-01
Switzerland (220 VAC)	779508-02
Australia (240 VAC)	779508-03
Europe (240 VAC)	779508-04
UK (240 VAC)	779508-06
Japan (100 VAC)	779508-07

C Series Modules¹

Analog Input Modules

NI 9205	779519-01
NI 9205 with D-Sub	779357-01
NI 9206	779526-01
NI 9211	779001-01
NI 9215	779011-01
NI 9215 with BNC	779138-01
NI 9233	779015-01
NI 9237	779521-01

Analog Output Module

NI 9263	779012-01
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Digital Input Modules

NI 9401	779351-01
NI 9421	779002-01
NI 9421 with D-Sub	779136-01

Digital Output and Relay Modules

NI 9401	779351-01
NI 9472	779004-01
NI 9472 with D-Sub	779137-01
NI 9481	779006-01

Accessories

NI 9901	779473-01
NI 9915	779018-01
NI 9917	779454-01
NI 9918	779455-01
NI 9932	779017-01
NI 9933	779103-01
NI 9936	779105-01
NI 9940	779567-01
NI 9941	779568-01

Academic Bundles

Standard Bundle	777448-60
Instrumentation Bundle	777448-61
DSA (Sound and Vibration) Bundle	777448-62

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Safety and Compliance

Safety

This product is designed to meet 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, CAN/CSA-C22.2 No. 61010-1

Note: For UL and other safety certifications, refer to the product label or visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

- EN 61326 EMC requirements; Industrial Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note: For EMC compliance, operate this device according to product documentation.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- 73/23/EEC; Low-Voltage Directive (safety)
- 89/336/EEC; Electromagnetic Compatibility Directive (EMC)

Note: Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain 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.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit ni.com/environment/weee.htm.

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Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with ni.com/pxiadvisor.

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