

NI CompactRIO

Rugged Form Factor

Reconfigurable Design

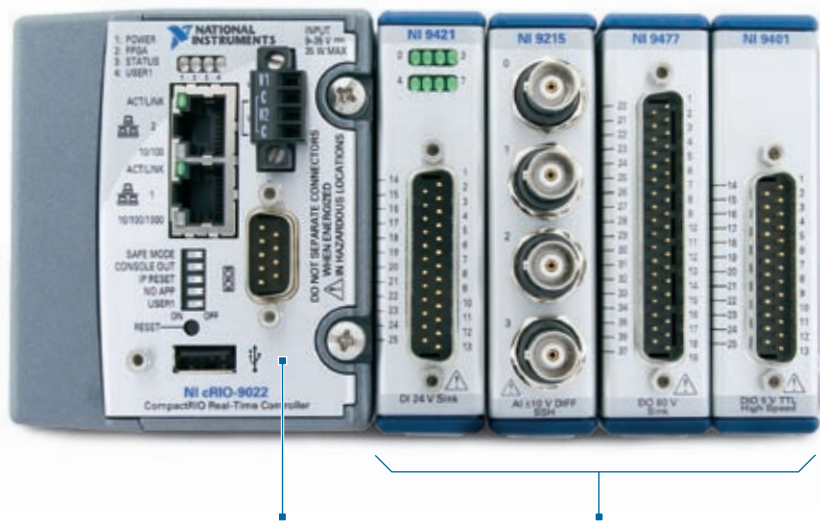
Embedded Control



The NI CompactRIO programmable automation controller (PAC) provides the high performance and reliability required for industrial and embedded control applications. CompactRIO blends open embedded architecture functionality and field-programmable gate array (FPGA) reliability with small size, ruggedness, and hot-swappable industrial I/O modules, making it the ideal platform to design, prototype, and deploy your advanced measurement and control solutions.

Advanced Control with CompactRIO

The open architecture of CompactRIO hardware features reconfigurable FPGAs, giving engineers and scientists the flexibility, performance, and reliability of custom hardware. Additionally, CompactRIO is compatible with a wide range of industrial protocols including Modbus, EtherNet/IP, and PROFIBUS for smooth integration with existing systems. CompactRIO is ideal for a variety of applications, from low-cost systems for high-volume deployment to high-performance systems suited for more complex control and measurement tasks.



LabVIEW Graphical Programming

- HMI user interface development
- Real-time processor programming
- FPGA programming

Real-Time Processor

- User interface and communication
- Built-in Web/file servers

Reconfigurable FPGA

- Embedded FPGA for high-speed control
- Customizable timing, triggering, and processing

System Specifications

Typical Isolation (withstand)	2300 V _{rms}	Typical Power Consumption	7 to 17 W
I/O Module Slots	4 or 8 slots	Serial Port	RS232
User-Programmable FPGA.....	Virtex-5 or Spartan-II	Ethernet Port	10/100, 10/100/1000 Mb/s
FPGA Timebases	40, 80, 120, 160, or 200 MHz	Temperature Range	Up to -40 to 70 °C
Real-Time Processors.....	266, 400, 533, or 800 MHz	Shock.....	50 g
DC Supply Range	9 to 35 V (on power-up), 6 to 35 V (after power-up)	Dimensions	179.6 by 88.1 by 88.1 mm (7.07 by 3.47 by 3.47 in.)

Certification Ratings

Product Safety: 2006/95/EC, EN 61010-1, IEC 61010-1, UL 61010-1, CSA 61010-1
Hazardous Locations, Class I, Division 2: Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nC IIC T4, EEx nC IIC T4
Shock and Vibration: IEC 60068-2-64, IEC 60068-2-27, IEC 60068-2-6
Mean Time Before Failure (MTBF): Bellcore Issue 6, Method 1, Case 3, MIL-HDBK-217F
Marine: Lloyd's Register (LR Type Approval System Test Spec No. 1)
Quality/Environmental Management System (QMS/EMS): ISO 9001/14001

Typical Certifications – actual specifications vary from product to product. Visit ni.com/certification for complete details.

