

# C Series Analog Input Modules

## NI 9201, NI 921x, NI 9221, NI 923x

- Signal conditioning for high voltage ( $\pm 60$  V), thermocouples, RTDs, accelerometers, microphones, strain gages, current inputs
- Advanced features such as smart TEDS sensor capability, antialiasing filters, open-thermocouple detection
- $\pm 80$  mV,  $\pm 10$  V, or  $\pm 60$  V analog input ranges
- 12-, 16-, or 24-bit (delta-sigma) resolution
- Up to 800 kS/s multiplexed or up to 100 kS/s simultaneous-sampling analog-to-digital converter (ADC)
- Up to 32 channels per module
- Up to 2,300  $V_{rms}$  isolation (withstand), up to 250  $V_{rms}$  isolation (continuous)
- NIST-traceable calibration certificate for guaranteed accuracy



Model	CompactRIO	NI CompactDAQ	Signal Type	Channels	Resolution (bits)	Max Sampling Rate (S/s)	Signal Input Ranges	Simultaneous Sampling	Antialiasing Filters	Isolation	Connector Options
NI 9201	✓	✓	Voltage	8	12	500 k	$\pm 10$ V	–	–	✓	Screw Terminal, D-Sub
NI 9203	✓	✓	Current	8	16	200 k	$\pm 20$ mA, 0 to 20 mA	–	–	✓	Screw Terminal
NI 9205	✓	✓	Voltage	32 SE/16 DI	16	250 k	$\pm 10$ , $\pm 5$ , $\pm 1$ , $\pm 0.2$ V	–	–	✓	Spring Terminal, D-Sub
NI 9206	✓	✓	CAT I Isolated Voltage	16 DI	16	250 k	$\pm 10$ , $\pm 5$ , $\pm 1$ , $\pm 0.2$ V	–	–	✓	Spring Terminal
NI 9211	✓	✓	Thermocouple	4	24	15	$\pm 80$ mV	–	✓	✓	Screw Terminal
NI 9215	✓	✓	Voltage	4	16	100 k/ch	$\pm 10$ V	✓	–	✓	Screw Terminal, BNC
NI 9217	✓	✓	RTD	4	24	400	0 to 400 $\Omega$	–	✓	✓	Screw Terminal
NI 9221	✓	✓	Voltage	8	12	800 k	$\pm 60$ V	–	–	✓	Screw Terminal, D-Sub
NI 9233	✓	✓	IEPE	4	24	50 k/ch	$\pm 5$ V	✓	✓	–	BNC
NI 9237	✓	✓	Bridge	4	24	50 k/ch	$\pm 250$ mV	✓	✓	✓	RJ50

Table 1. C Series Analog Input Modules Selection Guide

## Overview

High-accuracy C Series analog input modules for National Instruments CompactRIO and NI CompactDAQ provide high-performance measurements for a wide variety of industrial, in-vehicle, and laboratory sensors and signal types. Each module includes built-in signal conditioning and an integrated connector with screw terminal or cable options for flexible and low-cost signal wiring. All modules feature 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 with CompactRIO, NI C Series analog 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 custom timing, triggering, synchronization, filtering, signal processing, and

high-speed decision making for all C Series analog modules. For instance, with CompactRIO, you can implement custom triggering for any analog sensor type on a per-channel basis using the flexibility and performance of the FPGA and the numerous arithmetic and comparison function blocks built into NI LabVIEW FPGA.

## Key Features

- High-accuracy, high-performance analog measurements for any CompactRIO embedded system, R Series expansion chassis, or NI CompactDAQ chassis
- Screw terminals, BNC, D-Sub, spring terminals, strain relief, high-voltage, cable, solder cup backshell, and other connectivity options
- Available channel-to-earth ground double-isolation barrier for safety, noise immunity, and high common-mode voltage range
- CompactRIO Extreme Industrial Certifications and Ratings
- Built-in signal conditioning for direct connection to sensors and industrial devices

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



North American Hazardous Locations



# 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 that offers secure and safe connections to your C Series system. Table 2 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 connector kit with strain relief

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

Table 2. Connector Blocks for C Series I/O Modules

Table 3 lists the recommended connector block accessories for each C Series analog input module.

C Series Analog Input Module	Recommended Module Accessory
NI 9201	NI 9932, NI 9936
NI 9201 with D-Sub	NI 9934 <sup>1</sup>
NI 9211	NI 9932, NI 9936
NI 9215	NI 9932, NI 9936
NI 9217	NI 9939
NI 9221	NI 9932, NI 9936
NI 9221 with D-Sub	NI 9934 <sup>1</sup>

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

Table 3. Recommended Connector Block Accessories

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.

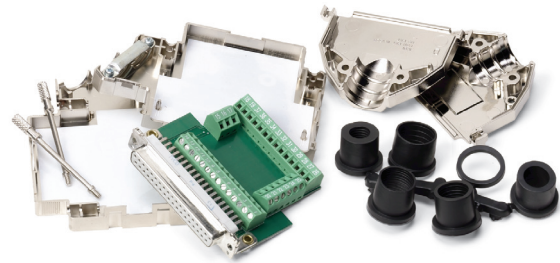


Figure 2. NI 9933 37-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

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.

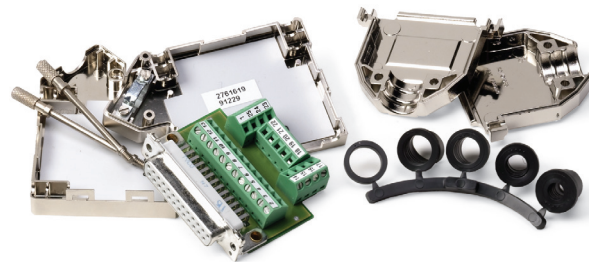


Figure 3. NI 9934 25-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

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.

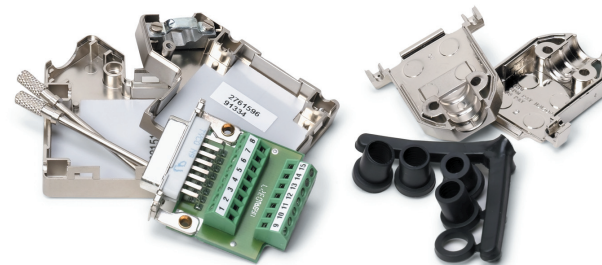


Figure 4. NI 9935 15-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

## C Series Module Accessories

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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](http://ni.com/compactrio) or [ni.com/compactdaq](http://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 Modules<sup>1</sup>

#### 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

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

#### OEM Discounts Available

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

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# 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 V) .....	779508-07

### C Series Modules

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

### Academic Bundles

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

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