

# CompactRIO Digital Input and Counter/Timer Modules

## NI cRIO-9411, NI cRIO-942x, NI cRIO-9435 **NEW!**

- High and low-speed 24 V logic (IEC 1131-2), differential/single-ended inputs, or universal AC/DC inputs up to 250 VAC/VDC
- Isolation up to 2,300 V<sub>rms</sub> (withstand), up to 250 V<sub>rms</sub> (continuous)
- Up to 1 μs input rate for ultrahigh-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	Logic	Source/Sink	Channels	I/O Delay Time	Signal Levels	Isolation	Connector
cRIO-9411	Differential or 5 V/TTL	–	6 DI/SE	500 ns	±5 to ±24 V	✓	D-Sub
cRIO-9421	24 V	Sink	8 SE	100 μs	24 V	✓	Screw Terminal, D-Sub
cRIO-9423	24 V	Sink	8 SE	1 μs	24 V	✓	Screw Terminal
cRIO-9435	Universal	Sink/source	4 DI	3 ms	±5 to 250 VDC, 10 to 250 VAC	✓	Screw Terminal

## Overview

High-performance digital input modules for National Instruments CompactRIO embedded systems and R Series expansion chassis provide industrial logic levels for direct connection to a wide array of industrial 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.

## Advanced Features

Advanced features include internal current limiting and industrial logic thresholds for direct connection to a wide array of industrial devices such as proximity switches, emergency stop buttons, level switches, pressure probes, and magnetic pickups. The NI cRIO-9411 module, ideal for quadrature position encoders, features 5 V/TTL logic levels with differential inputs up to ±24 V or single-ended inputs. The cRIO-9411 also accepts 6 to 30 V power and generates a regulated 5 V output for powering quadrature encoders. The cRIO-9435 is a universal digital input module that accepts AC and DC as well as both sinking and sourcing signals up to 250 VAC/VDC.

NI CompactRIO digital input modules connect directly to RIO FPGA hardware to create high-performance embedded systems that deliver the optimization and flexibility of a custom electrical circuit completely dedicated to your I/O application. The RIO FPGA hardware provides unlimited options for timing, triggering, synchronization, change detection, digital pattern matching, or

digital communication. For instance, a CompactRIO system 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 any CompactRIO embedded system or R Series expansion chassis
- Screw terminals, D-Sub, strain relief, high-voltage cable, solder cup backshell, and other connectivity options
- NI CompactRIO Extreme Industrial Certifications and Ratings<sup>1</sup>
- cRIO-9411 module generates regulated 5 V power for quadrature encoder or other devices
- Channel-to-earth ground double-isolation barrier for safety and noise immunity

Visit [ni.com/compactrio](http://ni.com/compactrio) for up-to-date information on module availability, example programs, application notes, and other developer tools.

**For ordering information, see page 381.**



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North American Hazardous Locations (pending)

**For more information, see page 379.**

<sup>1</sup>See CompactRIO Overview on page 366 for details.

# CompactRIO Accessories and Cables

**SH68-C68-S Cable** – for connecting an NI cRIO-9151 R Series expansion chassis to the digital port on a PCI or PXI R Series device. You can connect up to two cRIO-9151 chassis to an NI 7831R device, and up to four cRIO-9151 chassis to a PXI-7811R device.



**Note:** Use only the SH68-C68-S digital cable with the cRIO-9151 chassis.

**DIN-Rail Mounting Kits** – for mounting 4 or 8-slot CompactRIO embedded chassis or cRIO-9151 R Series expansion chassis to any standard 35 mm DIN rail. For high shock and vibration applications, NI recommends a panel mounting configuration rather than DIN rail. Panel mounting holes are built into all CompactRIO Chassis. For detailed mounting instructions, refer to the CompactRIO Installation Instructions manual for your chassis.



cRIO-9912	DIN-rail mounting kit for 4-slot CompactRIO chassis (embedded or expansion)
cRIO-9915	DIN-rail mounting kit for 8-slot CompactRIO chassis (embedded or expansion)

## Power Supplies

NI offers a variety of UL approved industrial power supplies. The PS-5 is a DIN-rail-mountable 24 VDC power supply that provides 5 A of current and is rated for operation from -25 to 60 °C. Two PS-5 supplies can be wired in parallel to provide up to 10 A. The PS-5 is recommended for heavy-duty industrial installations. The PS-4 is a DIN-rail-mountable 24 V power supply in FieldPoint packaging. The PS-3 and PS-2 are power supply “bricks” with a universal IEC power input. The PS-3 can also operate as a float charger for 12 VDC batteries. The PS-1 is a wall-mount power supply.