NI C Series Modular I/O for CompactRIO

C Series hardware from National Instruments features more than 50 hot-swappable modules and over 50 third-party modules. C Series I/O modules provide measurement-quality I/O and communication for desktop, portable, remote, industrial, and embedded applications. For a complete list of C Series modules, visit ni.com/compactrio.



Signal	Channels	Special Features
Analog Input		
Small signal (± 80 mV)	4, 32	16- to 24-bit, 100 to 250 kS/s, differential
Voltage (± 10 V)	4, 8, 32	12- to 24-bit, 100 to 250 kS/s, up to 250 V_{rms} ch-ch to 600 VDC CAT I bank isolation
High voltage (± 60 V to 300 V_{rms})	3, 4, 8	12- to 24-bit, 100 to 800 kS/s, 250 V_{rms} to 2300 V_{rms} ch-ch isolation
Thermocouple	4, 16	24-bit, 15 to 100 S/s (J, K, R, S, T, N, E, and B thermocouple types), differential
RTD	4	24-bit, 100 to 400 S/s, 3- and 4-wire measurements
IEPE sensors (accelerometer/microphone)	4	24-bit, 50 kS/s IEPE conditioning, built-in antialiasing
Bridge-based sensors (strain gages/load cells)	4, 8	24-bit, 10 to 100 kS/s (± 125 mV to ± 60 V; ± 25 mA; TC; 3- and 4-wire RTD; $\frac{1}{4}$ -, $\frac{1}{2}$ -, and full-bridge)
Analog Output		
Voltage (± 10 V)	4, 16	16-bit, 25 to 100 kS/s/ch
Current 0 to 20 mA	4	16-bit, 100 kS/s/ch, open-loop detection
Digital Input		
Bidirectional 5 V TTL	8	50 ns, 5 V TTL, ultrahigh-speed, bidirectional, 30 V protection
24 V sinking	8, 32	100 μ s to 7 μ s, up to 60 V protection
250 AC/DC universal	4	3 ms, ± 5 to 250 VDC, 10 to 250 VAC, universal, sink/source
Differential or TTL	6	500 ns, ± 5 to 24 V, single-ended TTL or differential, regulated 5 V supply output
Digital Output		
Bidirectional 5 V TTL	8	100 ns, 5 V TTL, ultrahigh-speed, bidirectional, 30 V protection
24 V sourcing	8, 32	1 to 500 μ s, 750 mA/ch max to 1 A/ch max, short-circuit-proof
24 V sinking	32	8 μ s, 5 to 60 V, sinking, isolation, up to 20 A per module
Relay Output		
Form A (SPST)	4	1 s, 30 VDC (2 A), 60 VDC (1 A), 250 VAC (2 A) electromechanical Form A (SPST)
Solid-state relay	8	60 VDC, SSR Form A, up to 750 mA/ch, 5 ms set and reset time, ch-ch isolation
Counter, Pulse Generation		
Counter/timer (24 V)	8, 32	1 μ s, 7 μ s, 30 to 60 V, single-ended and differential
Counter/timer (TTL)	6, 8	100 to 500 ns, ± 5 to 24 V, single-ended and differential
Quadrature encoder (differential)	2	500 ns, ± 5 to 24 V, six digital inputs for two encoders (phase A, phase B, and index inputs)
PWM/pulse generation (24 V, TTL)	8, 32	1 to 500 μ s, 5 to 60 V output, short-circuit-proof
Serial Interface		
RS232, RS485	4	—
Removable Storage		
Secure digital module	2	2-slot, up to 4 GB added storage, read/write at 2 MB/s
Motion		
H-bridge	1	5 A continuous current at 40 °C (1 A at 70 °C, built-in encoder interface and current sensor)
Drive interface	1	Stepper and servo drive signals, incremental encoder feedback, motion I/O
Controller Area Network (CAN)		
High-speed CAN, low-speed CAN	2	125 kbits/s to 1 Mbit/s transfer rate, ISO 11519 compliance

NI CompactRIO Module Development Kit

The CompactRIO Module Development Kit provides resources to help you develop custom modules that meet your specific requirements. The kit includes CompactRIO module development software, the *CompactRIO Module Development Kit User Manual*, and access to NI technical support. Get started at ni.com/compactrio.

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