

# C Series Digital Output and Relay Modules

## NI 940x, NI 947x, NI 948x **NEW!**

- High- and low-speed high-voltage digital outputs (up to 60 V), 5 V/TTL, SPST (Form A) electromechanical relay outputs or solid-state relay outputs
- Up to 32 channels per module; up to 256 channels per 8-slot chassis
- Down to 100 ns output rate for ultrahigh-speed control, pulse-width modulation (PWM), or digital communication
- Isolation up to 2,300 V<sub>rms</sub> (withstand), up to 250 V<sub>rms</sub> (continuous)
- Externally powered with high current-switching capacity (up to 20 A per module) for direct control of a wide array of industrial actuators
- Short-circuit-proof outputs available to protect from damage caused by current surges



| Product | Compatibility |               | Logic        | Channels | Sink/Source | I/O Delay Time | Signal Levels   | Output Current per Channel | Isolation | Connector Options     |
|---------|---------------|---------------|--------------|----------|-------------|----------------|-----------------|----------------------------|-----------|-----------------------|
|         | CompactRIO    | NI CompactDAQ |              |          |             |                |                 |                            |           |                       |
| NI 9401 | ✓             | ✓             | 5 V/TTL      | 8        | Sink/Source | 100 ns         | 5 V             | 2 mA                       | ✓         | D-Sub                 |
| NI 9403 | ✓             | ✓             | 5 V/TTL      | 32       | Sink/Source | 7 µs           | 5 V             | 2 mA                       | ✓         | D-Sub                 |
| NI 9472 | ✓             | ✓             | High Voltage | 8        | Source      | 100 µs         | 6 to 30 V       | 750 mA                     | ✓         | Screw Terminal, D-Sub |
| NI 9474 | ✓             | ✓             | High Voltage | 8        | Source      | 1 µs           | 5 to 30 V       | 1 A                        | ✓         | Screw Terminal        |
| NI 9476 | ✓             | ✓             | High Voltage | 32       | Source      | 500 µs         | 6 to 36 V       | 250 mA                     | ✓         | D-Sub                 |
| NI 9477 | ✓             | ✓             | High Voltage | 32       | Sink        | 8 µs           | 5 to 60 V       | 625 mA                     | ✓         | D-Sub                 |
| NI 9481 | ✓             | ✓             | Form A       | 4        | Sink/Source | 10 ms          | 60 VDC, 250 VAC | 2 A (30 VDC)               | ✓         | Screw Terminal        |
| NI 9485 | ✓             | ✓             | SSR          | 8        | Sink/Source | 9 ms           | 60 VDC, 30 VAC  | 750 mA                     | ✓         | Screw Terminal        |

Table 1. C Series Digital Output and Relay Module Selection Guide

## Overview

High-performance digital output and switching modules for National Instruments CompactRIO embedded systems, R Series expansion chassis, and NI CompactDAQ systems provide extended voltage ranges and high current-switching capacity for direct control of a wide array of industrial and automotive actuators. Each module features an integrated connector junction box with screw-terminal or cable options for flexible, low-cost signal wiring. All modules feature the NI CompactRIO Extreme Industrial Certifications and Ratings.

## System Compatibility

You can use NI C Series modules interchangeably in CompactRIO and NI CompactDAQ chassis. Many of the advanced timing features described apply only to CompactRIO reconfigurable I/O systems and not to NI CompactDAQ.

## Advanced Features

When used in CompactRIO, C Series digital output 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, digital waveform generation, or digital communication. For instance, with CompactRIO you can implement a circuit to generate

pulse-width modulation (PWM) outputs for controlling motors, heaters, or fans, as well as perform pulse code modulation encoding (PCME) for wireless telemetry applications.

## Key Features

- High-performance digital output switching for any CompactRIO embedded system, R Series expansion chassis, or NI CompactDAQ system
- Screw-terminal, strain relief, high-voltage, cable, solder-cup backshell, and other connectivity options
- Channel-to-earth ground double-isolation barrier for safety and noise immunity
- NI CompactRIO Extreme Industrial Certifications and Ratings

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.

Typical certifications – Actual specifications vary from product to product. Visit [ni.com/certification](http://ni.com/certification) for details.



