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## SPECIFICATIONS

# NI cRIO-9068

## Embedded Real-Time Controller with Reconfigurable FPGA for C Series Modules

This document lists the specifications for the NI cRIO-9068. The following specifications are typical for the -40 °C to 70 °C operating temperature range unless otherwise noted.



**Caution** Do not operate the cRIO-9068 in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to NI for repair.

## Network

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|                          |   |
|--------------------------|---|
| Network interface        | 10/100/1,000 Ethernet                         |
| Compatibility            | IEEE 802.3                                    |
| Communication rates      | 10 Mbps, 100 Mbps, 1,000 Mbps auto-negotiated |
| Maximum cabling distance | 100 m/segment                                 |

## RS-232 Serial Ports

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|                   |                            |
|-------------------|----------------------------|
| Maximum baud rate | 230,400 bps                |
| Data bits         | 5, 6, 7, 8                 |
| Stop bits         | 1, 2                       |
| Parity            | Odd, Even, Mark, Space     |
| Flow control      | RTS/CTS, XON/XOFF, DTR/DSR |

## RS-485 Serial Ports

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|                   |             |
|-------------------|-------------|
| Maximum baud rate | 230,400 bps |
| Data bits         | 5, 6, 7, 8  |
| Stop bits         | 1, 2        |



|                    |                                |
|--------------------|--------------------------------|
| Parity             | Odd, Even, Mark, Space         |
| Flow control       | XON/XOFF                       |
| Transmission modes | 2-wire auto, 4-wire            |
| Isolation voltage  | 60 VDC continuous <sup>1</sup> |

## Memory

|                    |        |
|--------------------|--------|
| Nonvolatile memory | 1 GB   |
| DRAM               | 512 MB |



**Note** Visit [ni.com/info](https://ni.com/info) and enter Info Code `SSDBP` for information about the life span of the nonvolatile memory and about best practices for using nonvolatile memory.

## Reconfigurable FPGA

|   |                  |
|---|------------------|
| FPGA type                                     | Xilinx Zynq 7020 |
| Number of flip-flops                          | 106,400          |
| Number of 6-input LUTs                        | 53,200           |
| Number of DSP slices<br>(18 × 25 multipliers) | 220              |
| Available block RAM                           | 4,480 kbits      |
| Number of DMA channels                        | 16               |
| Number of logical interrupts                  | 32               |

## Internal Real-Time Clock

|          |       |
|----------|-------|
| Accuracy | 5 ppm |
|----------|-------|

<sup>1</sup> Refer to the [Safety Voltages](#) section of this document for more information about the RS-485 serial port isolation voltage.

# Battery

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|  |           |
|--|-----------|
| Typical battery life with power applied to power connector | 10 years  |
| Typical battery life in storage at 55 °C                   | 5.7 years |
| Minimum battery life in storage at 85 °C                   | 5.3 years |

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# Power Requirements

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|                           |             |
|---------------------------|-------------|
| Voltage input range       | 9 V to 30 V |
| Maximum power input       | 25 W        |
| Maximum power consumption | 25 W        |

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**Note** The maximum power consumption specification is based on a fully populated system running a high-stress application at elevated ambient temperature and with all C Series modules and USB devices consuming the maximum allowed power.

# Physical Characteristics

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If you need to clean the controller, wipe it with a dry towel.

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## Screw-terminal wiring

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|                            |   |
|----------------------------|---|
| Gauge                      | 0.2 mm <sup>2</sup> to 2.1 mm <sup>2</sup> (24 AWG to 14 AWG) copper conductor wire |
| Wire strip length          | 10 mm (0.39 in.) of insulation stripped from the end                                |
| Temperature rating         | 85 °C   |
| Torque for screw terminals | 0.20 N · m to 0.25 N · m (1.8 lb · in. to 2.2 lb · in.)                             |
| Wires per screw terminal   | One wire per screw terminal   |

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## Connector securement

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|                          |   |
|--------------------------|---|
| Securement type          | Screw flanges provided                                |
| Torque for screw flanges | 0.3 N · m to 0.4 N · m (2.7 lb · in. to 3.5 lb · in.) |
| Weight                   | 1,164 g (41.1 oz)                                     |

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# Safety Voltages

Connect only voltages that are within the following limits:

|   |  |
|---|--|
| V terminal to C terminal                              | 30 V maximum, Measurement Category I                                 |
| Isolation voltage, RS-485 serial port to earth ground |  |
| Continuous  | 60 VDC, Measurement Category I                                       |
| Withstand   | 1,000 V <sub>rms</sub> , verified by a 5 s dielectric withstand test |

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as *MAINS* voltage. *MAINS* is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.



