# cDAQ-9179 Specifications

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# Contents

# cDAQ-9179 Specifications

## Definitions

**Warranted** specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

**Characteristics** describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- **Typical** specifications describe the performance met by a majority of models.
- **Nominal** specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are **Typical** unless otherwise noted.

## Conditions

Specifications are valid at 25 °C unless otherwise noted.

## Analog Input

| | |
|---|---|
| Input FIFO size | 127 samples per slot |
| Maximum sample rate[1] | Determined by the C Series module or modules |
| Timing accuracy[2] | 50 ppm of sample rate |
| Timing resolution[2] | 12.5 ns |

| | |
|---|---|
| Number of channels supported | Determined by the C Series module or modules |

# Analog Output

| | |
|---|---|
| **Number of channels supported** | |
| **Hardware-timed task** | |
| Onboard regeneration | 16 |
| Non-regeneration | Determined by the C Series module or modules |
| Non-hardware-timed task | Determined by the C Series module or modules |
| **Maximum update rate** | |
| Onboard regeneration | 1.6 MS/s (multi-channel, aggregate) |
| Non-regeneration | Determined by the C Series module or modules |
| Timing accuracy | 50 ppm of sample rate |
| Timing resolution | 12.5 ns |
| **Output FIFO size** | |
| Onboard regeneration | 8,191 samples shared among channels used |
| Non-regeneration | 127 samples per slot |
| 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

| | |
|---|---|
| **Waveform acquisition (DI) FIFO** | |
| Parallel modules | 511 samples per slot |
| Serial modules | 63 samples per slot |
| **Waveform generation (DO) FIFO** | |
| **Parallel modules** | |
| Slots 1 to 4 | 2,047 samples per slot |
| Slots 5 to 7 | 1,023 samples per slot |
| Slots 8 to 10 | 2,047 samples per slot |
| Slots 11 to 14 | 1,023 samples per slot |
| Serial modules | 63 samples per slot |

**Note** When parallel modules in a digital task are in slots 1 through 4 or slots 8 through 10, FIFO is 2,047 samples per slot for all slots. When parallel modules in a digital task are in slots 5 through 7 or slots 11 through 14, FIFO is 1,023 samples per slot for all 14 slots.

| | |
|---|---|
| **Digital input sample clock frequency** | |
| Streaming to application memory | System-dependent |
| Finite | 0 MHz to 10 MHz |
| **Digital output sample clock frequency** | |
| 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,chassis 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 chassis PFI or module PFI terminal |

## Module PFI Characteristics

| | |
|---|---|
| Functionality | Static digital input, static digital output, timing input, and timing output |
| Timing output sources[3] | 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 |

## Chassis PFI Characteristics

| | |
|---|---|
| Maximum input or output frequency | 1 MHz |
| Cable length | 3 m (10 ft) |

| | |
|---|---|
| Cable impedance | 50 Ω |
| PFI 0, PFI 1 | BNC |
| Power-on state | High impedance |

**Table 1.** Input/Output Voltage Protection

| Voltage | Minimum | Maximum |
|---|---|---|
| Input | -20 V | 25 V |
| Output | -15 V | 20 V |

| **Maximum operating conditions**[4] | |
|---|---|
| $I_{OL}$ output low current | 8 mA maximum |
| $I_{OH}$ output high current | -8 mA maximum |

**Table 2.** DC Input Characteristics

| Voltage | Minimum | Maximum |
|---|---|---|
| Positive going threshold | 1.43 V | 2.28 V |
| Negative going threshold | 0.86 V | 1.53 V |
| Hysteresis | 0.48 V | 0.87 V |

**Table 3.** DC Output Characteristics

| Voltage | Conditions | Minimum | Maximum |
|---|---|---|---|
| High | — | — | 5.25 V |
| | Sourcing 100 µA | 4.65 V | — |
| | Sourcing 2 mA | 3.60 V | — |
| | Sourcing 3.5 mA | 3.44 V | — |
| Low | Sinking 100 µA | — | 0.10 V |
| | Sinking 2 mA | — | 0.64 V |
| | Sinking 3.5 mA | — | 0.80 V |

## Digital Triggers

| | |
|---|---|
| Source | Any chassis PFI or module PFI terminal |
| Polarity | Software-selectable for most signals |
| Analog input function | Start Trigger,<br>Reference Trigger,Pause Trigger,Sample Clock,<br>Sample Clock Timebase |
| Analog output function | Start Trigger,<br>Pause Trigger,Sample Clock,<br>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 3.0 SuperSpeed |
| **High-performance data streams** | |
| In SuperSpeed mode | 12 |
| In Hi-Speed mode | 8 |

| | |
|---|---|
| Data stream types available | Analog input, analog output, digital input, digital output, counter/timer input, counter/timer output, NI-XNET[5] |

