

---

# cDAQ-9171

---

2023-04-03



# Contents

cDAQ-9171 Specifications..... 3

# cDAQ-9171 Specifications

These specifications are for the cDAQ-9171 chassis only. These specifications are typical at 25 °C unless otherwise noted. For the C Series module specifications, refer to the documentation for the C Series module you are using.

## Analog Input

|                                    |                                   |
|------------------------------------|-----------------------------------|
| Input FIFO size                    | 127 samples                       |
| Maximum sample rate <sup>[1]</sup> | Determined by the C Series module |
| Timing accuracy <sup>[2]</sup>     | 50 ppm of sample rate             |
| Timing resolution <sup>[2]</sup>   | 12.5 ns                           |
| Number of channels supported       | Determined by the C Series module |

## Analog Output

|                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>Number of channels supported</b> |                                     |
| <b>Hardware-timed task</b>          |                                     |
| Onboard regeneration                | 16                                  |
| Non-regeneration                    | Determined by the C Series module   |
| <b>Non-hardware-timed task</b>      |                                     |
| Determined by the C Series module   |                                     |
| <b>Maximum update rate</b>          |                                     |
| Onboard regeneration                | 1.6 MS/s (multi-channel, aggregate) |
|                                     |                                     |

|                         |  |
|-------------------------|--|
| Non-regeneration        | Determined by the C Series module  |
| Timing accuracy         | 50 ppm of sample rate  |
| Timing resolution       | 12.5 ns  |
| <b>Output FIFO size</b> |  |
| Onboard regeneration    | 8,191 samples shared among channels used   |
| Non-regeneration        | 127 samples  |
| AO waveform modes       | Non-periodic waveform,<br><br>periodic waveform regeneration mode from onboard memory,<br><br>periodic waveform regeneration from host buffer including dynamic update |

## Digital Waveform Characteristics

|   |                  |
|---|------------------|
| <b>Waveform acquisition (DI) FIFO</b>       |                  |
| Parallel modules                            | 511 samples      |
| Serial modules                              | 63 samples       |
| <b>Waveform generation (DO) FIFO</b>        |                  |
| Parallel modules                            | 2,047 samples    |
| Serial modules                              | 63 samples       |
| <b>Digital input sample clock frequency</b> |                  |
| Streaming to application memory             | System-dependent |

|  |                  |
|--|------------------|
| Finite                                       | 0 MHz to 10 MHz  |
| <b>Digital output sample clock frequency</b> |                  |
| Streaming from application memory            | System-dependent |
| Regeneration from FIFO                       | 0 MHz to 10 MHz  |
| Finite                                       | 0 MHz to 10 MHz  |
| Timing accuracy                              | 50 ppm           |

## General-Purpose Counters/Timers

|                               |   |
|-------------------------------|---|
| Number of counters/timers     | 4   |
| Resolution                    | 32 bits   |
| Counter measurements          | Edge counting, pulse, semi-period, period, two-edge separation, pulse width           |
| Position measurements         | X1, X2, X4 quadrature encoding with Channel Z reloading; two-pulse encoding           |
| Output applications           | Pulse, pulse train with dynamic updates, frequency division, equivalent time sampling |
| Internal base clocks          | 80 MHz, 20 MHz, 100 kHz   |
| External base clock frequency | 0 MHz to 20 MHz   |
| Base clock accuracy           | 50 ppm  |
| Output frequency              | 0 MHz to 20 MHz   |

|                            |   |
|----------------------------|---|
| Inputs                     | Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down           |
| Routing options for inputs | Any module PFI, analog trigger, many internal signals |
| FIFO                       | Dedicated 127-sample FIFO                             |

## Frequency Generator

|                     |                         |
|---------------------|-------------------------|
| Number of channels  | 1                       |
| Base clocks         | 20 MHz, 10 MHz, 100 kHz |
| Divisors            | 1 to 16 (integers)      |
| Base clock accuracy | 50 ppm                  |
| Output              | Any module PFI terminal |

## Module PFI Characteristics

|                                      |   |
|--------------------------------------|---|
| Functionality                        | Static digital input, static digital output, timing input, and timing output                |
| Timing output sources <sup>[3]</sup> | Many analog input, analog output, counter, digital input, and digital output timing signals |
| Timing input frequency               | 0 MHz to 20 MHz   |
| Timing output frequency              | 0 MHz to 20 MHz   |

## Digital Triggers

|                        |  |
|------------------------|--|
| Source                 | Any module PFI terminal  |
| Polarity               | Software-selectable for most signals   |
| Analog input function  | Start Trigger, Reference Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase |
| Analog output function | Start Trigger, Pause Trigger, Sample Clock, Sample Clock Timebase                    |
| Counter/timer function | Gate, Source, HW_Arm, Aux, A, B, Z, Up_Down  |

## Module I/O States

|             |  |
|-------------|--|
| At power-on | Module-dependent. Refer to the documentation for each C Series module. |
|-------------|--|

## Bus Interface

|                               |   |
|-------------------------------|---|
| USB specification             | USB 2.0 Hi-Speed  |
| High-performance data streams | 6   |
| Data stream types available   | Analog input, analog output, digital input, digital output, counter/timer input, counter/timer output, NI-XNET <sup>[4]</sup> |



**Note** If you are connecting the NI cDAQ-9171 to a USB hub, the hub must be externally powered.

## Power Requirements



**Caution** The protection provided by the NI cDAQ-9171 chassis can be impaired if it is used in a manner not described in this document.