**Caution** Do not connect the cRIO-9068 to signals or use for measurements within Measurement Categories II, III, or IV.



**Note** Measurement Categories CAT I and CAT O are equivalent. These test and measurement circuits are not intended for direct connection to the *MAINS* building installations of Measurement Categories CAT II, CAT III, or CAT IV.

## Environmental

Temperature (IEC 60068-2-1 and IEC 60068-2-2)

|           |                 |
|-----------|-----------------|
| Operating | -40 °C to 70 °C |
| Storage   | -40 °C to 85 °C |



**Caution** Failure to follow the mounting instructions in the user manual can cause temperature derating. Visit [ni.com/info](https://ni.com/info) and enter Info Code `criomounting` for more information about mounting configurations and temperature derating.

|                                     |                                 |
|-------------------------------------|---------------------------------|
| Ingress protection                  | IP 40                           |
| Operating humidity (IEC 60068-2-56) | 10% RH to 90% RH, noncondensing |
| Storage humidity (IEC 60068-2-56)   | 5% RH to 95% RH, noncondensing  |
| Pollution Degree (IEC 60664)        | 2                               |
| Maximum altitude                    | 5,000 m                         |

Indoor use only.

# Hazardous Locations

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|   |   |
|---|---|
| U.S. (UL)                               | Class I, Division 2, Groups A, B, C, D, T4;<br>Class I, Zone 2, AEx nA IIC T4 |
| Canada (C-UL)                           | Class I, Division 2, Groups A, B, C, D, T4;<br>Class I, Zone 2, Ex nA IIC T4  |
| Europe (ATEX) and International (IECEX) | Ex nA IIC T4 Gc   |

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## Shock and Vibration

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To meet these specifications, you must mount the system directly on a flat, rigid surface as described in the user manual, affix ferrules to the ends of the terminal lines, and provide strain relief for all cables.

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### Operating vibration

|                                  |   |
|----------------------------------|---|
| Random (IEC 60068-2-64)          | 5 g <sub>rms</sub> , 10 Hz to 500 Hz  |
| Sinusoidal (IEC 60068-2-6)       | 5 g, 10 Hz to 500 Hz  |
| Operating shock (IEC 60068-2-27) | 30 g, 11 ms half sine; 50 g, 3 ms half sine;<br>18 shocks at 6 orientations |

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## Safety and Hazardous Locations Standards

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

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1
- EN 60079-0:2012, EN 60079-15:2010
- IEC 60079-0: Ed 6, IEC 60079-15; Ed 4
- UL 60079-0; Ed 5, UL 60079-15; Ed 3
- CSA 60079-0:2011, CSA 60079-15:2012



**Note** For UL and other safety certifications, refer to the product label or the [Online Product Certification](#) section.

# Electromagnetic Compatibility

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This product meets the requirements of the following EMC standards for sensitive electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Industrial immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions



**Note** For the standards applied to assess the EMC of this product, refer to the [Online Product Certification](#) section.

## CE Compliance

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This product meets the essential requirements of applicable European Directives, as follows:

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 94/9/EC; Potentially Explosive Atmospheres (ATEX)

## Online Product Certification

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Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for this product, visit [ni.com/certification](https://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Environmental Management

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NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at [ni.com/environment](https://ni.com/environment). This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

## Waste Electrical and Electronic Equipment (WEEE)



**EU Customers** At the end of the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit [ni.com/environment/weee](https://ni.com/environment/weee).

## Battery Replacement and Disposal



**Battery Directive** This device contains a long-life coin cell battery. If you need to replace it, use the Return Material Authorization (RMA) process or contact an authorized National Instruments service representative. For more information about compliance with the EU Battery Directive 2006/66/EC about Batteries and Accumulators and Waste Batteries and Accumulators, visit [ni.com/environment/batterydirective](https://ni.com/environment/batterydirective).

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