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 to provide secure and safe connections to your CompactRIO or NI CompactDAQ 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)                          |

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

Table 2. C Series I/O Module Connector Blocks

Table 3 lists the recommended connector block accessories for each C Series digital output and relay module.

| C Series Digital Output and Relay Module | Recommended Module Accessory |
|--|------------------------------|
| NI 9401                                  | NI 9934 <sup>1</sup>         |
| NI 9403                                  | NI 9933 <sup>2</sup>         |
| NI 9472                                  | NI 9932, NI 9936             |
| NI 9472 with D-Sub                       | NI 9934 <sup>1</sup>         |
| NI 9474                                  | NI 9932, NI 9936             |
| NI 9476                                  | NI 9933 <sup>2</sup>         |
| NI 9477                                  | NI 9933 <sup>2</sup>         |
| NI 9481                                  | NI 9932, NI 9936             |
| NI 9485                                  | NI 9939                      |

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

<sup>2</sup>Requires a 37-pin D-Sub connector such as the NI 9933 accessory kit.

Table 3. Recommended Connector Block Accessories for CompactRIO

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

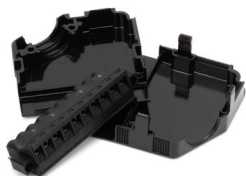


Figure 1. NI 9932 10-Position Strain Relief and High-Voltage Screw-Terminal Connector Kit

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.

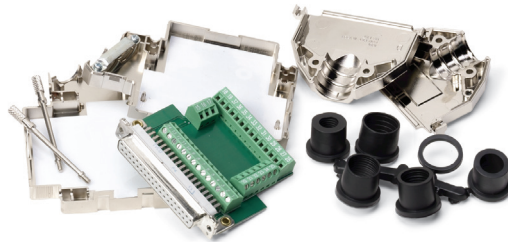


Figure 2. NI 9933 37-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

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.

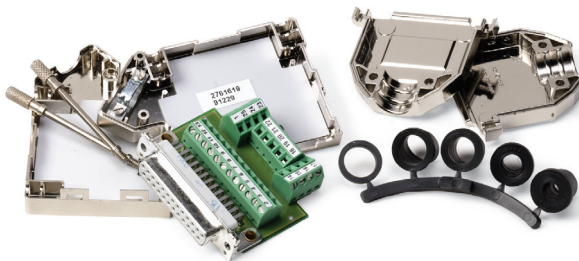


Figure 3. NI 9934 25-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

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.

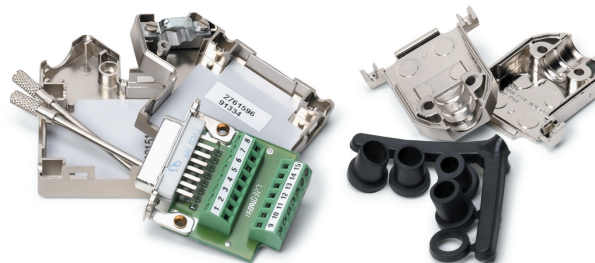


Figure 4. NI 9935 15-Pin D-Sub Connector Kit with Strain Relief and D-Sub Shell

## 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](https://ni.com/compactrio) or [ni.com/compactdaq](https://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-9012 ..... | 779563-01 |
| NI cRIO-9014 ..... | 779564-01 |
| 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 9403 .....            | 779787-01 |
| 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 |
| NI 9485 .....            | 779600-01 |

##### 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.

<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 800 813 3693 (U.S.) or go to [ni.com/compactrio](http://ni.com/compactrio).

## NI CompactDAQ Ordering Information

### Ordering Information

#### System Chassis

|                               |           |
|-------------------------------|-----------|
| NI cDAQ-9172                  |           |
| U.S., 120 VAC .....           | 779508-01 |
| Swiss, 220 VAC .....          | 779508-02 |
| Australian, 240 VAC .....     | 779508-03 |
| Universal Euro, 240 VAC ..... | 779508-04 |
| UK, 240 VAC .....             | 779508-06 |
| Japanese, 100 VAC .....       | 779508-07 |

#### C Series Modules<sup>1</sup>

##### 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 |
|---------------|-----------|

##### Digital Input Modules

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

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

#### 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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