**Note** Some C Series modules have additional power requirements. For more information about C Series module power requirements, refer to the documentation for each C Series module.



**Note** Sleep mode for C Series modules is not supported in the NI cDAQ-9171.

|                            |                     |
|----------------------------|---------------------|
| Power consumption from USB | 5 V, 500 mA maximum |
| Suspend mode               | 2.5 mA maximum      |

## Physical Characteristics

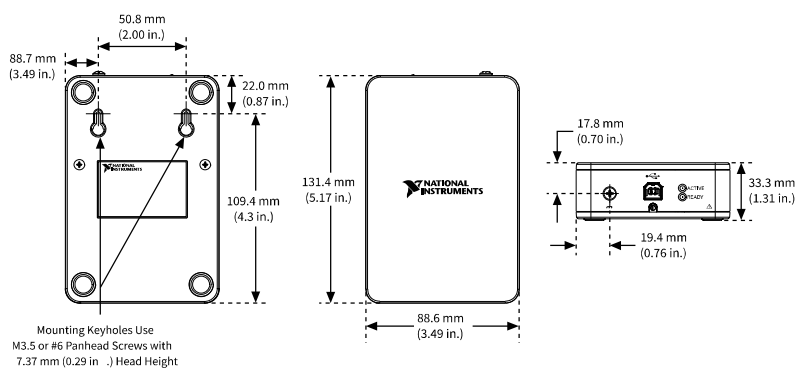
|                                 |   |
|---------------------------------|---|
| Weight (unloaded)               | 353 g (12.5 oz)   |
| Dimensions (unloaded)           | 131.4 mm × 88.6 mm × 33.3 mm<br>(5.17 in. × 3.49 in. × 1.31 in.) Refer to the following figure. |
| <b>USB connector securement</b> |   |
| USB securement type             | Jackscrew provided on locking USB cable (part number 198506-01 or 780534-01)                    |
| Torque for jackscrew            | 0.41 N · m (3.6 lb · in.)   |
| <b>Chassis ground</b>           |   |



|                         |  |
|-------------------------|--|
| Gauge                   | 1.31 mm <sup>2</sup> (16 AWG) or larger wire |
| Torque for ground screw | 0.76 N · m (6.7 lb · in.)                    |

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

Figure 1. NI cDAQ-9171 Dimensions



## Environmental

|   |                              |
|---|------------------------------|
| Operating temperature (IEC-60068-2-1 and IEC-60068-2-2) | -20 °C to 55 °C              |
| Storage temperature (IEC-600068-2-1 and IEC-60068-2-2)  | -40 °C to 85 °C              |
| Operating humidity (IEC-60068-2-56)                     | 10% to 90% RH, noncondensing |
| Storage humidity (IEC-60068-2-56)                       | 5% to 95% RH, noncondensing  |
| Pollution Degree (IEC 60664)                            | 2                            |
| Maximum altitude  | 5,000 m                      |

Indoor use only.

## Hazardous Locations

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

## Shock and Vibration

To meet these specifications, you must panel mount the NI cDAQ-9171 system, use an NI locking USB cable, and affix ferrules to the ends of the terminal lines.

|                         |  |
|-------------------------|--|
| Operational shock       | 30 g peak, half-sine, 11 ms pulse (Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)                          |
| <b>Random vibration</b> |  |
| Operating               | 5 Hz to 500 Hz, 0.3 g <sub>rms</sub>   |
| Non-operating           | 5 Hz to 500 Hz, 2.4 g <sub>rms</sub> (Tested in accordance with IEC 60068-2-64. Non-operating test profile exceeds the requirements of MIL PRF-28800F, Class 3.) |

## Safety and Hazardous Locations Standards

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 6, UL 60079-15; Ed 4
- 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

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

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions



**Note** In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.



**Note** Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.



**Note** For EMC declarations and certifications, and additional information, refer to the [Online Product Certification](#) section.

## CE Compliance

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)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

## Online Product Certification

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](http://ni.com/certification), search by model number or product line, and click the appropriate link in the Certification column.

## Environmental Management

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](http://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).

## 电子信息产品污染控制管理办法（中国 RoHS）

**中国客户** National Instruments 符合中国电子信息产品中限制使用某些有害物质指令(RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 [ni.com/environment/rohs\\_china](https://ni.com/environment/rohs_china)。(For information about China RoHS compliance, go to [ni.com/environment/rohs\\_china](https://ni.com/environment/rohs_china).)

<sup>1</sup> Performance dependent on type of installed C Series module and number of channels in the task.

<sup>2</sup> Does not include group delay. For more information, refer to the documentation for each C Series module.

<sup>3</sup> Actual available signals are dependent on type of installed C Series module.

<sup>4</sup> When a session is active, CAN or LIN (NI-XNET) C Series modules use a total of two data streams regardless of the number of NI-XNET modules in the chassis.