

## SPECIFICATIONS

# cDAQ™ -9179

14-Slot, USB 3.0 CompactDAQ Chassis

## Definitions

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

The following characteristic specifications 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

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Specifications are valid at 25 °C unless otherwise noted.

## Analog Input

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Input FIFO size	127 samples per slot
Maximum sample rate <sup>1</sup>	Determined by the C Series module or modules
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 or modules

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<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.

# 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, periodic waveform regeneration mode from onboard memory, 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 <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

## Chassis PFI Characteristics

Maximum input or output frequency	1 MHz
Cable length	3 m (10 ft)
Cable impedance	50 $\Omega$
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<sup>4</sup>

$I_{OL}$ output low current	8 mA maximum
$I_{OH}$ output high current	-8 mA maximum

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

<sup>4</sup> Stresses beyond those listed under *Maximum operating conditions* may cause permanent damage to the chassis.

**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 $\mu$ A	4.65 V	—
	Sourcing 2 mA	3.60 V	—
	Sourcing 3.5 mA	3.44 V	—
Low	Sinking 100 $\mu$ A	—	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, 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

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At power-on

Module-dependent. Refer to the documentation for each C Series module.

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**Note** The cDAQ-9179 may revert the input/output of the modules to their power-on state when the USB cable is removed.

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## Bus Interface

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USB specification

USB 3.0 SuperSpeed

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High-performance data streams

In SuperSpeed mode

12

In Hi-Speed mode

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Data stream types available

Analog input, analog output, digital input, digital output, counter/timer input, counter/timer output, NI-XNET<sup>5</sup>

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## Power Requirements

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**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)

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Maximum power consumption<sup>6</sup>

25 W

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<sup>5</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.

<sup>6</sup> Includes maximum 1 W module load per slot across rated temperature and product variations.



**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.

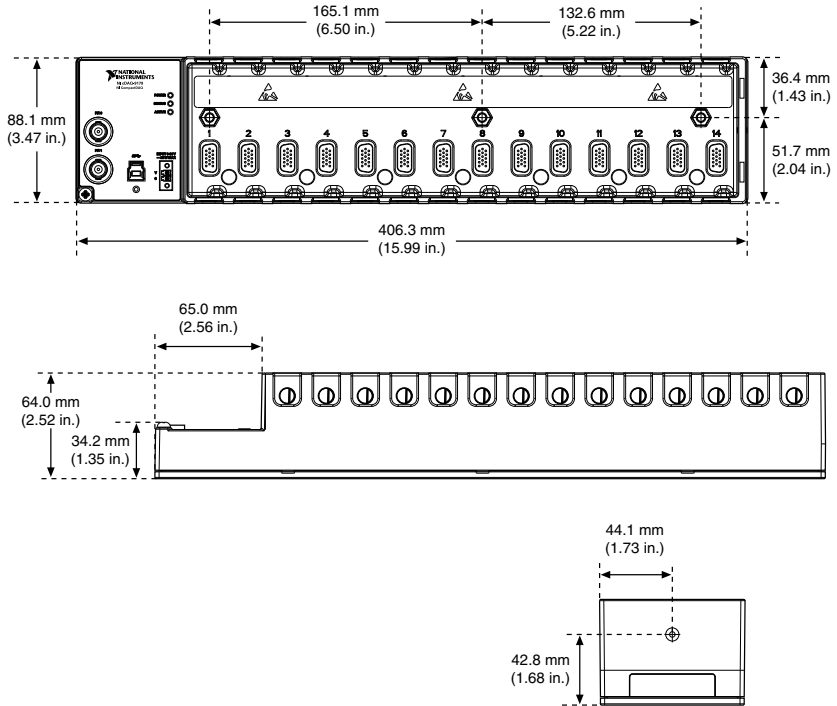
Power input connector	2 positions 3.5 mm pitch mini-combicon screw terminal with screw flanges, Sauro CTMH020F8-0N001
Power input mating connector	Sauro CTF02BV8, Phoenix Contact 1714977, or equivalent
Power consumption from USB, 4.10 V to 5.25 V	500 $\mu$ A maximum

## Physical Characteristics

Weight (unloaded)	1.46 kg (51.7 oz)
Dimensions (unloaded)	406.3 mm $\times$ 88.1 mm $\times$ 64.0 mm (15.99 in. $\times$ 3.47 in. $\times$ 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 $\cdot$ m (3.6 lb $\cdot$ in.)
Chassis ground	
Gauge	1.31 mm <sup>2</sup> (16 AWG) or larger wire
Torque for ground screw	0.76 N $\cdot$ m (6.7 lb $\cdot$ in.)

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

**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

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 cDAQ-9179 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 for other circuits not intended for direct connection to the



## Environmental

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Operating temperature <sup>7</sup>	-20 °C to 55 °C
Storage temperature (IEC-600068-2-1 and IEC-60068-2-2)	-40 °C to 85 °C
Ingress protection	IP 40
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.

## Shock and Vibration

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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 (Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)
Random vibration	
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.)

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<sup>7</sup> When operating the cDAQ-9179 in temperatures below 0 °C, you must use the PS-15 power supply or another power supply rated for below 0 °C.

# Safety

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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 C22.2 No. 61010-1



**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 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

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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)

# 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).

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