Power Supply	Output Capacity	Input Voltage
PS-1	20 VDC, 0.8 A	120 VAC
PS-2	24 VDC, 0.8 A	Japan 100 VAC/US 120 VAC North American 240 VAC
PS-3	13.8 VDC, 4 A	Japan 100 VAC/US 120 VAC North American 240 VAC
PS-4	24 VDC, 0.625 A	UPI
PS-5	24 VDC, 5 A	UPI



cRIO-9935 15-Pin Connector Kit

## Connectivity Accessories

The CompactRIO system is designed to provide flexible options for low cost field wiring and cabling. The cRIO-9932 kit provides strain relief and operator protection from high-voltage signals for any 10-position screw terminal module. The cRIO-9935 (or other 15-pin D-Sub connector) is required for use with the cRIO-9411 module. The cRIO-9935 includes a screw terminal connector with strain relief as well as a D-Sub solder cup backshell for creating custom cable assemblies. The cRIO-9936 consists of 10 screw terminal plugs for any 10-position screw terminal module. The cRIO-9937 consists of ten 4-position power supply plugs for CompactRIO real-time controllers.

Product	Description
cRIO-9932	Strain relief and high-voltage connector kit, 10-position screw-terminal
cRIO-9933	37-pin connector kit with strain relief
cRIO-9934	25-pin connector kit with strain relief
cRIO-9935	15-pin connector kit with strain relief
cRIO-9936	10-position screw-terminal plugs (quantity 10)
cRIO-9937	4-position controller power supply plugs (quantity 10)

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



cRIO-9937  
Power Supply Plugs



cRIO-9932 Strain Relief and  
High-Voltage Connector Kit



cRIO-9936 10-position  
screw terminal plugs

Visit [ni.com/compactrio](http://ni.com/compactrio) for up-to-date information on availability of accessories.

**For ordering information, see page 381.**

# 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	
Japan 100 VAC/US 120 VAC .....	777584-01
North American 240 VAC .....	777584-05
NI PS-3	
Japan 100 VAC/US 120 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

NI PXI-7811R Digital I/O .....	778800-01
NI PXI-7831R Multifunction I/O .....	778668-01
NI PCI-7831R Multifunction I/O .....	778797-01

### Input/Output Modules<sup>1</sup>

#### Analog Input Modules

NI cRIO-9201 .....	779013-01
NI cRIO-9211 .....	779001-01
NI cRIO-9215 .....	779011-01
NI cRIO-9221 .....	779014-01
NI cRIO-9233 .....	779015-01

#### Analog Output Module

NI cRIO-9263 .....	779012-01
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#### Digital Input and Counter/Timer Modules

NI cRIO-9411 .....	779005-01
NI cRIO-9421 .....	779002-01
NI cRIO-9423 .....	779009-01
NI cRIO-9435 .....	779010-01

#### Digital Output and Relay Modules

NI cRIO-9472 .....	779004-01
NI cRIO-9474 .....	779003-01
NI cRIO-9481 .....	779006-01

#### Accessories

NI cRIO-9912 .....	779019-01
NI cRIO-9915 .....	779018-01
NI cRIO-9932 .....	779017-01
NI cRIO-9933 .....	779103-01
NI cRIO-9934 .....	779104-01
NI cRIO-9935 .....	779016-01
NI cRIO-9936 .....	779105-01
NI cRIO-9937 .....	779106-01

#### Ethernet Cables

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

<sup>1</sup>Visit [ni.com/compactrio](http://ni.com/compactrio) for up-to-date information on module availability.

## BUY NOW!

For complete product specifications, pricing, and accessory information, call (866) 265-9891 (U.S. only) or go to [ni.com](http://ni.com) and search on a four-digit model number listed above.