## Power Requirements

**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 cDAQ-9179.

| | |
|---|---|
| Voltage input range | 9 to 30 V (measured at the cDAQ-9179 power connector) |
| Maximum power consumption[6] | 25 W |

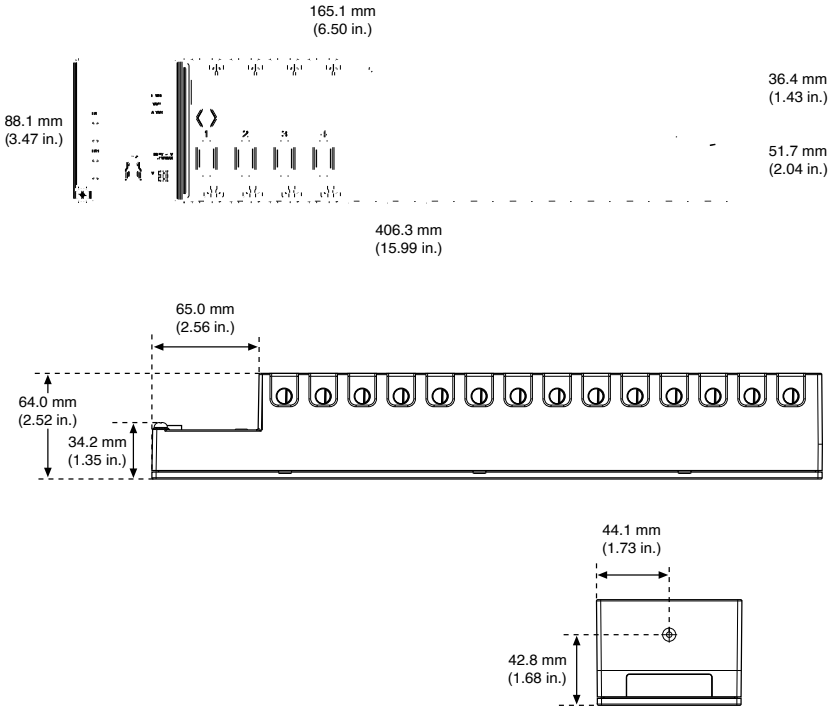
**Note** The maximum power consumption specification is based on a fully populated system running a high-stress application at elevated ambient temperature and with all C Series modules consuming the maximum allowed power.

| | |
|---|---|
| Power input connector | 2 positions 3.5 mm pitch mini-combicon screw terminal with screw flanges, Sauro CTMH020F8-0N001 |
| Power input mating connector | Sauro CTF02BV8, Phoenix Contact 1714977, or equivalent |
| Power consumption from USB, 4.10 V to 5.25 V | 500 µA maximum |

# Physical Characteristics

| | |
|---|---|
| Weight (unloaded) | 1.46 kg (51.7 oz) |
| Dimensions (unloaded) | 406.3 mm × 88.1 mm × 64.0 mm (15.99 in. x 3.47 in. × 2.52 in.) Refer to the following figure. |
| **USB connector securement** | |
| 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.) |
| **Chassis ground** | |
| Gauge | 1.31 $mm^2$ (16 AWG) or larger wire |
| Torque for ground screw | 0.76 N · m (6.7 lb · in.) |

**Figure 1.** cDAQ-9179 Dimensions




# Safety Voltages

Connect only voltages that are below these limits.

| | |
|---|---|
| V terminal to C terminal | 30 V max, Measurement Category I |
| Chassis ground to C terminal | 30 V max, Measurement Category I |

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

# Environmental Characteristics

| **Temperature** |
|---|

| | |
|---|---|
| Operating temperature[7] | -20 °C to 55 °C |
| Storage | -40 °C to 85 °C |
| Ingress protection | IP 40 |
| **Humidity** | |
| Operating | 10% to 90% RH, noncondensing |
| Storage | 5% to 95% RH, noncondensing |
| Pollution Degree | 2 |
| Maximum altitude | 5,000 m |

## Shock and Vibration

To meet these specifications, you must panel mount the cDAQ-9179 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 |
| **Random vibration** | |
| Operating | 5 Hz to 500 Hz,0.3 $g_{rms}$ |
| Non-operating | 5 Hz to 500 Hz,2.4 $g_{rms}$ |

## Safety Compliance 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 C22.2 No. 61010-1

**Note** For safety certifications, refer to the product label or the Product Certifications and Declarations section.

## Electromagnetic Compatibility

## CE Compliance CE

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)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)
- 2014/53/EU; Radio Equipment Directive (RED)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

## Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

## 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 **Engineering a Healthy Planet** web page at 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.

## EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—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.

## 电子信息产品污染控制管理办法（中国 RoHS）

- **中国 RoHS**— NI 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 NI 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)