cDAQ-9179 Specifications

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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, 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[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

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

Table 1. Input/Output Voltage Protection

Maximum operating conditions[4]

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

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 2. DC Input Characteristics

Voltage	Conditions	Minimum	Maximum
High	—	—	5.25 V
	Sourcing 100 µA	4.65 V	—
	Sourcing 2 mA	3.60 V	—

Voltage	Conditions	Minimum	Maximum
	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

Table 3. DC Output Characteristics

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

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.

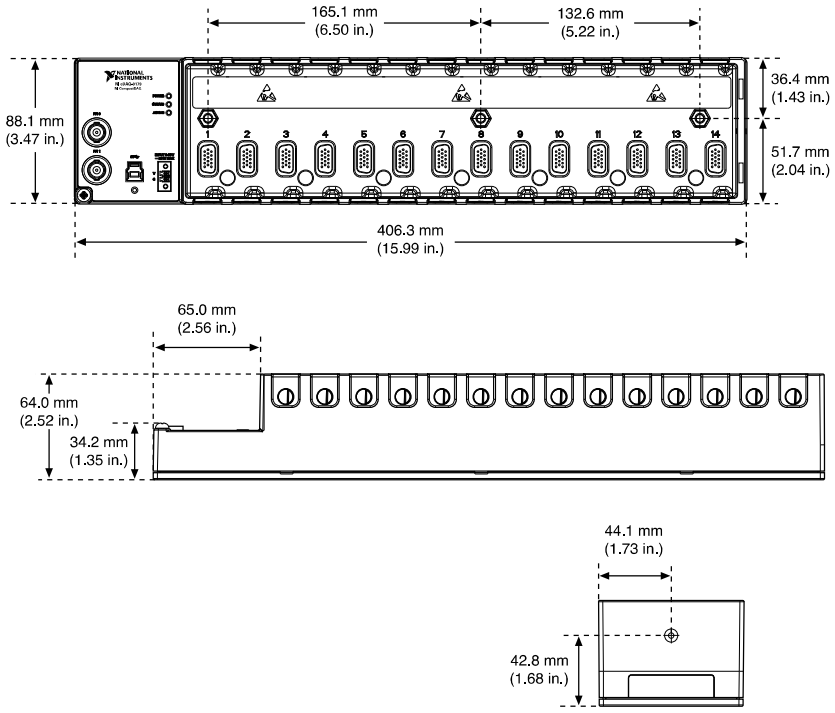
USB connector securement

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.)

[1] Performance dependent on type of installed C Series module and number of channels in the task.

[2] Does not include group delay. For more information, refer to the documentation for each C Series module.

[3] Actual available signals are dependent on type of installed C Series module.

[4] Stresses beyond those listed under **Maximum operating conditions** may cause permanent damage to the chassis.

[5] 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.

[6] Includes maximum 1 W module load per slot across rated temperature and product variations.

[7] 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.